3GPP TSG-RAN WG4 Meeting #110 R4-2401099

Athens, GR, 26 Feb – 01 Mar, 2024

**Agenda item:** 10

**Source:** Moderator (CMCC)

**Title:** Topic summary for [110][140] NR\_LTE\_Rel-18\_feature\_list

**Document for:** Information

# Introduction

This summary focuses on the Rel-18 UE feature list for LTE and NR including agenda 10. The latest UE feature list is in R4-2321993.

Companies contributions are listed as below.

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Related UE feature** |
| [**R4-2400178**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2400178.zip) | Updated Summary of Rel-18 UE RF Capabilities | Apple | NR\_RF\_FR2\_req\_Ph3  NR\_FR2\_multiRX\_DL  NR\_MG\_enh2  NR\_demod\_enh3  NR\_MC\_enh  NR\_mob\_enh2  NR\_NTN\_enh  Netw\_Energy\_NR  NR\_DualTxRx\_MUSIM |
| [**R4-2400336**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2400336.zip) | Input to Rel-18 RAN4 UE feature list for Rel-18 NR\_cov\_enh2 | Nokia, Nokia Shanghai Bell | NR\_cov\_enh2 |
| [**R4-2401107**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2401107.zip) | UE feature list for Rel-18 NR\_MC\_enh | NTT DOCOMO INC. | NR\_MC\_enh |
| [**R4-2401564**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2401564.zip) | Discussion on Rel-18 feature list | Huawei, HiSilicon | NR\_ENDC\_RF\_FR1\_enh2  NR\_channel\_raster\_enh  NR\_HST\_FR2\_enh  NR\_pos\_enh2  NR\_MC\_enh  NR\_mob\_enh2  NR\_NTN\_enh  NR\_cov\_enh2  Netw\_Energy\_NR  NR\_SL\_enh2 |
| [**R4-2401846**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2401846.zip) | Input to the Rel-18 RAN4 UE feature list for FG 28-1 | Ericsson | NR\_channel\_raster\_enh |
| [**R4-2402440**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2402440.zip) | Views on RAN4 Rel-18 UE feature list | Intel Corporation | NR\_ENDC\_RF\_FR1\_enh2  NR\_channel\_raster\_enh  RF\_RF2\_req\_Ph3  NR\_MG\_enh2  NR\_HST\_FR2\_enh  NR\_cov\_enh2  Netw\_Energy\_NR |
| [**R4-2402517**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110/Docs/R4-2402517.zip) | RAN4 feature list for NCR-MT | ZTE Corporation | NCR |

# NR\_ENDC\_RF\_FR1\_enh2

Agreement in RAN4#109:

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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 for the band configured. |  | Yes | N/A | UE doesn’t support 4Tx Tx diversity for the band configured | 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 |

## 27-1 TxD for 4Tx

**Proposal from Intel (R4-2402440)**

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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** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Capability interpretation for mixture of FDD/TDD and/or FR1/FR2** |
| 27. NR\_ENDC\_RF\_FR1\_enh2 | 27-1 | TxDiversity for 4Tx | Indicates UE supports Tx diversity for 4Tx for the band configured in the band combination. | No | Yes | N/A | UE doesn’t support 4Tx Tx diversity for the band configured in the band combination | Per FS | No | FR1 only | N/A |

**Recommended WF:**

Discuss the above changed made by Intel.

Samsung: in our view the changes are not necessary. It can be used for both single band and band combinations. For future approval, companies are OK to extend to band combinations.

Intel: Basically our orginial motivation is that there would be confusion. We are OK with no change

Chair: conclusion is that no change is needed.

## 27-2 low MSD

**Proposal from Huawei(R4-2401564) and Intel (R4-2402440)**

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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** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Capability interpretation for mixture of FDD/TDD and/or FR1/FR2** |
| 27. NR\_ENDC\_RF\_FR1\_enh2 | 27-2 | LowerMSD for inter-band NR CA and EN-DC | Indicates whether the UE supports lower maximum sensitivity degradation when the band is the victim band with sensitivity degradation as specified in 38.101-1 and 38.101-3.  The victim band and associated aggressor band(s) are within at least one of inter-band CA or EN-DC band combinations supported by the UE.  This feature includes following components:  1) The aggressor band which causes sensitivity degradation to the victim band.  2) The additional aggressor band only when the sensitivity degradation to the victim band is caused by IMD of another two bands.  3) MSD type, including harmonic, harmonic mixing, cross band isolation, IMD2, IMD3, IMD4, IMD5 and ‘all’. Value ‘all’ indicates the MSD capability class is applicable for all MSD types defined in this release, which are applicable to the associated victim band/aggressor band(s).  4) The applicable power class for the lower MSD capability.  5) The lower MSD capability class as specified in 7.3A.7 in 38.101-1 and 38.101-3. | No | Yes | N/A | The UE shall comply with the minimum requirements for MSD. | Per band | No | FR1 only | Support mixture of FDD/TDD |

**Recommended WF:**

The above changes are aligned with RAN2 endorsed CRs. Recommend to capture the above changes.

Huawei: we need add 38.101-3.

1. NR\_channel\_raster\_enh

Agreement in RAN4#109:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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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** |
| 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 |

## 28-1 enhanced channel raster

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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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** |
| 28. NR\_channel\_raster\_enh  **Option 1: Huawei (R4-2401564)** | 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 |  | 100 KHz channel raster shall be applied | 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. | Optional with capability signalling |
| 28. NR\_channel\_raster\_enh  **Option 2 (R4-2401846)**  **Ericsson** | 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 and TS 38.101-5 | 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.  Should be early implementable from Rel-16. | Mandatory for  1) all Rel-18 UEs for certain bands as defined in 38.101-1 and 38.101-5  2) (e)RedCap UEs from Rel-17 for all applicable bands supported by the UE.  Optional otherwise. |
| 28. NR\_channel\_raster\_enh  **Option 3 (R4-2402440)**  **Intel** | 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, TS 38.101-5 | N/A | Yes |  | UE may not support requirements for UE channel bandwidths located on enhanced channel raster | Per Band | No | FR1 only | N/A (applicable to FR1 FDD/TDD bands) | Applies only for FR1 bands with a 100 kHz channel raster for both TN and NTN (ΔFRaster = 100kHz). | Mandatory with capability signalling from Rel-18  Optional with capability signalling for Rel-16/17 |

**Recommended WF:**

According to companies proposals, the changes in components can be agreeable. However, on the Consequence and Mandatory/optional, more discussion is needed.

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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** |
| 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 and TS 38.101-5 | N/A | Yes |  | ~~[N/A (not defined)]~~  Option 1: UE may not support requirements for UE specific channel bandwidths located on enhanced channel raster  Option 2: If not supported, it is not always guaranteed the narrower UE specific channel bandwidth is located in the wider BS channel bandwidth. | 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.  [Should be early implementable from Rel-16.] | FFS |

**Nokia: we should add something about the consequence.**

**Ericsson: last time we agreed with not defined and N/A. Our preference is not to specify any particular thing. It is common in RAN2 spec. Intel proposal may be acceptable.**

**Intel: We need to add something for this column. We disagree with Ericsson.**

**Ericsson: in our view, there are different understanding on the requirements for UE.**

1. NR\_RF\_FR2\_req\_Ph3

No FGs are captured in last meeting due to BC is mandatory.

