3GPP TSG-RAN WG4 Meeting # 109 R4-2321822

Chicago, US, November 13 – 17, 2023

**Agenda item:** 10

**Source:** CMCC

**Title:** Rel-18 RAN4 UE feature list for NR

**Document for:** Approval

1. Introduction

This contribution includes the RAN4 UE feature list for Rel-18 NR. The previous Rel-18 RAN4 UE feature list is R4-2321797.

1. NR\_ENDC\_RF\_FR1\_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 (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** |
|  27. NR\_ENDC\_RF\_FR1\_enh2 | [27-1] | TxDiversity for 4Tx | Indicates UE supports Tx diversity for 4Tx. |  | Yes | N/A | 4Tx TxD cannot be supported and verified | [Per FS] | No | FR1 only | N/A |  | Optional with capability signalling |
| 27. NR\_ENDC\_RF\_FR1\_enh2 | 27-2 | LowerMSD for inter-band NR CA and EN-DC  | Capability to indicate better MSD performance than the specified minimum requirements. [The essential information of this capability includes: - victim band and aggressor band(s) of the band combination - MSD type - Lower-MSD capability class- power class] |  | Yes |  | The UE shall comply with the minimum requirements for MSD. | Per band  | No |  FR1 only | Support mixture of FDD/TDD |  | Optional with capability signalling |

1. NR\_channel\_raster\_enh

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| 28. NR\_channel\_raster\_enh | 28-1 | Enhanced channel raster | The UE supports the requirements for UE channel bandwidths located on the enhanced channel raster of a band as specified in TS 38.101-1, 38.101-4, TS 38.101-5 [and in TS38.133] | N/A | Yes |  | [N/A (not defined)] | Per Band | No | FR1 only | The feature is supported for applicable bands in FDD-TDD and FR1/FR2 combinations | Applies only for bands with a 100 kHz channel raster for both TN and NTN. | FFS |

1. NR\_RF\_FR2\_req\_Ph3

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| 29. NR\_RF\_FR2\_req\_Ph3 | 29-1 |  |  |  |  |  |  |  |  |  |  |  |  |

1. NR\_FR2\_multiRX\_DL

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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 |
| 30. NR\_FR2\_multiRX\_DL | 30-1 |  |  |  |  |  |  |  |  |  |  |  |  |

1. NR\_RRM\_enh3 (input from moderator)

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| 31. NR\_RRM\_enh3 | 31-1 | Enhanced L3 measurement reporting for unknown SCell activation if the valid L3 measurement results are available | Support of reporting valid L3 measurement results triggered by the SCell activation command |  | Yes | N/A | UE does not support reporting valid L3 measurement results triggered by SCell activation command | Per UE | No | No | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported, including single SCell activation, single PUCCH SCell activation, and multiple SCell activation with/without PUCCH SCell. | Optional with capability signaling |
| 31. NR\_RRM\_enh3 | 31-2 | Beam sweeping factor reduction for FR2 unknown SCell activation | Support of reducing beam sweeping factor for cell detection if UE has full set (N=8) of beam sweeping during AGC settling part during FR2-1 unknown SCell activation procedureSupport of reducing beam sweeping factor for SSB based L1-RSRP measurement if UE has full set (N=8) of beam sweeping during AGC settling part during FR2-1 unknown SCell activation procedure |  | Yes | N/A | UE does not support beam sweeping factor reduction for cell detection during FR2-1 unknown SCell activation.UE does not support beam sweeping factor reduction for SSB based L1-RSRP measurement during FR2-1 unknown SCell activation. | Per Band | TDD onl | FR2-1 only | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported.Candidate values for beam sweeping reduction for cell detection during FR2-1 unknown SCell activation are 1,2,4, or 6. [Agreed in WF R4-2310081]Candidate values for beam sweeping reduction for SSB based L1-RSRP measurement during FR2-1 unknown SCell activation are 0,1,2,3,4,5,6, or 7. [Agreed in WF R4-2310081] | Optional with capability signaling |
| 31. NR\_RRM\_enh3 | 31-3 | Shorter measurement interval for unknown SCell activation | (1) Support of using SSB periodicity instead of SMTC periodicity for the measurement interval during unknown SCell activation when the SMTC is only configured in measurement object for enhanced unknown SCell activation requirement.(2) Support of performing L1-RSRP measurement in non-DRX mode even DRX is configured during unknown SCell activation |  | Yes | N/A | UE does not use SSB periodicity instead of SMTC periodicity for the measurement interval during unknown SCell activation when the SMTC is only configured in MO for enhanced unknown Scell activation requirement.UE does not support performing L1-RSRP measurement in non-DRX mode even DRX is configured during unknown SCell activation | Per UE | No | No | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported. | Optional with capability signaling |

