**3GPP TSG-RAN WG4 Meeting #116bis R4-2514620**

**Prague, Czech Republic, Oct. 13-17, 2025**

**Agenda item:** 9

**Source:** CMCC

**Title:** Rel-19 RAN4 UE feature list for NR (version 3)

**Document for:** Approval

Introduction

This contribution includes the RAN4 UE feature list for Rel-19 NR.

1. NR\_ENDC\_RF\_Ph4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 46. NR\_ENDC\_RF\_Ph4 | 46-1 | MPR enhancement for activated carrier | Indicates whether UE supports reduced MPR for single CC if single CC is activated for intra-band UL contiguous CA.If the UE also supports *powerBoosting-pi2BPSK-QPSK-r18* and/or *powerBoosting-pi2BPSK-QPSK-Modified-r18*, then these capabilities are applicable to the activated CC |  | Yes | N/A | The FR1 UE shall support MPR requirement based on UL CA configuration even for single activated CC. | Per BC | No | FR1 only | N/A |  | Optional with capability signaling |
| 46-2 | FR2 MPR-Improvement Downlink Independent | Indicates whether UE supports reduced MPR by removing dependence on DL CA configuration. |  | Yes | N/A | The FR2 UE only supports MPR requirement with dependence of DL CA configuration. | Per BC | Yes | FR2 only | N/A |  | Optional with capability signaling |
| 46-3 | FR2 MPR Improvement Activation Dependent | Indicates whether UE supports MPR based on activation status of its configured CCs and when all activated CCs form a contiguous block in both UL and DL for intra-band contiguous CA |  | Yes | N/A | The FR2 UE shall support MPR requirement based on CA configuration. | Per BC | Yes | FR2 only | N/A |  | Optional with capability signaling |
| 46-4 | MPR reduction for single carrier with single value | Indicates whether UE supports MPR reduction for single UL carrier with 1/2\*UE CBW and 1/2\*NRB extension for dual-sided symmetric and single-sided case Supported cases as following ({ratio value on low side, ratio value on high side} ) :{1/2, 0}, {0, 1/2}, {1/2, 1/2}NOTE 1: NRB is the number of RBs defined per channel bandwidth by RAN4 in TS 38.101-1, Table 5.3.2-1 for FR1 |  | Yes | N/A | The FR1 UE shall support MPR requirement in existing spec without enhancement. | Per band | No | FR1 only | N/A | This capability is applicable for single UL CC case  | Optional with capability signaling |
| 46-5 | MPR reduction for single carrier with multiple values | Indicates whether UE supports MPR reduction for single UL carrier with 1/X\*UE CBW and 1/X\*NRB extension for dual-sided symmetric and single-sided case, where 1/X is a set of ratios of {1/2, 1/4} Supported cases as following ({ratio value on low side, ratio value on high side}):{1/2, 0}, {0, 1/2}, {1/2, 1/2}, {1/4, 0}, {0,1/4}, {1/4, 1/4} NOTE 1: NRB is the number of RBs defined per channel bandwidth by RAN4 in TS 38.101-1, Table 5.3.2-1 for FR1 |  | Yes | N/A | The FR1 UE shall support MPR requirement in existing spec without enhancement. | Per band | No | FR1 only | N/A | This capability is applicable for single UL CC case | Optional with capability signaling |
| 46-6 | Support maximum 6 MIMO layers for DL reception | Indicates whether the UE supports maximum 6 spatial multiplexing layers for DL reception for FWA. |  | Yes | N/A | FWA does not support maximum 6 MIMO layers for DL reception | Per FSPC | N/A | FR1 only | N/A |  | Optional with capability signaling |

