3GPP TSG-RAN WG4 Meeting #110 R4-240xxxx

Athens, GR, 26 Feb – 01 Mar, 2024

**Agenda item:** 10

**Source:** Moderator (CMCC)

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

**Document for:** Information

# Introduction

The previous UE feature list are in R4-2321993, R4-2403842.

Companies contributions are listed as below.

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Related features** |
| [**R4-2404353**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110bis/Docs/R4-2404353.zip) | On Rel-18 UE feature list | Apple | 30. NR\_FR2\_multiRX\_DL  32. NR\_MG\_enh2  36. NR\_demod\_enh3  39. NR\_Mob\_enh2 |
| [**R4-2404609**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110bis/Docs/R4-2404609.zip) | Consideration on Rel-18 RAN4 UE feature list for NR | Huawei, HiSilicon | 28 NR\_channel\_raster\_enh  30 NR\_FR2\_multiRX\_DL  32 NR\_MG\_enh2  38 NR\_MC\_enh  39 NR\_Mob\_enh2 |
| [**R4-2404928**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110bis/Docs/R4-2404928.zip) | Views on RAN4 Rel-18 UE feature list | Intel Corporation | 2.1 NR\_channel\_raster\_enh  2.2 NR\_MG\_enh2  2.3 NR\_cov\_enh2  2.4 Netw\_Energy\_NR |
| [**R4-2405973**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_110bis/Docs/R4-2405973.zip) | Rel-18 RAN4 UE feature list for NR\_MC\_enh | DOCOMO Beijing Labs | 38. NR\_MC\_enh |

# NR\_channel\_raster\_enh

Agreement in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature s** | **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, TS 38.101-5 |  | Yes |  | UE may not support requirements for UE specific channel bandwidths located on enhanced channel raster;  configuring a narrower UE-specific channel bandwidth inside a wider gNB channel bandwidth may not be possible. | 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 with capability signaling for all Rel-18 UEs for certain bands as defined in 38.101-1 and 38.101-5  Optional otherwise  FFS for RedCap |

### Issues copied from thread [101]

*Sub-topic description:* **NR channel raster capability for RedCap**

**Issue 2-3-1:** How to apply the enhanced channel raster for the RedCap UE and RedCap operating bands?

* Proposals
  + Option 1: RAN4 support the enhanced channel raster as mandatory feature for the All Redcap operating NR bands.
  + Option 2: RAN4 only support the enhanced channel raster as mandatory feature for Redcap UEs in the same set of NR operating bands for eMBB UEs.
* Discussion
  + Ericsson: we support option 1 from Rel-17. All RedCap UEs support enhanced channel raster.
  + Qualcomm: option 2 from Rel-18.
  + Ericsson: RedCap UEs do not send the capability.
  + Huawei: For Rel-17, there are already existing RedCap UEs in the filed. Do not agree to mandate. From Rel-18, open for option 1.
  + Nokia: For Rel-17, what is the restriction to support enhanced channel raster?
  + Qualcomm: We can not change legacy UE.
  + CTC: Rel-18, we support option 1
  + Nokia: What is the possibility of Rel-17 UE needs to be clarified.
  + Ericsson: It requires different configurations from network side if there is UE not supporting enhanced channel raster. We should fix problem from now.
  + CATT: mandatory support enhanced channel raster is beneficial. We support option 1 from Rel-18. Check feasibility of mandatory support for Rel-17,
  + Verizon: Agree with Ericsson.
  + ZTE: Prefer option 1 from Rel-17.
  + Apple: Similar view as QC. Option 2 from Rel-18.
  + Intel: Option 1. We support introduce capability from Rel-17 and set it mandatory from now on.

**Agreement in adhoc session:**

For Rel-18, at least support the enhanced channel raster as mandatory feature for (e)Redcap UEs in the same set of NR operating bands for eMBB UEs. FFS on other bands.

**Issue 2-3-2:** Which specification release would be applied to support the enhanced channel raster for the RedCap UE as release independent manner?