## 29-1 Beam correspondence in RRC\_IDLE and RRC\_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 (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** |
| 29. NR\_RF\_FR2\_req\_Ph3  **Option 1 (R4-2400178, Apple)** | 29-1 | Beam correspondence in initial access and RRC\_INACTIVE ~~for PC3 UEs~~ | R18 and onward UE shall support beam correspondence in initial access and RRC\_INACTIVE and satisfy the corresponding spherical coverage requirement for initial access and RRC\_INACTIVE as specified in 38.101-2 | ~~8-2 and 2-20~~ | No |  | UE performance in initial access and RRC\_INACTIVE in FR2 cannot be guaranteed | ~~Per UE~~ | N/A | FR2 only |  |  | Mandatory without capability signaling from Rel-18 |
| **Option 2 (R4-2402440, Intel)** | 29-1 | Beam correspondence for RRC\_INACTIVE and initial access | 1. Support of beam correspondence for RRC\_INACTIVE and initial access defined in TS 38.101-2 | No | No | N/A | UE may not satisfy the beam correspondence requirements for RRC\_INACTIVE and initial access | N/A | N/A | FR2 only | N/A |  | Mandatory without capability signalling from Rel-18 |

**Recommended WF:**

Discuss whether to capture FG 29-1 in RAN4 UE feature list.

1. NR\_FR2\_multiRX\_DL

No FGs are captured in last meeting.

## 30-1 Supports scheduling restriction relaxation and measurement restriction relaxation

**Proposal (R4-2400178, Apple)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
| 30. NR\_FR2\_multiRX\_DL | 30-1 | Supports scheduling restriction relaxation and measurement restriction relaxation | * Supports simultaneous reception of CSI-RS for layer 1 measurement and PDSCH with different QCL Type-D on overlapping OFDM symbols. * Supports Simultaneous layer 1 measurement of CSI-RS overlapping with another CSI-RS with different QCL Type-D on overlapping OFDM symbol(s). | 16-2c, 23-5-1, [at least one of 16-2a, 16-2b-1, 16-2b-2 and 16-2b-3] | Yes | N/A |  | Per FSPC | TDD only | FR2-1 only |  | [Note: It can be supported for all power classes excepted PC6. ] |

**Recommended WF:**

More technical discusison is required.

## 30-2 Fast beam sweeping for layer 1 measurement

**Proposal (R4-2400178, Apple)**

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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 |
| 30. NR\_FR2\_multiRX\_DL | [30-2] | Fast beam sweeping for layer 1 measurement | Supports beam sweeping factor reduction for SSB-based layer 1 measurement when the UE is in multi-RX operation. | 16-2c, 23-5-1 | [No] | N/A |  | Per band | N/A | FR2-1 only |  | Candidate values for Component 2: {2,4,6} for FR2-1  [Note: It can be supported for all power classes excepted PC6.] |

**Recommended WF:**

More technical discusison is required.

1. NR\_MG\_enh2

No FGs are captured in last meeting.

**Proposal from Intel (R4-2402440)**

Table 4. Rel-18 NR UE features for NR\_MG\_enh2 WI.

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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** | **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\_MG\_enh2 | 32-1 | Inter-RAT EUTRAN measurements without measurement gap using vacant RF chain (case b-1) | 1. Support of inter-RAT EUTRAN measurements without gap with or without interruption outside UE active BWP | No | Yes | NA | The UE does not support inter-RAT EUTRAN measurements without gap for case b-1 | Per UE | No | No | NA | Component 1 candidate value: true/false  The signalling name and structure are expected to be the same as the implementation of Rel-17 feature *NeedForNCSG-EUTRA-r17* in TS38.331 | Optional with capability signalling |
| 32. NR\_MG\_enh2 | 32-2 | Inter-RAT EUTRAN measurements without measurement gap when target CRS is within UE active bandwidth part (case b-2) | 1. Support of inter-RAT EUTRAN measurements without gap when CRS is fully contained within UE active BWP | No | Yes | NA | The UE does not support inter-RAT EUTRAN measurements without gap for case b-2 | Per UE | No | No | NA | Component 1 candidate value: true/false | Optional with capability signalling |
| 32. NR\_MG\_enh2 | 32-3 | Support of effective measurement window (EMW) for Inter-RAT EUTRAN measurements without measurement gap | 1. Supported EMW patterns for Inter-RAT EUTRAN measurements without measurement gap | 32-1 or 32-2 | Yes | NA | The UE does not support the EMW configurations in addition to the mandatory ones specified in TS 38.133 | Per UE | No | No | NA | 1. UE indicates the bitmap of supported EMW patterns (6 patterns in total)  2. EMW pattern #0, #1 specified in TS 38.133 are conditionally mandatory if the UE supports feature group 32-1 or 32-2 | Optional with capability signalling |
| 32. NR\_MG\_enh2 | 32-4 | Intra and Inter-frequency measurement without gap using vacant RF chain | 1. Support of intra- and inter- frequency measurements without gap with or without interruption | No | Yes | NA | The UE does not support intra- and/or inter-frequency measurements without gap with or without interruption | Per UE | No | No | NA | Component 1 candidate value: true/false  The signalling name and structure are expected to be the same as the implementation of Rel-17 feature *NeedForNCSG-NR-r17* in TS38.331 | Optional with capability signalling |
| 32. NR\_MG\_enh2 | 32-5 | Concurrent measurement gap with Pre-MG within FR | 1. Support of RRM requirements in TS 38.133 for multiple per-UE (or per-FR) measurement gap patterns with at least one per-UE (or per-FR) Pre-MG. | 1) 19-3-1 or 19-3-2  2) 19-2-1 | Yes | NA | The UE does not support multiple per-UE (or per-FR) measurement gap patterns with at least one Pre-MG and related RRM requirements | Per UE | No | No | NA | Component 1 candidate value: true/false | Optional with capability signalling |
| 32. NR\_MG\_enh2 | 32-6 | Concurrent measurement gap with NCSG within FR | 1. Support of RRM requirements in TS 38.133 for multiple per-UE (or per-FR) measurement gap patterns with at least one per-UE (or per-FR) NCSG. | [19-1a and 19-2-1] | Yes | NA | The UE does not support multiple per-UE (or per-FR) measurement gap patterns with at least one NCSG and related RRM requirements | Per UE | No | No | NA | Component 1 candidate value: true/false | Optional with capability signalling |

Table 5. Rel-18 LTE UE features for NR\_MG\_enh2 WI.

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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** | **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\_MG\_enh2 | x-x | Inter-RAT NR measurement without gap using vacant RF chain | 1. Support of inter-RAT NR measurements without gap with or without interruption | No | Yes | NA | The UE does not support inter-RAT NR measurements without gap with or without interruption | Per UE | No | No | NA | Component 1 candidate value: true/false  The signalling name and structure are expected to be the same as the implementation of Rel-17 feature *NeedForNCSG-NR-r17* in TS38.331 | Optional with capability signalling |

**Recommended WF:**

More technical discusison is required. Recommend to discuss in RRM session.