1. NonCol\_intraB\_ENDC\_NR\_CA\_Ph2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 47. NonCol\_intraB\_ENDC\_NR\_CA\_Ph2 | 47-1 | 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 TS 38.133 and UE RF requirements for intra-band non-collocated NR-CA including 7.10A in TS 38.101-1. And the UE also supports TDD-TDD intra-band NR-CA operation with MRTD according to Table 7.6.4-1 in TS 38.133 and UE RF requirements for intra-band NR-CA except for 7.10A in TS 38.101-1. | 33-1 (RAN4 R18 feature) | Yes | N/A | Intra-band non-collocated NR CA operation with up to 4layer per CC is not supported. | Per BC | N/A | FR1 only | N/A | Supported for band n77/n78 only | Optional with capability signaling |
| 47-2 | Support of inter-band non-contiguous EN-DC with overlapping or partially overlapping bands operation | Indicates the UE supports TDD-TDD inter-band non-contiguous EN-DC with overlapping or partially overlapping bands operation with MTTD/MRTD requirements according to Table 7.5.2.1-1/Table 7.6.2.1-1 in TS 38.133 and UE RF requirements for inter-band non-contiguous EN-DC with overlapping or partially overlapping bands including 7.10B in TS 38.101-3. And the UE also supports inter-band non-contiguous EN-DC with overlapping or partially overlapping bands operation with MRTD according to Table 7.6.3 in TS 38.133 and UE RF requirements for inter-band non-contiguous EN-DC with overlapping or partially overlapping bands except for 7.10B in TS 38.101-3. | 33-2 (RAN4 R18 feature) and 2-19 (R16 RAN4 feature) | Yes | N/A | Inter-band non-contiguous EN-DC with overlapping or partially overlapping bands operation with up to 4layer per CC is not supported. | Per BC | N/A | FR1 only | N/A | Supported for band B42 and n77/n78 only | Optional with capability signaling |

1. NR\_ATG\_enh

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 48. NR\_ATG\_enh | 48-1 | Rx beam Type | Indicates whether the UE supports one common Rx beam or two simultaneous separate Rx beams when UE capable of antennaArrayType-r18 on both PCC and SCC. |  | yes | N/A | If UE does not support the capability, network does not know ATG UE’s reception capability. | Per BC | No | FR1 only | N/A | This UE feature is applicable only for inter-band CA band combination(s) in Table 5.2J.1A.2 in TS 38.101-1. | Conditional mandatory for UEs supporting antennaArrayType-r18 on each band of the supported Band combination |

1. NR\_RRM\_Ph5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 49. NR\_RRM\_Ph5 | 49-1 | Simultaneous L3 measurement on three carriers for measurements without measurement gap under CA/DC operation. | Support of measuring serving cell and neighbor cells measurement on three carriers simultaneously for measurements without measurement gap.Support of separate indications for different cases: {FR1 only CA and FR1 only NR-DC}, {FR1 only EN-DC}, {FR1+FR2 CA PCell is FR1 only}, and {FR1+FR2 NR-DC PCell is FR1 only}. |  | Yes |  | UE does not support measuring serving cell and neighbor cells on three carriers simultaneously for measurements without measurement gap. | Per-UE | No | No |  | UE indicating this capability shall meet the corresponding enhanced requirements defined in TS38.133 Clause 9.1.5.1.1, 9.1.5.1.2, and 9.1.5.1.3 if the feature is supported. | Optional with capability signaling |
| 49-2 | Fast Rx beam sweeping factor for FR2-1 L3 measurement delay reduction | Supports fast Rx beam sweeping factor reduction for L3 measurement for FR2-1. |   | Yes | N/A  | UE does not support fast Rx beam sweeping for FR2-1 L3 measurement delay reduction. | Per band | TDD only | FR2-1 only |  | Candidate values: {2, 4, 6} for FR2-1. Note: It is only supported for power class 3. | Optional with capability signalling |
| 49-3 | L3 serving cell and neighbor cells measurement and report on one serving carrier per-band for intra-frequency measurements without measurement gap | Support of serving cell and neighbor cells measurement and report on one serving carrier per-band for intra-frequency measurements without measurement gap if multiple serving carriers are configured in a same band. |  | Yes |  | UE does not support serving cell and neighbor cells measurement and report on one serving carrier per-band for intra-frequency measurements without measurement gap if multiple serving carriers are configured in a same band. | Per-UE | No | FR2-1 only |  | UE indicating this capability shall meet the corresponding enhanced requirements in TS38.133 Clause 9.2.3.2, 9.1.5.1.1, 9.1.5.1.2, 9.1.5.1.3, and 9.1.5.1.4  | Optional with capability signaling |
| 49-4 | Fast SCell activation based on early measurement report | Supports fast SCell activation based on early measurement reports as specified in TS38.133 clause 8.3.2A | Both 1) and 2):1) 39-8 or 39-9 in R18 RAN4 feature list or 18-7 (idleInactiveNR-MeasReport-r16)2) idleInactiveNR-MeasBeamReport-r16 | Yes | N/A | UE may not fulfill fast SCell activation requirements as specified in TS38.133 clause 8.3.2A but fulfills SCell activation requirements defined prior to Release 19. | Per-UE | N/A | Yes | N/A |  | Optional with capability signaling |