* Proposals
  + Option 1: From Rel-17 ([R4-2405660](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_110bis/Docs/R4-2405660.zip), Nokia), the enhanced channel raster will be supported for RedCap UEs as mandatory.
  + Option 2: From Rel-18 ([R4-2405609](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_110bis/Docs/R4-2405660.zip), Qualcomm), the enhanced channel raster will be supported for RedCap UEs as mandatory with capability signalling.
  + Option3: From Rel-17 ([R4-2405419](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_110bis/Docs/R4-2405419.zip), Huawei), the enhanced channel raster will be supported for RedCap UEs as optional feature with capability signalling.
    - The Rel-18 RedCap UEs will be supported as mandatory in certain bands with capability signalling.
* Recommended WF
  + TBD.

**Issue 2-3-3:** Update UE feature lists of the enhance channel raster for RedCap UEs

* Proposals
  + Option 1: Based on discussion paper ([R4-2405419](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_110bis/Docs/R4-2405419.zip), Huawei), RAN4 remove “FFS for RedCap”.
  + Option 2: Above issue 2-3-1 and issue 2-3-2 decision, the final UE feature lists will be updated.
  + Option3: Other option is not precluded.
* Recommended WF
  + Need to check with Option 2 as agreements. It will be updated and discussed in UE feature list in Rel-18.

**Agreement in adhoc session:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **…** | **Mandatory/Optional** |
| 28. NR\_channel\_raster\_enh | 28-1 | Enhanced channel raster | Unchanged columns are omitted | Mandatory with capability signaling for all Rel-18 UEs for certain bands as defined in 38.101-1 and 38.101-5  Optional otherwise  FFS for (e)RedCap |

1. NR\_FR2\_multiRX\_DL (not discussed during adhoc)

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 30. NR\_FR2\_multiRX\_DL | 30-1 | 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 PC3 only. |  |
| 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 PC3 only. |  |

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

**Recommended WF:**

Discuss the following proposal from Apple and Huawei. Changed parts are highlighted in yellow.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 30. NR\_FR2\_multiRX\_DL | 30-1 | 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 PC3 only. | [Optional with capability signalling] |

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

**Recommended WF:**

Discuss the following proposal from Apple. Changed parts are highlighted in yellow.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 30. NR\_FR2\_multiRX\_DL | [30-2] | 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 | [Yes] | 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.] | [Optional with capability signalling] |

1. NR\_MG\_enh2 (not discussed during adhoc)

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-10] | Simultaneous reception of NR data and EUTRAN CRS outside BWP with different numerology | Support concurrent inter-RAT measurement on EUTRAN cell in non-DSS with CRS not contained within UE’s active DL BWP and PDCCH or PDSCH reception from the serving cell with a different numerology. | 32-6 | Yes | No | scheduling restriction is applicable | Per UE | No | FR1 only | NA |  | Optional with capability signalling |

## 32-2 Two Pre-MG configuration with simultaneous activation/deactivation

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-2] | Two Pre-MG configuration with simultaneous activation/deactivation | Support configurations of two Pre-MG with simultaneous activation/deactivation in the same FR. | 32-1 | Yes | No | UE activation/deactivation time for simultaneous Pre-MG is undefined | Per UE | No | No | N.A |  | Optional with capability signalling |

**Recommended WF:**

Huawei propose to remove FG 32-2, while Intel propose to keep 32-2 and remove []. More discussion is needed.