1. NR\_HST\_FR2\_enh

Agreement in last meeting:

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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** |
| 34.NR\_HST\_FR2\_enh | 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 only | N/A | FFS how to give the condition of bi-directional deployment | Optional with capability signaling |
| 34.NR\_HST\_FR2\_enh | 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 38.133  2) 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 only | N/A |  | Optional with capability signaling |
| 34.NR\_HST\_FR2\_enh | 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 only | N/A |  | Optional without capability signaling |
| 34.NR\_HST\_FR2\_enh | 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 only | N/A |  | Optional with capability signalli |

## 34-1 Support of NR FR2 HST with simultaneous DL reception with two different QCL TypeD RSs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | **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\_HST\_FR2\_enh  **Option 1: Intel R4-2402440** | 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 | No | FR2 only | N/A | A single indication element is used to indicate for all three components.  candidate value: true/false | Optional with capability signaling |
| 34.NR\_HST\_FR2\_enh  **Option 2: Huawei R4-2401564** | 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 | 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 | No | FR2 only | N/A | FFS how to give the condition of bi-directional deployment | Optional with capability signaling |

**Recommended WF:**

Discuss the following:

1. Whether to remove []
2. Whether to remove bullet 3) as proposed in option2
3. Whether to add note1 as proposed in option1

## 34-2 Enhanced FR2 HST RRM requirements for intra-band CA and inter-frequency measurements in connected mode

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | **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\_HST\_FR2\_enh  **Option 1: Intel R4-2402440** | 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 38.133  2) Support of the RRM requirement for enhanced 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 | UE does not support enhanced RRM requirements for CA and/or inter-frequency measurements for HST FR2 | Per Band | No | FR2 only | N/A | candidate value: true/false | Optional with capability signaling |
| 34.NR\_HST\_FR2\_enh  **Option 2: Huawei R4-2401564** | 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 38.133  2) 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 | UE does not support enhanced RRM requirements for CA and/or inter-frequency measurements for HST FR2 | Per Band | No | FR2 only | N/A |  | Optional with capability signaling |

**Recommended WF:**

Discuss whether option 1 is agreeable.

## 34-3 Enhanced FR2 HST RRM requirements for inter-frequency measurement in Idle and Inactive mode

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | **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\_HST\_FR2\_enh  **Option 1: Intel R4-2402440** | 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 | No | No | N/A | UE does not support enhanced IDLE mode FR2 HST UE mobility | Per Band | No | FR2 only | N/A | candidate value: true/false | Optional without capability signaling |
| 34.NR\_HST\_FR2\_enh  **Option 2: Huawei R4-2401564** | 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 only | N/A |  | Optional without capability signaling |

**Recommended WF:**

Discuss the following:

1. Whether prerequisite 22-1 is needed
2. Whether “Consenquence” proposed in option 1 is agreeable
3. The report type, per UE or per band

## 34-4 Enhanced FR2 HST RRM requirements for inter-frequency measurement in Idle and Inactive mode

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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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** | **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\_HST\_FR2\_enh  **Option 1: Intel R4-2402440** | 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] | 22-2 | Yes | N/A | [UE does not support enhanced MAC CE for TCI state switch indication for FR2 HST] | Per Band | No | FR2 only | N/A | candidate value: true/false | Optional with capability signalling |
| 34.NR\_HST\_FR2\_enh  **Option 2: Huawei R4-2401564** | 34-3 | 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 | 22-2 | Yes | N/A | UE does not support enhanced MAC CE for TCI state switch indication for FR2 HST | Per Band | No | FR2 only | N/A |  | Optional with capability signalli |

**Recommended WF:**

Option 1 and option 2 are mostly the same. Use option 1 as baseline.

1. NR\_demod\_enh3

Agreement in last RAN4 meeting

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 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 antennas  2) 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 |

## 36-x Proposal in R4-2400178 (Apple)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 36. NR\_demod\_enh3 | 36-1 | MU-MIMO Interference Mitigation advanced receiver | R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO up to *maxNumberMIMO-LayersPDSCH* layers across target and co-scheduled UEs with 2 RX and 4RX antennas.  Note: This is the UE capability when modulation order is signalled via DCI | 3-4 | Yes | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO | Per FSPC | N/A | FR1 only |  | This is the UE capability when modulation order is signalled via DCI | Optional with capability signaling |
| 36. NR\_demod\_enh3 | 36-2a | MU-MIMO Interference Mitigation advanced receiver with modulation order not signalled | R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO for 2 layers across target and co-scheduled UEs with 2RX and 4RX | 36-1 | Yes | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO when modulation order is not signalled | Per FSPC | N/A | FR1 only |  |  | Optional with capability signaling |
| 36. NR\_demod\_enh3 | 36-2b | MU-MIMO Interference Mitigation advanced receiver with modulation order not signalled | R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO for 2 layers across target and co-scheduled UEs with 2RX and *maxNumberMIMO-LayersPDSCH* layers across target and co-scheduled UEs with 4RX | 36-1 | Yes | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO when modulation order is not signalled | Per FSPC | N/A | FR1 only |  |  | Optional with capability signaling |
| 36. NR\_demod\_enh3 | 36-3 | DMRS Configuration for MU-MIMO advanced receiver | DMRS configuration supported with R-ML for MU-MIMO (1) Type 1 with length 1 (2) Type 1 with length 2 (3) Type 2 with length 1 (4) Type 2 with length 2 | 36-1 | Yes |  | UE is not capable of advanced receiver to suppress inter-user inference in MU-MIMO with the DMRS configuration | Per FSPC | N/A | FR1 only |  |  | Optional with capability signaling |

**Recommended WF:**

FG 36-1 is agreed in last meeting. Remove [] in 36-1.

Further discuss other FGs.

1. NR\_pos\_enh2

Agreement in last RAN4 meeting:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 37.  NR\_pos\_enh2 | 37-1 | Support of reduced number of samples for PRS based positioning measurements with frequency hopping for RRC\_CONNECTED | 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/false  Need for the LMF to know if the feature is supported: True | Optional with capability signalling |
| 37.  NR\_pos\_enh2 | 37-1A | Support of reduced number of samples for PRS based positioning measurements with frequency hopping for RRC\_IDLE and RRC\_INACTIVE | 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/false  Need 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 for RRC\_CONNECTED | 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/false  Need for the LMF to know if the feature is supported: True | Optional with capability signalling |
| 37.  NR\_pos\_enh2 | 37-2A | Support of reduced number of samples in positioning measurements with PRS bandwidth aggregation for RRC\_IDLE and RRC\_INACTIVE | 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/false  Need for the LMF to know if the feature is supported: True | Optional with capability signalling |

## 37-x Proposal in R4-2401564 (Huawei)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 37.NR\_pos\_enh2 | 37-3 | DL PRS or UL SRS frequency hopping for RedCap UEs | Indicate the switching time for UL SRS or DL PRS hopping for RedCap UEs. |  | Yes | N/A | UE does not support DL PRS or UL SRS frequency hopping for RedCap UEs | Per Band | N/A | N/A | N/A | Candidate value set: FR1: {70us, 140us, 210us}. FR2: {35us, 70us, 125us}  Detailed information can refer to the LS to RAN1 in R4-2306659 and R4-2310305 | Optional with capability signalling |
| 37.NR\_pos\_enh2 | 37-4 | DL PRS or UL SRS frequency hopping before the first hop and after the last hop for RedCap UEs | Indicate the switching time for UL SRS or DL PRS transmission between the initial/active BWP to first hop and switching time between last hop to the initial/active BWP for RedCap UEs. | 37-3 | Yes | N/A | The switching time repoted in 37-1 would apply for DL PRS or UL SRS frequency hopping before the first hop and after the last hop for RedCap UEs | Per Band | N/A | N/A | N/A | Candidate value set: {100us, 140us, 200us, 300us, 500us }  Detailed information can refer to the LS to RAN1 in R4-2314732. | Optional with capability signalling |

**Recommended WF:**

More discussion is needed on proposed new FGs.