1. NR\_MG\_enh2 (input from moderator)

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| NR\_MG\_enh2 | [32-1] | Concurrent gap with Pre-MG in a FR | Support of multiple per-UE (or per-FR) measurement gap patterns with at least one per-UE (or per-FR) Pre-MG. Detail in Clause [9.1.x.2] of TS 38.133.  | 19-3-x and 19-2x = 1 or 2  | Yes | No | Network should not configure concurrent gap with Pre-MG | Per UE | No | No | N.A |  | Optional with capability signalling  |
| NR\_MG\_enh2 | [32-2] | 2 Pre-MG configuration with simultaneous activation/deactivation | Support configurations of 2 Pre-MG with simultaneous activation/deactivation in the same FR.  | 32-1 | Yes | No | Unknown activation time for simultaneous Pre-MG is expected | Per UE | No | No | N.A |  | Optional with capability signalling  |
| NR\_MG\_enh2 | [32-3] | Dynamic collision | Support the RRM requirements when the activation/deactivation delay of Pre-MG overlaps the other measurement gap with lower priority or Pre-MG | 32-1 | Yes | No | UE is not expected to meet the requirements | Per UE | No | No | N.A |  | Optional with capability signalling  |
| NR\_MG\_enh2 | [32-4] | Concurrent gap with NCSG in a FR | Support of multiple per-UE (or per-FR) measurement gap patterns with at least one per-UE (or per-FR) NCSG. Detail in clause [9.1.y.2] of TS 38.133.  | 19-1 and 19-2 | Yes | No | Network should not configure concurrent gap with NCSG | Per UE | No | No | N.A |  | Optional with capability signalling  |
| NR\_MG\_enh2 | [32-5] | 2 NCSG configuration in a FR | Support configurations of 2 NCSG in the same FR | 32-4 | Yes | No | Network should not configure 2 NCSG in the same FR | Per UE | No | No | N.A |  | Optional with capability signalling  |
| NR\_MG\_enh2 | [32-6] | Need for interruption  | UE capability to indicate whether interruption is needed when UE reports “no-gap” in NeedForGapsInfoNR | nr-NeedForGap-Reporting-r16 | yes | no | Network cannot know whether the UE can repport NeedForInterruptionInfoNR | Per UE | No | No | N.A |  | Optional with capability signalling |
| NR\_MG\_enh2 | [32-7] | [Inter-RAT EUTRAN measurements without gap and outside active DL BWP] | 1. Support of requirements of inter-RAT EUTRAN measurements outside active DL BWP without gap with or without interruption.FFS: Whether this could be coupled or related to the capability of EMW supporting. |  | Yes | NA | UE behaviour of supporting inter-RAT EUTRAN measurements without gap is known to network | [Per UE] | No | No | N.A |  | Optional with capability signalling |
| NR\_MG\_enh2 | [32-8] | Inter-RAT EUTRAN measurement without gap [and within active DL BWP] | Support of inter-RAT EUTRAN measurements without gap when CRS is contained within UE’s active DL BWP | [32-9] | Yes | No | Measurement gap will be needed for inter-RAT EUTRAN measurements | Per UE | No | FR1 only | N.A |  | Optional with capability signalling |
| NR\_MG\_enh2 | [32-9] | Effective measurement window for inter-RAT EUTRAN measurements | Support configuration of effective measurement window for inter-RAT EUTRAN measurements, including offset, duration and periodicity.  | [32-7 or 32-8] | Yes | No | Undefined UE measurement behavior and when to allow scheduling restriction | Per UE | No | No | N.A | * A bitmap for 6 effective measurement window (EMW) patterns defined in TS 38.133.
* TBD which patterns(s) are mandatory supported
 | Optional with capability signalling |
| NR\_MG\_enh2 | [32-10] | SimultaneousRxDataCRS-DiffNumerology | Support concurrent inter-RAT measurement on EUTRAN cell in non-DSS with CRS contained within UE’s active DL BWP and PDCCH or PDSCH reception from the serving cell with a different numerology |  32-8 | Yes | No | scheduling restriction is applicable | Per UE | No | FR1 only | N.A |  | Optional with capability signalling |
| 32. NR\_MG\_enh2 | [32-11]] | Inter-RAT NR measurement without gap  | Support of inter-RAT NR measurements without gap with or without interruption |  | Yes | NA | The UE does not support inter-RAT NR measurements without gap with or without interruption for performing inter-RAT NR measurement without gap | Per UE | No | No | NA | RAN2 implemented already as interRAT-NeedForIntrNR-r18.  | Optional with capability signalling |
| Note: FG 32-11 is LTE feature group |