## 32-3 Support for dynamic collisions

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-3] | Support for dynamic collisions | Support RRM requirements for handling dynamic collisions between a Pre-MG and another measurement gap or Pre-MG. | 32-1 | Yes | No | UE is not expected to meet RRM requirements for dynamic collisions | Per UE | No | No | N.A |  | Optional with capability signalling |

**Recommended WF:**

**Discuss following options from Huawei and Intel**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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  **Huawei** | [32-3] | Support for dynamic collisions | Support RRM requirements for handling configuration with a pre-MG colliding with another MG or pre-MG, while the first pre-MG has higher priority. | 32-1 | Yes | No | UE is not expected to meet RRM requirements when configured with a pre-MG colliding with another MG or pre-MG, while the first pre-MG has higher priority. | Per UE | No | No | N.A |  | Optional with capability signalling |
| 32. NR\_MG\_enh2  **Intel** | 32-2 | Two Pre-MG configuration with simultaneous activation/deactivation | Support configurations of two Pre-MG with simultaneous activation/deactivation in the same FR. | 32-1 | Yes | No | UE activation/deactivation time for simultaneous Pre-MG is undefined | Per UE | No | No | N.A |  | Optional with capability signalling |

## 32-5 Two NCSG configuration in a FR

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-5] | Two NCSG configuration in a FR | Support configurations of two NCSG in the same FR | 32-4 | Yes | No | UE behaviour is undefined if the network configures two NCSGs in the same FR | Per UE | No | No | N.A |  | Optional with capability signalling |

**Recommended WF:**

Huawei propose to remove FG 32-5, while Intel propose to keep 32-5 and remove []. More discussion is needed.

## 32-6 Inter-RAT EUTRAN measurements without gap and outside active DL BWP

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-6] | [Inter-RAT EUTRAN measurements without gap and outside active DL BWP] | Support of requirements of inter-RAT EUTRAN measurements outside active DL BWP without gap with or without interruption. | [32-8] | Yes | NA | UE behaviour of supporting inter-RAT EUTRAN measurements without gap is known to network | [Per UE] | No | No | N.A |  | Optional with capability signalling |

**Recommended WF:**

Huawei propose to remove FG 32-6, while Intel propose following changes. More discussion is needed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 32. NR\_MG\_enh2 | 32-6 | Inter-RAT EUTRAN measurements without gap and outside active DL BWP | Support of requirements of inter-RAT EUTRAN measurements outside active DL BWP without gap with or without interruption. | No | Yes | NA | UE behaviour of supporting inter-RAT EUTRAN measurements without gap is known to network | Per UE | No | No | N.A |  | Optional with capability signalling |

## 32-7 Inter-RAT EUTRAN measurement without gap [and within active DL BWP]

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 32-7 | Inter-RAT EUTRAN measurement without gap [and within active DL BWP] | Support of inter-RAT EUTRAN measurements without gap when CRS is contained within UE’s active DL BWP | [32-8] | Yes | No | Measurement gap will be needed for inter-RAT EUTRAN measurements | Per UE | No | FR1 only | N.A |  | Optional with capability signalling |

**Recommended WF:**

Remove prerequisite and remove [] in FG column.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 32-7 | Inter-RAT EUTRAN measurement without gap and within active DL BWP | Support of inter-RAT EUTRAN measurements without gap when CRS is contained within UE’s active DL BWP |  | Yes | No | Measurement gap will be needed for inter-RAT EUTRAN measurements | Per UE | No | FR1 only | N.A |  | Optional with capability signalling |

## 32-8 Effective measurement window for inter-RAT EUTRAN measurements

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 32-8 | Effective measurement window for inter-RAT EUTRAN measurements | Support configuration of effective measurement window for inter-RAT EUTRAN measurements, including offset, duration and periodicity. | [32-6 or 32-7] | Yes | No | Undefined UE measurement behaviour and when to allow scheduling restriction | Per UE | No | No | N.A | * A bitmap for 6 effective measurement window (EMW) patterns defined in TS 38.133. * #0 and #1 are mandatory, if UE supports EMW feature.   + FFS other conditions, e.g., UE supports Case b-1 or b-2   Other patterns are optional | Optional with capability signalling |