1. NR\_MC\_enh

No FGs are captured in last meeting.

## 38-x Dynamic UL Tx switching

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 38.  NR\_MC\_enh  **Option 1: R4-2400178 Apple** | 38-1 | UL Tx switching across 3 bands for single-TAG | * UE to indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, SUL or inter-band EN-DC * UE to declare the switching period for UL Tx switching across 3 bands for in inter-band EN-DC, inter-band UL CA or SUL band combinations. Switching period value to be from the set (35uSec, 140uSec, 210uSec) |  | yes | no | UE does not support Tx switching across 3 bands for inter-band EN-DC, inter-band UL CA and SUL band combinations, single-TAG | per band pair per BC | No | FR1 only | N/A | Agreed in RAN#98-e RP-223557 | Optional with capability signalling |
|  | UL Tx switching across 4 bands for single-TAG | * UE to indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, SUL or inter-band EN-DC * UE to declare the switching period for UL Tx switching across 4 bands for in inter-band EN-DC, inter-band UL CA or SUL band combinations. Switching period value to be from the set (35uSec, 140uSec, 210uSec) |  | yes | no | UE does not support Tx switching across 4 bands for inter-band EN-DC, inter-band UL CA and SUL band combinations, single-TAG | per band pair per BC | No | FR1 only | N/A | Agreed in RAN#98-e RP-223557 | Optional with capability signalling |
| **Option 2: R4-2401107 NTT DOCOMO** |  | Switching period for dynamic UL Tx switching across 3 bands in case of inter-band CA, SUL for single TAG | 1. Indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL for single TAG.   * 2. Indicate the supported switching period for dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL for single TAG. |  | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 2 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
|  | Switching period for dynamic UL Tx switching across 4 bands in case of inter-band CA, SUL for single TAG | 1. Indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL for single TAG.  2. Indicate the supported switching period for dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL for single TAG. |  | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 2 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
| 38.  NR\_MC\_enh  **Option 3: R4-2401564 Huawei** | 38-1 | Switching period for dynamic UL Tx switching across up to 4 bands in case of inter-band CA, SUL] | UE to indicate support of dynamic UL Tx switching across up to 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 |

**Recommended WF:**

Discuss whether to have separate FGs for 3 bands and 4 bands first.

## 38-x Dynamic UL Tx switching for dual TAG

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
| 38.  NR\_MC\_enh  **Option 1: R4-2400178 Apple** | 38-3 | UL Tx switching across 2 bands for dual-TAG | * UE to indicate support of dynamic UL Tx switching across 2 bands for inter-band UL CA, SUL or inter-band EN-DC, dual-TAG mode * UE to declare the switching period for UL Tx switching across 2 bands for in inter-band EN-DC, inter-band UL CA or SUL band combinations, dual-TAG mode. Switching period value to be from the set (35uSec, 140uSec, 210uSec) |  | yes | no | UE does not support Tx switching across 2 bands for inter-band EN-DC, inter-band UL CA and SUL band combinations, dual-TAG | per band pair per BC | No | FR1 only | N/A | Agreed in RAN#101 RP-232418 | Optional with capability signalling |
| 38-4 | UL Tx switching across 3 bands for dual-TAG | * UE to indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, SUL or inter-band EN-DC, dual-TAG mode * UE to declare the switching period for UL Tx switching across 3 bands for in inter-band EN-DC, inter-band UL CA or SUL band combinations, dual-TAG mode. Switching period value to be from the set (35uSec, 140uSec, 210uSec) | 38-1 and 38-2 | yes | no | UE does not support Tx switching across 3 bands for inter-band EN-DC, inter-band UL CA and SUL band combinations, dual-TAG | per band pair per BC | No | FR1 only | N/A | NOTE: Signalling structure is up to RAN2.  RAN4 will specify for UL CA and EN-DC for which band combinations DL interruptions are  Agreed in RAN#101 RP-232418 | Optional with capability signalling |
| 38-5 | UL Tx switching across 4 bands for dual-TAG | * UE to indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, SUL or inter-band EN-DC, dual-TAG mode * UE to declare the switching period for UL Tx switching across 4 bands for in inter-band EN-DC, inter-band UL CA or SUL band combinations, dual-TAG mode. Switching period value to be from the set (35uSec, 140uSec, 210uSec) | 38-1 and 38-2 | yes | no | UE does not support Tx switching across 4 bands for inter-band EN-DC, inter-band UL CA and SUL band combinations, dual-TAG | per band pair per BC | No | FR1 only | N/A | NOTE: Signalling structure is up to RAN2.  RAN4 will specify for UL CA and EN-DC for which band combinations DL interruptions are  Agreed in RAN#101 RP-232418 | Optional with capability signalling |
| **Option 2: R4-2401107 NTT DOCOMO** | [38-3] | Switching period for dynamic UL Tx switching across 2 bands in case of inter-band CA, SUL for dual TAG | 1. Indicate support of dynamic UL Tx switching across 2 bands for inter-band UL CA, or SUL for dual TAG.   * 2. Indicate the supported switching period for dynamic UL Tx switching across 2 bands for inter-band UL CA, or SUL for dual TAG. |  | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 2 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
| 38-4 | Switching period for dynamic UL Tx switching across 3 bands in case of inter-band CA, SUL for dual TAG | 1. Indicate support of dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL for dual TAG.  2. Indicate the supported switching period for dynamic UL Tx switching across 3 bands for inter-band UL CA, or SUL for dual TAG. |  | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 2 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
| 38-5 | Switching period for dynamic UL Tx switching across 4 bands in case of inter-band CA, SUL for dual TAG | 1. Indicate support of dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL for dual TAG.  2. Indicate the supported switching period for dynamic UL Tx switching across 4 bands for inter-band UL CA, or SUL for dual TAG. |  | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 2 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |

**Recommended WF:**

Use option 2 as baseline.

## 38-x DL interruption

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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** |
| 38.  NR\_MC\_enh  **Option 1: R4-2400178 Apple** | 38-6 | DL interruption for Tx switching across 3 bands | Capability to indicate that for the band where DL interruption is needed, the RRM interruption requirements defined in RAN4 shall be applied for duplex mode combinations except the combinations   * SUL+TDD * TDD+TDD CA with the same UL-DL pattern * TDD+TDD EN-DC with the same UL-DL pattern | 38-1, 38-2, 38-3 | yes | no | UE not reporting this capability means DL interruption is not required | per band pair per BC | No | FR1 only | N/A |  | Optional with capability signalling |
| 38-7 | DL interruption for Tx switching across 4 bands | Capability to indicate that for the band where DL interruption is needed, the RRM interruption requirements defined in RAN4 shall be applied for duplex mode combinations except the combinations   * SUL+TDD * TDD+TDD CA with the same UL-DL pattern * TDD+TDD EN-DC with the same UL-DL pattern | 38-1, 38-2, 38-3 | yes | no | UE not reporting this capability means DL interruption is not required | per band pair per BC | No | FR1 only | N/A |  | Optional with capability signalling |
| **Option 2: R4-2401107 NTT DOCOMO** | 38-6 | Application of DL interruptions due to dynamic UL Tx switching | 1. Capability to indicate that for the band where DL interruption is needed, the RRM interruption requirements defined in RAN4 shall be applied for duplex mode combinations except the combinations  - SUL+TDD   * - TDD+TDD CA with the same UL-DL pattern SUL+TDD | 38-1, 38-2, 38-3, 38-4, 35-5 | Yes | N/A | UL Tx switching where DL interruption is needed cannot be supported. | Per BC | No | FR1 only | Support mixture of FDD/TDD | Note: 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. | Optional with capability signaling |
| 38.  NR\_MC\_enh  **Option 3: R4-2401564 Huawei** | 38-2 | 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. 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 | Yes |  |  | Per BC, details are up to RAN2 | No need | Applicable only to FR1 |  |  | Optional with capability signaling |

**Recommended WF:**

Option 1 separates DL interruption for 3 bands and 4 bands. Option 2 and 3 use one FG for DL interruption. Discuss whether to have separate FGs for 3 bands and 4 bands.