1. Netw\_Energy\_NR\_enh

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 50. Netw\_Energy\_NR\_enh | 50-1 | Lower bound of measurement periodicity of 10ms for the deactivated measurement requirement in fast measurement window on OD-SSB SCell | Indicates a lower bound of measurement periodicity as 10ms. The lower bound is applied to the deactivated SCell measurement requirement in fast measurement window on OD-SSB SCell | At least one among RAN1 feature of 61-1, 61-2, 61-2a, 61-3, 61-4, 61-4a | Yes | n/a | UE performs on-demand SSB based deactivated SCell measurement without a lower bound within fast measurement window  | Per BC | n/a | n/a | n/a | UE indicates whether the lower bound of 10ms is needed as the minimum supported measurement periodicity. | Optional with capability signaling |
| 50-2 | Additional processing time for OD-SSB activation and parameter update  | Indicates an additional processing time of 2ms in addition to T\_min = $m+3N\_{slot}^{subframe,μ}$+1 for reception of on-demand SSB bursts from the time when UE receives OD-SSB activation or parameter update MAC CE command.  | At least one among RAN1 feature of 61-3, 61-4, 61-4a | Yes | n/a | Additional processing time of 5ms in addition to T\_min = $m+3N\_{slot}^{subframe,μ}$+1 for reception of on-demand SSB bursts from the time when UE receives OD-SSB activation or parameter update MAC CE command.  | Per band | n/a | n/a | n/a | Note 1: Default value of additional processing time is 5 ms | Optional with capability signaling |

1. NR\_LPWUS

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 1. NR\_LPWUS
 |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. NR\_Mob\_Ph4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 52. NR\_Mob\_Ph4 | 52-1 | Number of CSI-RS resources for L1-RSRP measurement within a slot | * The max number of CSI-RS resources for L1-RSRP measurement that UE can measure within a slot across candidate cells for L1-RSRP measurement
 | 63-1 | Yes | No | There is no limitation on the number of CSI-RS resources for L1 measurement within a slot. | Per BC | No | No | N/A | Candidate value: {1,2,3,4,5,6,7,8,16,32, 48,64}* Note: It is also counted in FG 2-24
 | Optional with capability signaling |
| 52-2 | Number of total CSI-RS resources to be measured | * The max number of total CSI-RS resources of serving cells and candidate cells across all CCs for L1 measurement. Both LTM candidate cell(s) and serving cells for CSI-RS based L1-RSRP measurement are counted, regardless of whether CSI-RS based L1-RSRP measurement on serving cell is configured in LTM-CSI-ResourceConfig-r18 or not.
 | 63-1 | Yes | No | There is no limitation on the total number of CSI-RS resources of serving cells and neighbouring cells across all CCs for L1 measurement. | Per BC | No | No | N/A | Candidate values:{2,4,8,12,16,32,64}* Note: the value should be not smaller than UE capability of beamManagementSSB-CSI-RS (Component 2 of 2-24)
 | Optional with capability signaling |
| 52-3 | Skip SSB based L1-RSRP measurement for candidate cell CSI-RS-based L1-RSRP measurement | 1. Indicates support for skipping SSB-based L1-RSRP during neighboring cell CSI-RS-based L1-RSRP measurement.
2. Indicates support for skipping SSB-based L1-RSRP during both neighboring cell and serving cell CSI-RS-based L1-RSRP measurement.
 | 63-1 | Yes | N/A | **For UE doesn’t support neither 1) nor 2):** CSI-RS resources from neighbour cell shall be Type-D QCL’ed with the associated SSB for L1 measurement. CSI-RS resources configured for LTM L1-RSRP measurement from serving cell shall be Type-D QCL’ed with SSB for L1-RSRP measurement, or another CSI-RS in resource set configured with repetition ON.**For UE support 1) but not 2):** CSI-RS resources from neighbour cell do not need to be Type-D QCL’ed with the associated SSB for L1 measurement, but shall be Type-D QCL’ed with the associated SSB for L3 measurement. CSI-RS resources configured for LTM L1-RSRP measurement from serving cell shall be Type-D QCL’ed with SSB for L1-RSRP measurement, or another CSI-RS in resource set configured with repetition ON.**For UE support 2) but not 1):** CSI-RS resources from neighbour cell do not need to be Type-D QCL’ed with the associated SSB for L1 measurement, but shall be Type-D QCL’ed with the associated SSB for L3 measurement. CSI-RS resources configured for LTM L1-RSRP measurement from serving cell do not need to be Type-D QCL’ed with SSB for L1-RSRP measurement, or another CSI-RS in resource set configured with repetition ON. | Per UE | no | FR2-1 only | N/A | UE can only indicate support of 1) or 2) but not both. | Optional with capability signalling |