**Recommended WF:**

Discuss the following proposals from Intel and Huawei.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 32. NR\_MG\_enh2  **Intel** | 32-8 | Effective measurement window for inter-RAT EUTRAN measurements | Support configuration of effective measurement window for inter-RAT EUTRAN measurements, including offset, duration and periodicity. | 32-6 or 32-7 | Yes | No | Undefined UE measurement behaviour and when to allow scheduling restriction | Per UE | No | No | N.A | * A bitmap for 6 effective measurement window (EMW) patterns defined in TS 38.133. * #0 and #1 are mandatory, if UE supports EMW feature.   + FFS other conditions, e.g., UE supports Case b-1 or b-2   Other patterns are optional | Optional with capability signalling |
| 32. NR\_MG\_enh2  **Huawei** | 32-8 | Effective measurement window for inter-RAT EUTRAN measurements | Support configuration of effective measurement window for inter-RAT EUTRAN measurements, including offset, duration and periodicity. | [32-6 or 32-7] | Yes | No | Undefined UE measurement behaviour and when to allow scheduling restriction | Per UE | No | No | N.A | * A bitmap for 6 effective measurement window (EMW) patterns defined in TS 38.133. * #0 and #1 are mandatory, if UE supports EMW feature.   If UE supports ‘nogap-noncsg’ for an LTE measurement and/or FG 32-7, and may cause scheduling restriction due to the LTE measurement outside MG, it should also support FG 32-8   * Other patterns are optional | Optional with capability signalling |

## 32-10 Simultaneous reception of NR data and EUTRAN CRS outside BWP with different numerology

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | [32-10] | Simultaneous reception of NR data and EUTRAN CRS outside BWP with different numerology | Support concurrent inter-RAT measurement on EUTRAN cell in non-DSS with CRS not contained within UE’s active DL BWP and PDCCH or PDSCH reception from the serving cell with a different numerology. | 32-6 | Yes | No | scheduling restriction is applicable | Per UE | No | FR1 only | NA |  | Optional with capability signalling |

**Recommended WF:**

Remove [] for 32-10

## 32-xx Rel-18 LTE UE features for NR\_MG\_enh2 WI.

**Recommended WF:**

Remove [] for 1st FG

Further discuss two options for 2nd FG

Table 2: Rel-18 LTE UE features for NR\_MG\_enh2 WI.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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-y | InterRAT-BandInfoNR-r18 | Support of inter-RAT NR measurements without gap with or without interruption.  This feature has a defined RRC signalling: ‘InterRAT-BandInfoNR-r18’ |  | Yes | NA | The UE does not support inter-RAT NR measurements without gap with or without interruption for performing inter-RAT NR measurement without gap | Per UE | No | No | NA | [Component 1 candidate value: “{no-gap-with-interruption, no-gap-no-interruption}”] | Optional with capability signalling |
| 32. NR\_MG\_enh2 | x-z  Option 1  Huawei | SimultaneousRxData-NRSSB-DiffNumerology | Support concurrent inter-RAT measurement on NR carrier with a different numerology than 15kHz and reception from the serving cell | x-y | Yes | No | scheduling restriction is applicable to reception from the serving cell when performing inter-RAT measurement on NR without gap with a different numerology than 15kHz | Per UE | No | FR1 only | N.A |  | Optional with capability signalling |
|  | [x-y]  Option 2  Intel | Simultaneous reception of LTE data and NR SSB with 30kHz SCS | Support concurrent inter-RAT NR measurement with a different numerology than 15kHz and reception from LTE serving cell |  | Yes | NA | Scheduling restriction is applicable | Per UE | No | No | NA |  | Optional with capability signalling |

1. NR\_demod\_enh3 (not discussed during adhoc)

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 | 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, when co-scheduled UE(s)’ modulation order is signaled | 3-4 | Yes | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO | Per UE  Note: UE supports R-ML on MU-MIMO on single carrier operation. UE optionally supports R-ML on MU-MIMO on one or more carriers in CA operation | No | FR1 only | N/A |  | Optional with capability signaling |
| 36. NR\_demod\_enh3 | 36-2a | MU-MIMO Interference Mitigation advanced receiver with modulation order detection | 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] when co-scheduled UE(s)’ modulation order is not signaled | 36-1 | No | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO with modulation order detection | N/A | No | FR1 only | N/A |  | Optional without capability signaling |
| 36. NR\_demod\_enh3 | 36-2b | MU-MIMO Interference Mitigation advanced receiver with modulation order detection | 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] when co-scheduled UE(s)’ modulation order is not signaled | 36-1 | No | N/A | UE not capable of advanced receiver to suppress inter-user inference in MU-MIMO with modulation order detection | N/A | No | FR1 only | N/A |  | Optional without capability signaling |

**Recommended WF:**

Apple propose to remove 36-2b? More discussion is needed.