1. NonCol\_intraB\_ENDC\_NR\_CA

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| 33. NonCol\_intraB\_ENDC\_NR\_CA | 33-1 | Support of intra-band non-collocated NR CA operation | Indicates the UE supports TDD-TDD intra-band non-collocated NR-CA operation with MTTD/MRTD requirements according to Table 7.5.4.1/Table 7.6.4-2 in 38.133 [5] and UE RF requirements for intra-band non-collocated NR-CA including 7.10A in 38.101-1 [2]. And the UE also supports TDD-TDD intra-band NR-CA operation with MRTD according to Table 7.6.4-1 in 38.133 and UE RF requirements for intra-band NR-CA except for 7.10A in 38.101-1 [2]. |  | Yes | N/A | Intra-band non-collocated NR CA operation is not supported. The UE supports TDD-TDD intra-band NR-CA operation with MRTD according to Table 7.6.4-1 in 38.133 and UE RF requirements for intra-band NR-CA except for 7.10A in 38.101-1. | Per BC | N/A | FR1 only | N/A | Supported for band n77/n78 only | Optional with capability signaling |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 33. NonCol\_intraB\_ENDC\_NR\_CA | 33-2 | Support network control of requirement applicability for UE supporting interBandMRDC-WithOverlapDL-Bands-r16 | For Rel-18, introduce a new UE capability which indicates support network control of requirement applicability for UE supporting interBandMRDC-WithOverlapDL-Bands-r16. This field is only applicable to the UE indicating interBandMRDC-WithOverlapDL-Bands-r16.. | 2-19(Rel-16 RAN4 feature) | Yes | N/A | The UE will support “interBandMRDC-WithOverlapDL-Bands-r16” only which means in Rel-18 the network can’t enforce modification on the UE types | [per UE] | N/A | FR1 Only | N/A |  | Optional with capability signalling |
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1. NR\_HST\_FR2\_enh (**input from moderator)**