1. NR\_XR\_Ph3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 53.NR\_XR\_Ph3 | 53-1 | Recommended ratio of gap occasions for cancelation  | Indicates the UE is capable of reporting recommended ratio of measurement gap occasions for cancelation | 64-1 | Yes | N/A | The UE does not support reporting recommended ratio for gap cancelation | Per UE | no | no |  |  | Optional with capability signalling |

1. NR\_FR1\_lessthan\_5MHz\_BW\_Ph2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 54. NR\_FR1\_lessthan\_5MHz\_BW\_Ph2 | 54-1 | Support of less than 5MHz CBW operation in CA/DC | 1. Support for 3 MHz symmetric channel bandwidth in DL and UL in CA/DC
2. Support for 3 MHz channel bandwidth in uplink with larger than 3 MHz channel BW in DL in CA/DC
3. Support 12 PRB CORESET0 in CA/DC
4. Support 12 PRB CORESET0 with an associated SS/PBCH block located at GSCN 41637 in CA/DC
5. Support 5 MHz channel bandwidth with 20 PRB CORESET0 in CA/DC
 | Layer-1 UE feature group 51-1, 51-1a, 51-2a, 51-2b, 51-3 | Yes |  | The UE does not support corresponding UE features in CA/DC operations | NA (see Note column) | FDD only | FR1 only | NA | All components in the feature group do not require new capabilities signalling definition in Rel-19 and respective Rel-18 capability signalling is reused based on RAN2 agreements. | Optional |

1. NR\_LBCA\_SW

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 55. NR\_LBCA\_SW | 55-1 | Switching period for switching between a LB FDD band and an SDL band | UE to indicate support of LB-LB carrier aggregation via switching between an FDD band (case 1) and SDL band (case 2): Case 1: Tx/Rx on FDD carrier 1 and no Rx on SDL carrier 2- Case 2: Rx on SDL carrier 2 and no Tx/Rx on FDD carrier 1*switchingPeriodForFDD-SDL* indicates the length of the switching time between {case1, case2}: 35us represents 35 us of switching time, 70us represents 70us of switching time,140us represents 140us of switching time, as specified in TS 38.101-1. | N/A | Yes | N/A | Operation of Carrier aggregation between FDD and SDL via switching is not supported. | Per band pair per band combination |  | Applicable to FR1 only |  |  | Optional with capability signalling |

1. NR\_FR1\_7MHz\_BW

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 56. NR\_FR1\_7MHz\_BW | 56-1 | UE support of 7MHz CBW | Indicates UE support of 7MHz CBW |  | Yes |  | Network does not know if UE supports 7MHz CBW | Per UE |  | FR1 only |  |  | Optional with capability signalling |

1. 3Tx UL switching (R19 TEI)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 57. 3Tx UL switching | 57-1 | Switch period for dynamic UL Tx switching between 2 bands for 3Tx UE with up to 2Tx per band | Indicate the supported switching period for dynamic UL Tx switching between two bands for 3Tx UE with up to two transmit antenna connectors in each band | Rel-16 RAN4 feature group 7-1 (Dynamic Tx switching between two uplink carriers) | Yes | N/A | UE does not support dynamic UL Tx switching between 2 bands for 3Tx UE with up to 2Tx per band | UE signals supported switching period per pair of UL bands per UL band combination | No need | FR1 only | Support mixture of FDD/TDD | Candidate value set: {35us, 140 us, 210us}UE is mandatory to support dualUL when supporting this feature  | Optional with capability signalling |
| 57-2 | Application of DL interruptions due to dynamic UL Tx switching between 2 bands for 3Tx UE with up to 2Tx per band  | Capability to indicate that for the band where DL interruption is needed due to dynamic UL Tx switching between 2 band for 3Tx UE with up to 2Tx per band | 57-1 | Yes | N/A | UE not reporting this capability means DL interruption is not required | UE capability is defined as per band per band combination for each band pair supporting UL Tx switching | No need | FR1 only | Support mixture of FDD/TDD |  | Optional with capability signalling |
| 57-3 | UL-MIMO coherence capability for dynamic UL Tx switching between 2 bands for 3Tx UE with up to 2Tx per band | Capability to indicate whether UL-MIMO coherence is supported when dynamic UL Tx switching between 2 bands for 3Tx UE with up to 2Tx per band is conducted.  | 57-1 | Yes | N/A | Rel-15 per band capability *pusch-TransCoherence* is applicable | Per band per BC | No need | FR1 only | Support mixture of FDD/TDD | Candidate values set: { nonCoherent, fullCoherent } | Optional with capability signalling |