1. NR\_MC\_enh

## 38-4 Additional switching Period for Dual UL

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 38-4 | [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 | 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 |

**Recommended WF:**

More offline discussion is needed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **38.**  **NR\_MC\_enh** | **38-4** | **Additional switching Period for switching case across three or four bands for Dual UL** | **1. Indicate additionally the supported Tx switching period for switching case across four bands, i.e., between {1T, 1T, 0T, 0T and {0T, 0T, 1T, 1T}}, when Rel-18 UL Tx switching is configured by uplinkTxSwitchingMoreBands-r18.**  Indicate the support of 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.  **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** | **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** |

## 38-5 preferredBandPairs for four-band switching case

Agreements in RAN4#110:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 38-5 | [preferredBandPairs for four-band switching case] | [1. Support the indication of 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 | 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 |

**Agreement in adhoc session:**

If 38-5 is merged to 38-4, 38-5 will be removed from feature list.

## 38-7 Switching period restriction for fallback band combination

**Agreement in adhoc session::**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 38.  NR\_MC\_enh | 38-7 | Switching period restriction for fallback band combination | Indicates whether the same value of switching period is applicable to the fallback band combinations for given band combination supporting uplink Tx switching across up to four bands. When the field is included for a band combination, it represents the largest value, i.e. 210us is supported for each band pair in all fallback band combinations for a given band combination supporting UL Tx switching across up to 4 bands. | 38-1 | Yes | N/A | The same switching period reported for each band pair in this band combination is supported for the same band pair in all the fallback band combinations. | Per BC | No | FR1 only | Support mixture of FDD/TDD |  | Optional with capability signaling |