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| 34-1 | Support of NR FR2 HST with simultaneous DL reception with [two different QCL TypeD RSs]  | [1) Support of enhanced RF requirement to support FR2-1 PC6 UEs with simultaneous DL reception with two different QCL TypeD RSs]2) Support of enhanced RRM requirement to support FR2-1 PC6 UEs with simultaneous DL reception with [two different QCL TypeD RSs][3) Support of enhanced demodulation processing to support FR2-1 PC6 UEs with simultaneous DL reception with two different QCL TypeD RSs] | 22-1, [16-2c] | Yes | N/A | UE does not support FR2 high speed train scenario with simultaneous DL reception with [two different QCL TypeD RSs] | [Per Band] | N/A No | FR2-1 only | N/A | FFS how to give the condition of bi-directional deployment | Optional with capability signaling |
| 34-2 | [Enhanced FR2 HST RRM requirements for intra-band CA and inter-frequency measurements in connected mode] | [1) Support of the RRM requirement for intra-band CA in connected mode to support FR2 high speed up to 350 km/h, as specified in TS 38.1332) Support of the RRM requirement for inter-frequency measurements in connected mode to support FR2 high speed up to 350 km/h, as specified in TS 38.133] | [22-1] | [Yes] | [N/A] | [The performance of intra-frequency measurement on SCC and/or inter-frequency measurements in connected mode for NR FR2 HST scenario cannot be guaranteed] | [Per UE] | No | FR2-1 only | N/A |   | Optional with capability signaling |
| 34-3 | [Enhanced FR2 HST RRM requirements for inter-frequency measurement in Idle and Inactive mode] | [Support of the RRM requirement for inter-frequency measurements in idle and Inactive mode to support FR2 high speed up to 350 km/h, as specified in TS 38.133] | [22-1] | [No] | [N/A] | [The performance of inter-frequency measurement in idle and Inactive mode for FR2 HST scenario cannot be guaranteed] | [Per UE] | No | FR2-1 only | N/A |   | Optional without capability signaling |
| 34-4 | [Support of enhanced MAC CE for TCI state switch indication for FR2 HST] | [1. Support of enhanced large one-shot UL transmit timing adjustment as specified in TS 38.133 based on the new MAC CE named as [TBA] 2. Support of Power Class 6 UE requirements for TCI state switching delay requirement as specified in TS 38.133 based on the new MAC CE named as [TBA] ]   | FFS:Option 1: [22-2]Option 2: [22-1] | Yes | N/A | [UE does not support enhanced MAC CE for TCI state switch indication for FR2 HST] | [Per Band] | No | FR2-1 only | N/A |   | Optional with capability signalli |

1. NR\_ATG (input from moderator)

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| 35. NR\_ATG | 35-1 | Enhanced RRM requirements for measurements in IDLE and INACTIVE modes | Indicate the support of enhanced inter-frequency cell re-selection requirements for ATG (as specific in TS 38.133 Table 4.2D.2.4-2) |  | no | N/A | If UE does not support the capability, legacy measurement requirements (as specified in TS 38.133, Table 4.2D.2.4-1) are applied. | Per UE | No | FR1 only | N/A |  | Optional without capability signaling |
| 35. NR\_ATG | 35-2 | Antenna type | Indicate whether UE supports the RF and RRM requirements with antenna array as specified in TS 38.101-1 section 6.1J, 7.1J and TS 38.133. If the field is absent, the RF and RRM requirements with omni-directional antenna applies as specified in TS 38.101-1 section 6.1J, 7.1J and TS 38.133.  |  | yes | N/A | If UE does not support this feature group, performance cannot be guaranteed.  | Per Band | No | FR1 only | N/A |  | Mandatory with capability signaling for UE supports NR communication via ATG |
| 35. NR\_ATG | 35-3 | Rated max output power | Indicate the support of rated maximum output power at maximum modulation order and full PRB configurations |  | yes | N/A | If UE does not support the capability, network does not know ATG UE’s maximum output power. | Per band | No | FR1 only | N/A | Value range from 23dBm to 40dBm with 1dB as granularity | Mandatory with capability signaling for UE supports NR communication via ATG |
| 35. NR\_ATG | 35-4 | ATG specific P-max | Indicate the support of ATG specific P-max configured by network.  |  | no | N/A | If UE does not support ATG specific P-max value, ATG UE can’t identify configured maximum output power PCMAX,f,c | Per UE | No | FR1 only | N/A | Value range from -21dBm to 42dBm | Mandatory without capability signaling for UE supports NR communication via ATG |