The main difference between option 2 and 3 on the description is that option 3 only allows interruption for TDD+TDD CA with the same UL-DL pattern. More discussion is needed.

## 38-x Unaffected Band

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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** |
| **Option 1: R4-2401107 NTT DOCOMO** | 38-7 | Switching Period for unaffected Band for Dual UL | 1. Indicate 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 during the switching period reported for the band pair of band X and band Y, as defined in 38.101-1  2. Indicate the support 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 Y, as specified in 38.101-1.  3. Indicate additionally the supported switching period for unaffected band for dual UL. | 38-1, 38-4 | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination. | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 3 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
| 38.  NR\_MC\_enh  **Option 2: R4-2401564 Huawei** | 38-3 | 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 Y, 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 | Yes |  |  | Per BC, details are up to RAN2 | No need | Applicable only to FR1 |  |  | Optional with capability signaling |
| 38.  NR\_MC\_enh  **Option 3: R4-2400178 Apple** |  | Optional UE TX switching capability | * For the band with the number of Tx chain **unchanged** due to switching, in addition to the baseline UE assumption agreed in RAN4 #104e, introduce optional UE capability to allow UL transmission on the band with the number of Tx chain unchanged (i.e., one Tx chain is maintained on the band) during UL switching.     The swithing period is the switching period between band A and band B | 38-1 | yes | no | UE not reporting this capability means UE does not support optional Tx switching capability | per band pair per BC | No | FR1 only | N/A | RAN2 to define how the UE could signal to the network its support of this this optional feature.  Agreed in RAN#98-e RP-223557 | Optional with capability signalling |

**Recommended WF:**

Use option 1 as baseline.

## 38-x Additional switching period

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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** |
| **Option 1: R4-2401107 NTT DOCOMO** | 38-8 | Additional switching Period for Dual UL | 1. Indicate additionally the supported 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. | 38-1, 38-2, 38-4, 35-5 | Yes | N/A | UL Tx switching across more than 2 bands cannot be supported for the band pair in the band combination. | Per BC | No | FR1 only | Support mixture of FDD/TDD | Component 1 candidate value: {35us, 140 us, 210us} | Optional with capability signaling |
| 38.  NR\_MC\_enh  **Option 2: R4-2401564 Huawei** | 38-4 | 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 | Yes |  |  | Per BC, details are up to RAN2 | No need | Applicable only to FR1 |  |  | Optional with capability signaling |

**Recommended WF:**

Use option 1 as baseline.

## 38-x Improved switching period

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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** |
| **Option 1: R4-2401107 NTT DOCOMO** | 38-9 | Improved switching period for four-band switching case | * 1. Support the capability that the switching period can be improved to min {max(Tswitch\_A-C, Tswitch\_B-D), max(Tswitch\_A-D, Tswitch\_B-C)} assuming UE’s preferred (switched-from, switched-to) band pairs for parallel UL transmission switching for a band combination consisting of four different bands. | 38-1, 35-5 | Yes | N/A | Network can only assume the maximum switch period | Per BC | No | FR1 only | Support mixture of FDD/TDD | Note: Detailed information can refer to the LS to RAN2 in R4-2317609 | Optional with capability signalling |
| 38.  NR\_MC\_enh  **Option 2: R4-2401564 Huawei** | 38-5 | Improved switching period for four-band switching case | Indicate UE supporting the advanced capability of the switching period can be improved to min {max(Tswitch\_A-C, Tswitch\_B-D), max(Tswitch\_A-D, Tswitch\_B-C)}. | 38-1 | 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 signaling |

**Recommended WF:**

Use option 1 as baseline.

## 38-x UL-MIMO coherence capability

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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** |
| **Option 1: R4-2401107 NTT DOCOMO** | 38-10 | UL-MIMO coherence capability for dynamic Tx switching between 2Tx-2Tx switching among 3 or 4 bands | * 1. 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 | N/A | UL-MIMO coherence cannot be supported for UL Tx switching across more than 2 bands. | Per BC | No | FR1 only | Support mixture of FDD/TDD | Note: Detailed information can refer to the LS to RAN2 in R4-2217741. | Optional with capability signalling |
| 38.  NR\_MC\_enh  **Option 2: R4-2401564 Huawei** | 38-6 | 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 | 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 signaling |

**Recommended WF:**

Use option 1 as baseline.

1. NR\_Mob\_enh2

No FGs are captured in last meeting.