1. NR\_Mob\_enh2 (not discussed during adhoc)

**Recommended WF:**

Discuss the following proposal from Huawei. Changes are highlighted in yellow.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 simultaneous L1-RSRP measurements for more than one cell when the max RTD among the cells on the same frequency layer or in the same active BWP is larger than CP length of the cell on the frequency layer. | 45-1 from RAN1 Rel-18 feature list or 39-2 or 39-2a | Yes | No | NW does not know which requirements UE will follow | Per BC | No | Yes | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-2 | SSB based inter-frequency L1-RSRP measurements without measurement gaps | Capability of SSB based inter-frequency L1-RSRP measurements without measurement gaps (without interruption on serving cell(s)) for LTM | 45-1a from RAN1 Rel-18 feature list and 9-4 | Yes | No | UE does not support inter-frequency L1-RSRP measurements without measurement gaps | Per UE | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-2a | SSB based inter-frequency L1-RSRP measurements with measurement gaps | Capability of SSB based inter-frequency L1-RSRP measurements with measurement gaps for LTM | 45-1a from RAN1 Rel-18 feature list | Yes | No | UE does not support inter-frequency L1-RSRP measurements with measurement gaps | Per UE | No | No | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3-1 | Number of frequency layers for L1-RSRP measurement | 1. The max number of frequency layers UE can measure for intra- and inter-frequency without measurement gaps L1-RSRP measurement   2. The max number of frequency layers UE can measure for inter-frequency L1-RSRP measurement with measurement gaps | 1. Component 1: 45-1 from RAN1 Rel-18 feature list and/or 39-2  2. Component 2: 39-2a | Yes | No | NW does not know the max number of frequency layers UE can measure | Per BC | No | Yes | No | 1. Candidate values Component 1: {1,2,3,4,5,6,7,8}  2. Candidate values Component 2: {1,2,3,4,5,6,7,8} | Mandatory with capability signaling if UE supports 45-1, 39-2 and/or 39-2a |
| 39.  NR\_Mob\_enh2 | 39-3-2 | Number of neighbour cells to be measured per frequency layer | 1. The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps   2. The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps | 1. Component 1: 45-1 from RAN1 Rel-18 feature list or 39-2  2. Component 2: 39-2a | Yes | No | There is no limitation on the number of neighbour cells per frequency layer for L1 measurement. | Per BC | No | [Yes] | N/A | 1. Candidate values Component 1: {1,2,3,4,5,6,7,8}  2. Candidate values Component 2: {1,2,3,4,5,6,7,8}  Note: it is RAN4 understanding that RAN1 feature 45-1 and 45-1a is for number of cell that can be configured for L1 measurement. What RAN4 is discussing here is for number of cells on which UE can actually perform L1 measurement. | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3-3 | Number of total cells to be measured | The max number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. | 45-1 from RAN1 Rel-18 feature list or 39-2 | Yes | No | There is no limitation on the number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. | Per BC] | No | No | N/A | [candidate values: {1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16}] | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3-4 | 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 or 39-2 | Yes | No | There is no limitation on the number of cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. | Per BC | No | Yes | N/A | Candidate value: {1,2,3,4,5,6,7,8}  Note: It is also counted in FG 2-24 | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3-5 | Number of SSB resources for L1-RSRP measurement per frequency layer | 1. The max number of SSB resources UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps   2. The max number of SSB resources UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps | 1. Component 1: 45-1 from RAN1 Rel-18 feature list or 39-2  2. Component 2: 39-2a | Yes | No | There is no limitation on the number of SSB resources per frequency layer for L1 measurement. | Per BC | No | Yes | No | Candidate value of Component 1: {1,2,3,4,5,6,7,8}  Candidate value of Component 2: {1,2,3,4,5,6,7,8} | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-3-6 | Number of total SSB resources to be measured | The max number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. | 45-1 from RAN1 Rel-18 feature list or 39-2 | Yes | No | There is no limitation on the number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. | Per BC | No | Yes | No | Candidate values:  {2,4,8,12,16,32,64} | Optional with capability signaling |
| 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 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 | PDCCH-order RACH for LTM is not supported if the PRACH bandwidth is outside of any configured BWP Network does not know whether UE supports the case that RACH bandwidth is outside of any configured BWP and network does not know the corresponding length of the interruption | 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 | Candidate values for interruption length Y = 0.25, 0.5, 1 and 2 | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-5 | RF/BB preparation time for PDCCH-order RACH | Indicates the RF/BB preparation time 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 | PDCCH-order RACH for LTM is not supported if the PRACH bandwidth is outside of any configured BWP Network does not know whether UE supports the case that RACH bandwidth is outside of any configured BWP and network does not know the corresponding RF/BB preparation time | [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 | Candidate values:  { [1ms,3ms,5ms,10ms] } | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | [39-6] | Early processing of an LTM candidate cell RRC configuration | Indicates the number of cells, [FFS: including both SpCell and SCell], on which UE supports early processing of an LTM candidate cell RRC configuration before cell switch. | 45-3a or 45-4a in RAN1 feature list | Yes | No | TLTM\_RRC-processing delay (refer to TS 38.133) will not be skipped, i.e., 10ms | [Per UE] | No | Yes | N/A | Candidate values:  {1,2,…,TBD } | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-7 | Faster 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. |  | 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 of Component 1 and component 2: {10ms, 15ms}  Candidate values of Component 3: {20ms, 30ms} | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-8 | Measurement validation based on EMR measurement during connection setup/resume | Indicate UE supporting measurement validation and report based on EMR measurement during connection setup/resume for fast CA/DC setup |  | Yes | N/A | UE does not support measurement validation during connection setup/resume | Per-UE | No | FFS | N/A |  | Optional with capability signaling |
| 39.  NR\_Mob\_enh2 | 39-9 | Measurement validation based on non-EMR measurement during connection setup/resume | Indicate UE supporting measurement validation and report based on non-EMR measurement during connection setup/resume for fast CA/DC setup |  | Yes | N/A | UE does not support measurement validation during connection setup/resume | Per-UE | No | FFS | N/A |  | Optional with capability signaling |

1. NR\_cov\_enh2 (not discussed during adhoc)

Conclusion from thread [122]

Chair: the deadline to address this issue in Rel-18 is May meeting 2024.