1. NR\_demod\_enh3 (input from moderator)

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| 36. NR\_demod\_enh3 | 36-1 | MU-MIMO Interference Mitigation advanced receiver  | [1) R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO transmissions for total 2 layers across target and co-scheduled UEs with 2 RX antennas2) R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO transmissions for up to 2,3, or 4 total layers across target and co-scheduled UEs with 4 RX antennas.] | 3-4 | Yes | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO  | TBD  | No | FR1 only | N/A |  | Optional with capability signaling |

1. NR\_pos\_enh2 (input from moderator)

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| 37.NR\_pos\_enh2 | 37-1 | Support of reduced number of samples for PRS based positioning measurements with frequency hopping | 1. Support of reduced number of samples in PRS based positioning measurements with frequency hopping | RAN1 feature 28-1, 27-3-1, 45-5-1 | No | NA | RedCap UE does not support reduced number of samples for PRS based positioning measurements with frequency hopping | Per Band | No | No | NA | Component 1 candidate value: true/falseNeed for the LMF to know if the feature is supported: True | Optional with capability signalling |
| 37.NR\_pos\_enh2 | 37-2 | Support of reduced number of samples in positioning measurements with PRS bandwidth aggregation | 1. Support of reduced number of samples in positioning measurements with PRS bandwidth aggregation | Component 1 RAN1 feature 41-4-1 | No | NA | UE does not support reduced number of samples in positioning measurements with PRS bandwidth aggregation | Per Band | No | No | NA | Component 1 candidate value: true/falseNeed for the LMF to know if the feature is supported: True | Optional with capability signalling |