Proposal in R4-2400178 Apple

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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** |
| 39.  NR\_Mob\_enh2 | [39-1] | SSB based L1-RSRP measurements for multiple cells with RTD > CP | Capability of SSB based L1-RSRP measurements for more than 1 Cells with RTD > CP in one frequency layer | 45-1, or 45-1a from RAN1 Rel-18 feature list | Yes | No | [NW does not know which requirements UE will follow] | [Per UE] | No | Yes | N/A | Note: the max number of cells is up to 39-3-1 or 39-3a-1 | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-2] | SSB based inter-frequency L1-RSRP measurements without gap | Capability of SSB based inter-frequency L1-RSRP measurements without gap for LTM | 45-1a and 9-4 | Yes | No | UE does not support inter-frequency L1-RSRP measurements without gap | [Per band/BC] | No | No | N/A | Note: UE supports inter-frequency with Type 1 measurement gap by default if UE reports supporting 45-1a but not 39-3. | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-3-1] | Number of neighbour cells to be measured per intra-frequency layer | Capability of number of neighbour cells to be measured for L1-RSRP per intra-frequency layer | 45-1 from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of cells UE can measure | [per UE / Per band] | No | [No] | N/A | Candidate values: 2, 3, [… TBD] | Mandatory with capability signaling if UE supports 45-1 |
| 39.  NR\_Mob\_enh2 | [39-3-2] | [Number of SSB resources for L1-RSRP measurement within a slot] | The max number of SSB resources for L1-RSRP measurement that UE can measure within a slot across candidate cells for intra- and inter-frequency without gap L1-RSRP measurement | 45-1 from RAN1 Rel-18 feature list and/or 39-3 | Yes | No | NW does not know the max number of SSB resources for L1-RSRP measurement that UE can measure within a slot across candidate cells for intra- and inter-frequency without gap L1-RSRP measurement | Per band | No | Yes | N/A | Note: component 4 is also counted in FG 2-24 | Mandatory with capability signaling if UE supports 45-1 or 39-3 |
| 39.  NR\_Mob\_enh2 | [39-3-3] | [Number of SSB resources for L1-RSRP measurement per intra-frequency layer] | The max number of SSB resources for L1-RSRP measurement that UE can measure per intra-frequency layer | 45-1 from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of SSB resources for L1-RSRP measurement that UE can measure per frequency layer | Per UE | No | Yes | No |  | Mandatory with capability signaling if UE supports 45-1 |
| 39.  NR\_Mob\_enh2 | [39-3-4] | [Number of frequency layers for L1-RSRP measurement] | 1. The max number of frequency layers configured to measure for intra- and inter-frequency without gap L1-RSRP measurement 2. The max number of frequency layers configured to measure for inter-frequency L1-RSRP measurement with measurement gap | 45-1 and/or 39-2 or 45-a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of frequency layers UE can measure | Per UE | No | Yes | No |  | Mandatory with capability signaling if UE supports 45-1, 45-1a, 39-2 |
| 39.  NR\_Mob\_enh2 | [39-3a-1] | Number of neighbour cells to be measured for L1-RSRP inter-frequency layer | Capability of number of neighbour cells to be measured for L1-RSRP inter-frequency per frequency layer | 45-1a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of cells UE can measure | [per UE / Per band] | No | [No] | N/A | Candidate values: 2, 3, [… TBD] | Mandatory with capability signaling if UE supports 45-1a |
| 39.  NR\_Mob\_enh2 | [39-3a-2] | [Number of SSB resources for L1-RSRP measurement per inter-frequency layer] | The max number of SSB resources for L1-RSRP measurement that UE can measure per inter-frequency layer | 45-1, or 45-1a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of SSB resources for L1-RSRP measurement that UE can measure per frequency layer | Per UE | No | Yes | No |  | Mandatory with capability signaling if UE supports 45-1a |
| 39.  NR\_Mob\_enh2 | [39-4] | Interruption on DL slot(s) due to PDCCH- ordered RACH transmission | Capability on whether UE may cause interruption on DL slot(s) on serving cells due to PDCCH-ordered RACH transmission | 45-5 | Yes | No | UE does not cause interruptions on UL&DL slots on serving cells due to PDCCH-ordered RACH transmission | [Per band pair] (between the target band for RACH transmission and band under UE’s current band combo) per band combination | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-4a] | Interruption due to RF retuning for PDCCH- ordered RACH | Indicates the interruption length (Y ms) due to RF re-tuning for PDCCH ordered RACH of which the resources are not fully contained in any of UE’s configured UL BWP(s) of active serving cells | 45-5 | Yes | No | Network does not know whether UE supports the case that RACH bandwidth is outside of any configured BWP and the corresponding length of the interruption | [Per band pair] (between the target band for RACH transmission and band under UE’s current band combo) | No | No | N/A | Candidate values for interruption length Y = 0.25, 0.5, 1 and 2 | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-5] | Early ASN.1 decoding and validity check before cell switch | Capability of early ASN.1 decoding and validity check before cell switch to reduce or skip TLTM\_RRC-processing delay (refer to TS 38.133)]. | [Component 6 of 45-3 or 45-4] | Yes | No | TLTM\_RRC-processing delay will not be skipped, i.e., 10ms | [Per UE] | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-6] | [Shorter UE processing time during cell switch] | Capability of reduced TLTM\_processing delay (refer to TS 38.133)].   1. Support of reduced TLTM\_processing for cell switch from FR1 to FR1. 2. Support of reduced TLTM\_processing for cell switch from FR2 to FR2. 3. Support of reduced TLTM\_processing for cell switch from FR1/FR2 to FR2/FR1. | [Component 6 of 45-3 or 45-4] | Yes | No | TLTM\_processing delay will not be reduced, i.e., 20ms for intra-FR cell switch and 40ms for inter-FR cell switch | [Per UE] | No | No | N/A | Candidate values: TBD | Optional with capability signaling |

Proposal in R4-1401564 Huawei

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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** |
| 39.  NR\_Mob\_enh2 | 39-1-1 | Number of candidate cells to be measured for intra-frequency L1-RSRP measurement | Capability of Number of candidate cells to be measured for intra-frequency L1-RSRP measurement | 45-1 from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of cells UE can measure | Per BC | No | [No] | N/A | Candidate values: {1,2, TBD} | Mandatory with capability signaling if UE supports 45-1 |
| 39.  NR\_Mob\_enh2 | 39-1-2 | L1-RSRP measurements for multiple cells with RTD<= CP | 1. The max number of SSB resources configured to measure L1-RSRP within a slot across serving cells and candidate cells for intra- and inter-frequency without gap L1-RSRP measurement 2. The max number of SSB resources configured for L1-RSRP across serving cells and candidate cells for intra- and inter-frequency without gap L1-RSRP measurement | 45-1 from RAN1 Rel-18 feature list and/or 39-2a | Yes | No | [NW does not know which requirements UE will follow] | Per BC | No | Yes | N/A | Component 1 candidate values: {1,2,3,4,78} for candidate cells/{1,2,4,8} for both  Component 2 candidate values: {2,4,8,12,16,32,64} | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-1-3 | L1-RSRP measurements for multiple cells with RTD > CP | 1. The max number of SSB resources configured to measure L1-RSRP for RTD<=CP and RTD>CP within a slot acrossserving cells and candidate cells for intra- and inter-frequency without gap L1-RSRP measurement  2. The max number of SSB resources configured for L1-RSRP for RTD<=CP and RTD>CP across serving cells and candidate cells for intra- and inter-frequency without gap L1-RSRP measurement | 45-1 from RAN1 Rel-18 feature list and/or 39-1-2，39-2a | Yes | No | [NW does not know which requirements UE will follow] | Per BC | No | Yes | N/A | Component 1 candidate values: {1,2,3,4,78} for candidate cells  Component 2 candidate values: {2,4,8,12,16,32,64} | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-2-1 | Inter-frequency L1-RSRP measurements with gap | 1. The max number of SSB resources configured to measure L1-RSRP within a slot across candidate cells for inter-frequency L1-RSRP measurement  2. The max number of SSB resources configured across all the candidate cells for inter-frequency L1-RSRP measurement | 45-1, or 45-1a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of SSB resources for L1-RSRP measurement that UE can measure per frequency layer | Per BC | No | Yes | No | Component 1 candidate values: {1,2,3,4,78} for candidate cells  Component 2 candidate values: {2,4,8,12,16,32,64} | Mandatory with capability signaling if UE supports 45-1a |
| 39.  NR\_Mob\_enh2 | 39-2-2 | Number of candidate **cells** to be measured forL1-RSRP inter-frequency layer | Capability of number of candidate cells to be measured for L1-RSRP inter-frequency per frequency layer | 45-1a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of cells UE can measure | Per BC | No | [No] | N/A | Candidate values:1,2,TBD | Mandatory with capability signaling if UE supports 45-1a |
| 39.  NR\_Mob\_enh2 | 39-2a | Inter-frequency L1-RSRP measurements without gap | Capability of Inter-frequency L1-RSRP measurements without gap for LTM | 45-1a and 9-4 | Yes | No | UE does not support inter-frequency L1-RSRP measurements without gap | Per BC | No | No | N/A | Note: UE supports inter-frequency with Type 1 measurment gap by default if UE reports supporting 45-1a but not 39-3. | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3 | Number of **frequency layers** for L1-RSRP measurement | 1. The max number of frequency layers configured to measure for intra- and inter-frequency without gap L1-RSRP measurement 2. The max number of frequency layers configured to measure for inter-frequency L1-RSRP measurement with measurement gap | 45-1 and/or 39-2a or 45-a from RAN1 Rel-18 feature list | Yes | No | NW does not know the max number of frequency layers UE can measure | Per BC | No | Yes | No | Component 1 Candidate values: 1,2 TBD Component 2 Candidate values: 1,2 TBD | Mandatory with capability signaling if UE supports 45-1, 45-1a, 39-2 |
| 39.  NR\_Mob\_enh2 | 39-4 | Interruption on DL slot(s) due to PDCCH- ordered RACH transmission | Capability on whether UE causes interruption on DL slot(s) on serving cells due to PDCCH-ordered RACH transmission | 45-5 | Yes | No | UE does not cause interruptions on DL slots on serving cells due to PDCCH-ordered RACH transmission | [Per band pair] (between the target band for RACH transmission and band under UE’s current band combo) per band combination | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-4a | Interruption due to RF retuning for PDCCH- ordered RACH | Indicates the interruption length (Y ms) due to RF re-tuning for PDCCH ordered RACH when PRACH bandwidth is not within any of the configured UL BWPs of any active serving cell | 45-5 | Yes | No | Network does not know the length of the interruption | [Per BC] | No | No | N/A | Candidate values for interruption length Y = 0.25, 0.5, 1 and 2 | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-5 | Early ASN.1 decoding and validity check before cell switch | Capability of early ASN.1 decoding and validity check before cell switch to skip TLTM\_RRC-processing | Component 6 of 45-3 or 45-4 | Yes | No | TLTM\_RRC-processing delay will not be skipped, i.e., 10ms | [Per UE] | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-6 | [Shorter UE processing time during cell switch] | Capability of reduced TLTM\_processing delay when when target Pcell/SCell is current SCell/PCell | Component 6 of 45-3 or 45-4 | Yes | No | TLTM\_processing delay will not be reduced, i.e., 20ms for intra-FR cell switch and 40ms for inter-FR cell switch | [Per UE] | No | No | N/A | Candidate values: TBD | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-7 | Measurement validation during connection setup/resume for fast CA/DC setup | Indicate UE supporting measurement validation during connection setup/resume for fast CA/DC setup |  | Yes | No | UE does not support measurement validation during connection setup/resume | Per UE | No | Yes | N/A |  | Optional with capability signalling |