Agreements in RAN4#110

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** | **Need for the gNB to know if the feature is supported** | **Applicable to the capability signalling exchange between UEs (V2X WI only)”.** | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Capability interpretation for mixture of FDD/TDD and/or FR1/FR2** | **Note** | **Mandatory/Optional** |
| 41.NR\_cov\_enh2 | 41-1 | Support of ΔPPowerClass reporting mechanism | Support of ΔPPowerClass /ΔPPowerClass, CA/ΔPPowerClass, EN-DC/ΔPPowerClass, NR-DC reporting which is triggered upon uplink duty cycle exceedance or upon return to the power class after the duty cycle exceedance, as specified in TS 38.101-1 and TS 38.101-3. | No | Yes | N/A | UE does not support of report on the ΔPPowerClass | Per UE | No | FR1 only | N/A | Component 1 candidate values:   * Type 1: The UE can only report ∆PPowerClass  for non-CA operation   Type 2: The UE can report ∆PPowerClass  for non-CA operation, and the UE can also report ∆PPowerClass/ ΔPPowerClass,CA/∆PPowerClass,EN-DC/∆PPowerClass,NR-DC for CA operation. | Optional with capability signalling |
| 41.NR\_cov\_enh2 | 41-2 | Power boosting for DFT-s-OFDM pi/2 BPSK and QPSK transmissions without modified spectrum flatness requirement | 1. Support of UE power boosting for DFT-s-OFDM pi/2 BPSK and QPSK without modified spectrum flatness requirement for PC3 and PC2 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 | 1-6, 1-7 | Yes | N/A | UE cannot power boost without modified spectrum flatness requirement | Per FS | NO | FR1 only | N/A | FFS – RAN4 is still discussing the applicable scenarios | Optional with capability signalling |
| 41.NR\_cov\_enh2 | 42-3 | Power boosting for DFT-s-OFDM pi/2 BPSK and QPSK transmissions with modified spectrum flatness requirement shaping | 1. Support of UE power boosting for DFT-s-OFDM pi/2 BPSK and QPSK with modified spectrum flatness requirement for PC3 and PC2 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 | 1-6, 1-7 | Yes | N/A | UE cannot power boost with modified spectrum flatness requirement | Per FS | NO | FR1 only | N/A | FFS – RAN4 is still discussing the applicable scenarios | Optional with capability signalling |

**Agreement:**

**No update on UE feature list for NR\_cov\_enh2 in this meeting.**

1. Netw\_Energy\_NR (not discussed during adhoc)

Agreements in RAN4#110

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 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 | per FS | NA | FR1 only | NA | For each band within the BC, UE indicates if it supports the SSB-less operation when this band is the reference band and other band(s) in the BC as the SSB-less band(s).  If UE indicate “support” for this band, it means all other bands within the BC can be configured as SSB-less bands. | Optional with capability signaling |

**Recommended WF:**

Discuss the following new proposal from Intel.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |
|  | 42-2 | SCell without SS/PBCH block for intra-band non-contiguous CA | Support of SCell without SS/PBCH block for intra-band non-contiguous CA |  | Yes | NA | UE does not support SCell without SS/PBCH block for intra-band non-contiguous CA | Per FS | NA | FR1 only | NA | For each carrier within the combination, UE indicates if it supports the SSB-less operation when any of the carrier can be the reference carrier and other(s) in the combination be the SSB-less carrier(s).  If UE indicates ‘support’ for a combination, it means all the carriers in the combination can be configured as SSB-less carriers. | Optional with capability signalling |