1. NR\_MC\_enh (input from moderator)

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| 38. NR\_MC\_enh | 38-1  | [Switching period for dynamic UL Tx switching across 3 bands in case of inter-band CA, SUL for single TAG]  | [UE to indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL.switchingPeriodFor2T-r18 indicates the length of 2Tx-2Tx switching period. switchingPeriodFor1T-r18 indicates the length of 1Tx-2Tx switching and/or 1Tx-1Tx switching period, as specified in TS 38.101-1. n35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1.] |  | Yes |  | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | [Per BC, details are up to RAN2] | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38. NR\_MC\_enh | 38-2  | [Switching period for dynamic UL Tx switching across 4 bands in case of inter-band CA, SUL for single TAG]  | [UE to indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL.switchingPeriodFor2T-r18 indicates the length of 2Tx-2Tx switching period. switchingPeriodFor1T-r18 indicates the length of 1Tx-2Tx switching and/or 1Tx-1Tx switching period, as specified in TS 38.101-1. n35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1.] |  | Yes |  | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | [Per BC, details are up to RAN2] | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38. NR\_MC\_enh | [38-3]  | [Switching period for dynamic UL Tx switching across 2 bands in case of inter-band CA, SUL for dual TAG]  | [UE to indicate support of dynamic UL Tx switching across 2 bands for inter-band UL CA, or SUL.switchingPeriodFor2T-r18 indicates the length of 2Tx-2Tx switching period. switchingPeriodFor1T-r18 indicates the length of 1Tx-2Tx switching and/or 1Tx-1Tx switching period, as specified in TS 38.101-1. n35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1.] |  | Yes |  | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | [Per BC, details are up to RAN2] | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38. NR\_MC\_enh | 38-4  | [Switching period for dynamic UL Tx switching across 3 bands in case of inter-band CA, SUL for dual TAG]  | [UE to indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL.switchingPeriodFor2T-r18 indicates the length of 2Tx-2Tx switching period. switchingPeriodFor1T-r18 indicates the length of 1Tx-2Tx switching and/or 1Tx-1Tx switching period, as specified in TS 38.101-1. N35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1.] |  | Yes |  | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | [Per BC, details are up to RAN2] | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38. NR\_MC\_enh | 38-5 | [Switching period for dynamic UL Tx switching across 4 bands in case of inter-band CA, SUL for dual TAG]  | [UE to indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL.switchingPeriodFor2T-r18 indicates the length of 2Tx-2Tx switching period. switchingPeriodFor1T-r18 indicates the length of 1Tx-2Tx switching and/or 1Tx-1Tx switching period, as specified in TS 38.101-1. n35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1.] |   | Yes |  | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | [Per BC, details are up to RAN2] | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38. NR\_MC\_enh  | 38-6 | [Application of DL interruptions due to dynamic UL Tx switching]  | [uplinkTxSwitching-DL-Interruption-r18 indicates that DL interruption on the band will occur during UL Tx switching, as specified in TS 38.133. UE is not allowed to set this field for the band combination of SUL band+TDD band, for which no DL interruption is allowed. Field encoded as a bit map, where bit N is set to "1" if DL interruption on band N will occur during uplink Tx switching as specified in TS 38.133 [5]. The leading / leftmost bit (bit 0) corresponds to the first band of this band combination, the next bit corresponds to the second band of this band combination and so on. The capability is not applicable to the following band combinations, in which DL reception interruption is not allowed: -                TDD+TDD CA with the same UL-DL pattern]  | [38-1, 38-2, 38-3, 38-4, 35-5] | Yes  |  |   | [Per BC, details are up to RAN2]  | No need  | Applicable only to FR1  |  |  | Optional with capability signaling  |
| 38. NR\_MC\_enh  | 38-7  | [Switching Period for unaffected Band for Dual UL]  | *[SwitchingPeriodUnaffectedBandDualUL-r18* indicates for a given band pair {band X and band Y}, whether/how the switching period is to be applied on band X, Y, Z, when a UL Tx switching is triggered from band pair {band X and band Z} to band pair {band Y and band Z}, as defined in 38.101-1. If absent for band Z, the UE is not required to transmit on any UL bands, if switching period is located on X, during the switching period reported for the band pair of band X and band Y. -      *maintainedUL-Trans-r18* indicates that if the switching period is located on band X, the UE is capable of uplink transmission on band Z and is not required to transmit on band X and Y during the switching period reported for the band pair of band X and band, as specified in 38.101-1.  - -      *periodOnULBands-r18* indicates the switching period to be applied on any UL bands as specified in 38.101-1. N35us represents 35 us, n140us represents 140us, and n210us represents 210us. -      Band Z corresponds to the zth entry in the *uplinkTxSwitchingPeriodUnaffectedBandDualUL-List-r18*, which includes the UL band of this band combination excluding band X and band Y listed in the same order of the band combination.]   | [38-1, 38-4] | Yes  |  |   | [Per BC, details are up to RAN2]  | No need  | Applicable only to FR1  |  |  | Optional with capability signaling  |
| 38. NR\_MC\_enh  | 38-8  | [Additional switching Period for Dual UL]  | [Indicates the UL Tx switching period for switching between a band pair and another band pair or another band, when Rel-18 UL Tx switching is configured by *uplinkTxSwitchingMoreBands-r18*. If the capability is not reported, the switching period reported in *switchingPeriodFor2T-r18* or *switchingPeriodFor1T-r18* applies, as specified in TS 38.214 and TS 38.101-1.  -    *bandPairIndex1-r18*/*bandPairIndex2-r18*xx refers to the xxth band pair entry in the band pair list indicated by *ULTxSwitchingBandPair-r18.*-    *bandIndex-r18*xx refers to the xxth band entry in this band combination. -    *switchingAdditionalPeriodDualUL-r18* indicateds the length of switching period for switching between one band pair indicated by *bandPairIndex1-r18* and another band pair indicated by *bandPairIndex2-r18*or another band indicated by *bandIndex-r18.*-    n35us represents 35 us, n140us represents 140us, and n210us represents 210us, as specified in TS 38.101-1. A UE supporting this feature shall also indicate the support of *dualUL* switching option for the band pair(s) indicated in *bandPairIndex1-r18*/*bandPairIndex2-r18*.]  | [38-1, 38-2, 38-4, 35-5] | Yes  |  |   | [Per BC, details are up to RAN2]  | No need  | Applicable only to FR1  |  |  | Optional with capability signaling  |
| 38. NR\_MC\_enh  | 38-9  | [Improved switching period for four-band switching case]  | [Indicate UE supporting the advanced capability of resolving the switching ambiguity issue thus the switching period can be improved to min {max(Tswitch\_A-C, Tswitch\_B-D), max(Tswitch\_A-D, Tswitch\_B-C)}.] | [38-1, 35-5] | Yes |  | [Network can only assume the maximum switch period]  | [Per BC, details are up to RAN2]  | No need  | Applicable only to FR1  |  | Detailed information can refer to the LS to RAN2 in R4-2317609 | Optional with capability signalling  |
| 38. NR\_MC\_enh  | 38-10 | [UL-MIMO coherence capability for dynamic Tx switching between 2Tx-2Tx switching among 3 or 4 bands] | [Apply UL-MIMO coherence for the 2Tx-capable UL band(s). Rel-17 signalling on UL-MIMO coherence capability for 2Tx-2Tx switching is reused] | [38-1, 38-2, 38-3, 38-4, 35-5] | Yes |  | [The existing Rel-15 per band UE capability pusch-TransCoherence is applicable to each of the 2Tx-capable UL band(s) for Tx switching]  | [Per BC, details are up to RAN2]  | No need | Applicable only to FR1  |  | Detailed information can refer to the LS to RAN2 in R4-2217741. | Optional with capability signalling  |