**Recommended WF:**

More technical discussion is needed. Recommend to discuss in RRM session.

1. NR\_NTN\_enh

No FGs are captured in last meeting.

## 40-x DMRS bundling for NTN coverage enhancement

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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** |
| 40.  NR\_NTN\_enh  **Proposal in R4-2400178 Apple** | 40-1 | DMRS bundling for NTN coverage enhancement | The range of [*maxDurationDMRS-Bundling-r17*] for NTN bands for which RAN4 has introduced requirements is restricted as follows:   * Up to [4] slots if *ntn-ScenarioSupport-r17* is present and indicated as NGSO or only the IE field *nonTerrestrialNetwork-r17* is present * Up to [16] slots if *ntn-ScenarioSupport-r17* is present and indicated as GSO | [*maxDurationDMRS-Bundling-r17*], [*ntn-ScenarioSupport-r17*] | Yes | N/A | UE cannot support this feature | Per band |  |  | N/A |  | Optional with capability signalling |

RAN1 has assumed “pre-compensation to keep phase rotation due to timing drift within the phase difference limit can be performed at UE side” in order for the UE to meet the maximum allowable phase difference requirements for DMRS bundling.  Because the side conditions of the phase continuity requirement for DMRS bundling do not allow the UE to perform pre-compensation during the configured DMRS bundling window, the UE has to perform this operation at the beginning of the bundle. Thus, the range of the maximum duration of DMRS bundling needs to be restricted for NTN bands as follows:

* Up to [4] slots if *ntn-ScenarioSupport-r17* is present and indicated as NGSO or only the IE field *nonTerrestrialNetwork-r17* is present
* Up to [16] slots if *ntn-ScenarioSupport-r17* is present and indicated as GSO

It is proposed to reflect these restrictions in the Rel-18 UE feature list, with the understanding that RAN2 can accommodate the restriction in the capability value within the TS38.306 specification. Alternatively, if this approach is deemed too difficult, RAN4 can consider introducing new NTN-specific capabilities for DMRS bundling with these restrictions applied.

**Recommended WF:**

More discussion is needed on whether to introduce this FG.

## 40-x VAST UE type, beam steering

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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** |
| 40.NR\_NTN\_enh  **Proposal in R4-2401564 Huawei** | 40-1 | VSAT UE type in NTN | Support of fixed or mobile VSAT (Very Small Aperture Terminal) UE type  a) Type 1: a fixed VSAT, which is allowed to access to a cell for MSS (mobile satellite service) or FSS (fixed satellite service) from regulation perspective.  b) Type 2: a mobile VSAT, which is allowed to access to an MSS cell from regulation perspective.  A VSAT (Very Small Aperture Terminal) UE as defined in TS 38.101-5 must indicate support of this capability with only one type. If this capability is absent, a mobile VSAT is supported by default. |  | Yes | N/A | The network doesn’t know the VSAT UE type and cannot decide whether it’s allowed to handover this UE to an FSS cell. | Per UE | N/A | N/A | N/A | Support receiving access control indication in system information | Optional with capability signalling |
| 40-2 | Beam steering | Support of beam steering capability   1. Type 1: Fully electronically-steered beam UEs 2. Type 2: Fully mechanically-steered beam UEs   A VSAT (Very Small Aperture Terminal) UE as defined in TS 38.101-5 must indicate support of this capability with only one type. |  | Yes | N/A | Beam steering is not supported. | Per-band | FDD only | N/A | N/A | The capability is not applicable for UE other than VSAT. | Optional with capability signaling |

**Recommended WF:**

More discussion is needed.

1. NR\_cov\_enh2

No FGs are captured in last meeting.

## 41-1 ΔPPowerClass Report

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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  **Option1: R4-2400335 Nokia** | 41-1 | dpc (∆PPowerClass) report for FR1 | Indicates whether UE can report ∆PPowerClass or report ∆PPowerClass as well as ΔPPowerClass,CA/∆PPowerClass,EN-DC/∆PPowerClass,NR-DC when the UE is configured with *dpc-Reporting-FR1* and the reporting is triggered only by uplink duty cycle exceedance or by return to the *ue-PowerClass* or *powerClass* after the duty cycle exceedance. |  | Yes | No | UE cannot obtain optimized resource schedule by the network | Per UE | NO | FR1 only | N/A | NONE | Optional with capability signalling |
| 41 NR\_cov\_enh2  **Option 2: R4-2402440 Intel** | 41-1 | Support of ΔPPowerClass reporting mechanism | 1. Support of UE report on the ΔPPowerClass to indicate which power class requirements that the UE is referring to only when configured duty cycle is exceed as defined in TS 38.101-1 and 38.101-3 | No | Yes | N/A | UE does not support of report on the ΔPPowerClass to indicate which power class requirements that the UE is referring to only when configured duty cycle is exceed | [Per UE] | No | FR1 only | N/A | Component 1 candidate value: true/false | Optional with capability signalling |

**Recommended WF:**

Option 1 and option 2 are similar, further discuss the details.