1. NR\_IoT\_NTN\_req\_test\_enh

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 58.NR\_IoT\_NTN\_req\_test\_enh | 58-1 | Tx PC2 output power boosting for NTN NB-IoT UL | Indicate the supported PC2 Tx output power boosting for NB-IoT NTN UL in each FR1 band | NB IoT based IoT-NTN | Yes | N/A | No power boosting. | Per (UL) band:UE signals support for power boosting. | N/A | FR1 only | N/A | Additional RRC IE needs to be defined to enable this boosting. The requirements for power boosting are defined in Clause 6.2B.4 in TS36.102. | Optional with capability signalling |

1. NR\_AIML\_air

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 59. NR\_AIML\_air | 59-1 | UE-side beam prediction for BM Case1 | The RX beam corresponding to UE predicted TX beam in Set A is known when TX beam is not QCL Type D to a known TCI for BM Case-1 | Layer-1 FG: 58-1-2 | Yes | N/A | The network needs to transmit additional samples of reference signal corresponding to the predicted TX beam of set A | Per Band | TDD | FR2-1 only | N/A |  | Optional with capability signaling |
| 59-2 | UE-side beam prediction for BM Case2 | The RX beam corresponding to UE predicted TX beam in Set A is known when TX beam is not QCL Type D to a known TCI for BM Case-2 | Layer-1 FG: 58-1-4  | Yes | N/A | The network needs to transmit additional samples of reference signal corresponding to the predicted TX beam of set A | Per Band | TDD | FR2-1 only | N/A |  | Optional with capability signaling |

1. NR\_NTN\_Ku\_bands

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 60. NR\_NTN\_Ku\_bands | 60-1 | VSAT UE type in NTN | Support of fixed or mobile VSAT (Very Small Aperture Terminal) UE typea) Type a: a fixed VSAT, which can only be fixed.b) Type b: a mobile VSAT, which is capable to move.A VSAT (Very Small Aperture Terminal) UE as defined in TS 38.101-5 shall indicate support of this capability with only one type. | R2 34-1 | yes | N/A | If UE does not support the capability, network does not know VSAT UE’s capability. | Per UE | N/A | N/A(Note that this feature is used for both FR1-NTN (n248 and n247) and FR2-NTN Ku bands) | N/A | 1. The capability is not applicable for UE other than VSAT.2. This capability is an extension of Rel.18 UE feature 40-1, which is currently limited the support to FR2 only. | Optional with capability signalling |
| 60. NR\_NTN\_Ku\_bands | 60-2 | Beam steering  | Support of beam steering capabilitya) Type a: Fully electronically-steered beam UEsb) Type b: Fully mechanically-steered beam UEsA VSAT (Very Small Aperture Terminal) UE as defined in TS 38.101-5 shall indicate support of this capability with only one type. | R2 34-1 | yes | N/A | If UE does not support the capability, network does not know VSAT UE’s beam steering capability. | Per UE | N/A | N/A(Note that this feature is used for both FR1-NTN (n248 and n247) and FR2-NTN Ku bands) | N/A | 1. The capability is not applicable for UE other than VSAT.2. This capability is an extension of Rel.18 UE feature 40-2, which is currently limited the support to FR2 only. | Optional with capability signalling |

1. NR\_NTN\_Ph3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 61. NR\_NTN\_Ph3 | 61-1 | Tx  output power enhancement for NR-NTN UE | 1. Support of NTN (e) RedCap UE power boosting when applicable as defined in 6.2 of TS 38.101-5. |  | Yes | N/A | NTN Legacy output power limitation still apply | Per  band  | No | FR1 only | N/A | The feature can be supported in below scenarios:NTN (e) RedCap UE inFR1 single band with single uplink CC configured in the band where power boosting capability is indicated in this band.Additional RRC IE is used to enable/disable power boosting. | Optional with capability signalling |
| 61-2 | Support of (e)RedCap UE with FR1-NTN | Indicates whether the UE supports (e)RedCap UE with FR1-NTN. | Layer-1 FG: 28-1, 48-1 Layer-2 and Layer-3 FG: 34-1 | Yes | N/A | The requirements defined for  (e)RedCap UE with FR1-NTN in Rel-19 may not apply. | Per UE | No | FR1 only | N/A | If the UE indicates this capability, the UE shall support (e)RedCap UE with FR1-NTN. | Optional with capability signalling |