1. NR\_Mob\_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 (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** |
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1. NR\_NTN\_enh (input from moderator)

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1. NR\_cov\_enh2 (input from moderator)

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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** |
| 41 NR\_cov\_enh2 | [41-1] | MPR reduction for pi/2 BPSK and QPSK | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK for MPR reduction without transparent scheme | None | Yes | N/A | MPR reduction for pi/2 BPSK and QPSK without transparent schemes for MPR reduction is not possible | Per FS | No | FR1 only | Support mixture of FDD/TDD |  | Optional with capability signalling |
| 41 NR\_cov\_enh2 | [41-2] | MPR reduction for pi/2 BPSK and QPSK | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK with transparent schemes for MPR reduction | None | Yes | N/A | MPR reduction for pi/2 BPSK and QPSK with transparent schemes for MPR reduction is not possible | Per FS | No | FR1 only | Support mixture of FDD/TDD |  | Optional with capability signalling |

1. Netw\_Energy\_NR

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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** |
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1. NR\_DualTxRx\_MUSIM (input from moderator)

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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** |
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1. 4Rx\_low\_NR\_band\_handheld\_3Tx\_NR\_CA\_ENDC

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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** |
| 44.4Rx\_low\_NR\_band\_handheld\_3Tx\_NR\_CA\_ENDC | [44-1] | TxDiversity for the band configured with 2Tx | Indicates UE supports 2Tx diversity for the band configured with 2Tx |  | Yes | N/A | UE doesn’t support Tx diversity for 2Tx bands configured | Per FS | No | FR1 only | N/A | . | Optional with capability signalling |

1. NR\_SL\_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 (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** |
| 45.NR\_SL\_enh2 | 45-1 | Power class for sidelink CA | [Indicates power class the UE supports when operating according to this band combination used for sidelink. If the field is absent, the UE supports the default power class. If this power class is higher than the power class that the UE supports on the individual bands of this band combination (ue-PowerClassSidelink-r16 in BandNR), the latter determines maximum TX power available in each band. The UE sets the power class parameter only in band combinations that are applicable as specified in TS 38.101-1.] |  | Yes | Yes | UE cannot transmit in proper power class as specified in 38.101-1 | Per BC | No | FR1 only | N/A |  | Optional with capability signalling |
| 45.NR\_SL\_enh2 | 45-2 | SL reception in intra-carrier guard band | [Capability of reception in the non-zero intra-cell guardband between contiguous RB sets in SL wideband carrier operation wider than 20MHz when LBT is successful only in a subset of RB sets] |  | Yes | Yes | UE cannot receive in the intra-cell guard band specified in 38.101-1 | Per band | No | FR1 only | N/A |  | Optional with capability signalling |