## 41-2 and 41-3 Power Boost

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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  **Option1: R4-2400335 Nokia** | 41-2 | powerBoostRel18 | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK without modified spectrum flatness requirement for MPR reduction, when applicable as defined in 6.2 of TS 38.101-1.The power boosting is only enabled when signalled via RCC *powerBoostPi2BPSKRel18* for BPSK and *powerBoostQPSKRel18* for QPSK |  | Yes | N/A | UE cannot power boost without modified spectrum flatness requirement | Per FS | NO | FR1 only | N/A | NONE | Optional with capability signalling |
| 42-3 | powerBoostTSRel18 | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK with modified spectrum flatness requirement for MPR reduction, when applicable as defined in 6.2 of TS 38.101-1. The power boosting is only enabled when signalled via RCC *powerBoostPi2BPSKRel18* for BPSK and *powerBoostQPSKRel18* for QPSK |  | Yes | N/A | UE cannot power boost with modified spectrum flatness requirement | Per FS | NO | FR1 only | N/A | NONE | Optional with capability signalling |
| 41 NR\_cov\_enh2  **Option 2: R4-2402440 Intel** | 41-2 | Power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions | 1. Support of power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions for PC3 and PC2 without transparent scheme for MPR reduction, when applicable as defined in 6.2 of TS 38.101-1. | No | Yes | N/A | UE does not support power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions for PC3 and PC2 without transparent scheme for MPR reduction | Per FS | No | FR1 only | N/A | Component 1 candidate value: true/false | Optional with capability signalling |
| 41-3 | Power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions with frequency-domain spectrum shaping | 1. Support of power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions for PC3 and PC2 with frequency-domain spectrum shaping, when applicable as defined in 6.2 of TS 38.101-1. | No | Yes | N/A | UE does not support power boosting for PUSCH DFT-s-OFDM pi/2 BPSK and QPSK transmissions for PC3 and PC2 UEs with frequency-domain spectrum shaping | Per FS | No | FR1 only | N/A | Component 1 candidate value: true/false | Optional with capability signalling |
| 41 NR\_cov\_enh2  **Option 3: R4-2401564 Huawei** | 41-1 | powerBoostRel18 | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK without modified spectrum flatness requirement for MPR reduction, when applicable as defined in 6.2 of TS 38.101-1. |  | Yes |  |  | Per FS | N/A | FR1 only |  | UE cannot indicate the support of 41-1 and 41-2 simultaneously | Optional with capability signalling |
| 41-2 | powerBoostTSRel18 | Indicates whether UE supports power boosting for pi/2 BPSK and QPSK with modified spectrum flatness requirement for MPR reduction, when applicable as defined in 6.2 of TS 38.101-1. |  | Yes |  |  | Per FS | N/A | FR1 only |  | UE cannot indicate the support of 41-1 and 41-2 simultaneously | Optional with capability signalling |

**Recommended WF:**

All options are similar, further discuss the details.

1. Netw\_Energy\_NR

No FGs are captured in last meeting.

## 42-1 SCell without SS/PBCH block

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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** |
| 42.  Netw\_Energy\_NR  **Option 1: R4-2400178 Apple** | 42-1 | FR1 Inter-band SSB-less SCell operation | Support of SSB-less SCell operation for inter-band CA for FR1 and co-located cells |  | Yes | N/A | UE does not support SSB-less SCell operation for inter-band CA for FR1 and co-located cells, and network cannot configure FR1 inter-band SSB-less SCell to the UE for CA. | Per FS | No | FR1 only | N/A | UE is required to meet the RRM requirement of FR1 inter-band SSB-less SCell operations in TS38.133. | Optional with capability signaling |
| 42.Netw\_Energy\_NR  **Option 2: R4-2401564**  **Huawei** | 42-1 | SCell without SS/PBCH block for inter-band CA | Support of SCell without SS/PBCH block for inter-band CA |  | Yes | NA | UE cannot support SCell without SS/PBCH block for inter-band CA | UE indicates supporting this feature per Band pair per BC | NA | FR1 only | NA | UE support this feature shall be able to use SS/PBCH block from other Cells from another band within the band combination for time/frequency synchronization of SCell without SS/PBCH block. UE shall meet the SCell activation requirements based on periodic CSI-RS for tracking defined in 38.133 8.3.2 | Optional with capability signaling |
| 42.  Netw\_Energy\_NR  **Option 3: R4-2402440 Intel** | 42-1 | Support of SCell without SS/PBCH block for NR FR1 inter-band [and intra-band non-contiguous] CA | 1. Support of SCell without SS/PBCH block for NR FR1 inter-band [and intra-band non-contiguous] CA | No | Yes | N/A | SSB-less operation for NR FR1 inter-band and [intra-band non-contiguous] CA scenarios is not supported | Per FS | No | FR1 only | N/A | Component 1: Whether or not UE is able to use SS/PBCH block from other Cells for time/frequency synchronization of SCell without SS/PBCH block. | Optional with capability signaling |

**Recommended WF:**

The main difference between options and the Report Type and whether to also support intra-band non-contiguous CA. More discussion is needed.

## 42-x Aperiodic CSI-RS for tracking for fast SCell activation for SCell without SS/PBCH block for inter-band CA

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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** |
| 42.Netw\_Energy\_NR  **Proposal in R4-2401564**  **Huawei** | 42-2 | Aperiodic CSI-RS for tracking for fast SCell activation for SCell without SS/PBCH block for inter-band CA | Support of aperiodic CSI-RS for tracking for fast SCell activation for SCell without SS/PBCH block for inter-band CA | 42-1 | Yes | NA | UE cannot support fast SCell activation based on aperiodic CSI-RS for tracking for SCell without SS/PBCH block for inter-band CA | Per band | NA | FR1 only | NA | UE support this feature shall support fast SCell activation based on aperiodic CSI-RS for tracking for SCell without SS/PBCH block for inter-band CA. UE shall meet the SCell activation requirements based on Aperiodic CSI-RS for tracking defined in 38.133 8.3.2 |

**Recommended WF:**

Technical discussion is required on whether to introduce this FG.

1. NR\_DualTxRx\_MUSIM

No FGs are captured in last meeting.

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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** |
| 43.  NR\_DualTxRx\_MUSIM  **Proposal in R4-2400178 Apple** | 43-1 | Collision handling and signalling solution for handling collisions  between MUSIM gaps and between measurement gaps and MUSIM gaps | UE supports indication of MUSIM gap priority; collision handling between MUSIM gaps and between measurement gaps and MUSIM gaps | musim-GapPreference-r17 | YES | N/A | UE is not capable to meet Rel-18 MUSIM requirement | Per UE | No | No | N/A |  | Optional with UE capability signalling |

**Recommended WF:**

More discussion is needed.

1. NR\_SL\_enh2

Agreement in last RAN4 meeting:

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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 | The candidate values are true and false | Optional with capability signalling |

Huawei propose to remove [] of FG 45-1 in R4-2401564

**Recommended WF:**

Remove [] in FG 45-1

xx. NR\_netcon\_repeater

ZTE propose to capture NCR MT FGs in RAN4 UE feature list (R4-2402517).

**Recommended WF:**

Since no new FGs are introduced to NCR MT, if companies agree to capture the applicable FGs for NCR MT, recommend to capture following information in RAN4 UE feature list in stead of the tables:

The following FGs in TR38.822 are applicable to NCR MT:

* Rel-15 FGs: FG 1-1~FG 1-11, FG 2-1~FG 2-17, FG 3-1~FG 3-4
* Rel-16 and Rel-17 FGs: All of R16 and R17 features are optional for NCR-MT except for CA, DC related feature , unlicensed band and, HPUE Duty cycle, MPR related feature which is not applicable for NCR-MT.