**3GPP TSG RAN WG1 #101-e R1-20xxxxx**

e-Meeting, May 25th – June 5th, 2020

Source: NTT DOCOMO, INC.

Title: Session Notes for NR UE Features

Agenda Item: 7.2.11

**Document for:** **Discussion and Decision**

### **7.2.11 NR Rel-16 UE Features (2+3+3+5+2+4+3+2+4+2+1+2+1=32)**

***7.2.11.1 UE features for two-step RACH (2)***

[R1-2004401](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004401.zip) Summary on UE features for two-step RACH Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-2step-01] Email discussion/approval on feature group structure for two-step RACH (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether FG9-3 (Parallel MsgA and SRS/PUCCH/PUSCH transmissions across CCs in inter-band CA) is kept or removed
* Discuss and decide whether FG9-4 (MsgA operation in a band combination including SUL) is kept or removed
* Discuss and decide whether FG9-6 (up to X of msgBs per slot/within the msgB window) is kept or removed
* Discuss and decide whether any other new FG(s) is added or not
* Discuss and decide capability signaling design for FG(s) decided to be kept/added in this email discussion (if any)

Based on v006

**FL proposal 1:**

* **FG9-3 is removed from the UE features list for 2 step RACH**
  + **xxx**

**Agreements:**

* **FG9-4 is kept in the UE features list for 2 step RACH**
  + **“TBD” is removed from prerequisite feature groups for FG9-4**

**Agreements:**

* **FG[9-6] is kept with bracket in the UE features list for 2 step RACH**
  + **Add a note “RAN2 to make final decision on whether this FG is needed or not considering the maximum payload size of msgB”**

[101-e-NR-UEFeatures-2step-02] Email discussion/approval on capability signaling design for existing FGs for two-step RACH (25th – 29th May) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs
* Discuss and decide any other necessary update for the UE features list for two-step RACH based on identified issues/proposals in [R1-2004401](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004401.zip)

[R1-2003415](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003415.zip) Discussion on UE features for 2-step RACH vivo

[R1-2003459](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003459.zip) Discussion on the remaining issues of the UE features for two-step RACH ZTE, Sanechips

[R1-2003603](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003603.zip) Discussion of NR Rel-16 UE features for two-step RACH CATT

[R1-2003752](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003752.zip) Discussion on UE features for two-step RACH Intel Corporation

[R1-2003893](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003893.zip) UE features for two-step RACH Samsung

[R1-2004137](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004137.zip) Discussion on UE features for NR 2step RACH LG Electronics

[R1-2004146](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004146.zip) Rel-16 UE features for 2-step RACH Huawei, HiSilicon

[R1-2004240](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004240.zip) Views on NR 2-step RACH UE feature Apple

[R1-2004350](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004350.zip) UE Features for Two-Step RACH Ericsson

[R1-2004400](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004400.zip) Discussion on UE features for Two-step RACH NTT DOCOMO, INC.

[R1-2004476](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004476.zip) Discussion on two step RACH UE features Qualcomm Incorporated

[R1-2004559](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004559.zip) On UE features or 2-step RACH Nokia, Nokia Shanghai Bell

***7.2.11.2 UE features for NR-U (3)***

[R1-2004403](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004403.zip) Summary on UE features for NR-U Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-NRU-01] Email discussion/approval on feature group structure for NR-U (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether FG10-2a (SSB-based RRM [for semi-static channel access mode]) is kept or merged to FG10-2 (SSB-based RRM [for dynamic channel access mode])
* Discuss and decide whether FG10-2d (SSB-based RLM [for semi-static channel access mode]) is kept or merged to FG10-2c (SSB-based RLM [for dynamic channel access mode])
* Discuss and decide whether FG10-19a ([Support DL reception in a carrier with intra-cell guard-bands]) is kept or removed
* Discuss and decide whether FG10-19b ([Support UL transmission with subset of RB sets passing LBT]) is kept or removed
* Discuss and decide whether FG10-21b (Support UL to DL COT sharing) is kept or removed
* Discuss and decide whether FG10-31 ([Support of CSI-RS measurements for CSI reporting and tracking without COT duration from DCI 2\_0]) is kept or removed
* Discuss and decide whether any additional FG(s) related to SSB-based BFD and CBD with Q is added or not based on proposals identified in [R1-2004403](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004403.zip)
* Discuss and decide whether any additional FG(s) related to intra-cell guard band length smaller than the default intra-cell guard band length defined in RAN4 is added or not based on proposals identified in [R1-2004403](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004403.zip)
* Discuss and decide capability signaling design for FG(s) decided to be kept/added in this email discussion (if any)

Based on v002

**FL proposal 1:**

* **FG10-2a for “SSB-based RRM for semi-static channel access mode” is kept in the UE features list for NR-U (depending on [101-e-NR-unlic-NRU-InitAccessProc-07])**
  + **Clarify that FG10-2 is for “SSB-based RRM for dynamic channel access mode”**

**FL proposal 2:**

* **FG10-2d for “SSB-based RLM for semi-static channel access mode” is kept in the UE features list for NR-U (depending on [101-e-NR-unlic-NRU-InitAccessProc-07])**
  + **Clarify that FG10-2c is for “SSB-based RLM for dynamic channel access mode”**

**FL proposal 3:**

* **Add “SSB-based BFD/CBD with Q” as additional components in FG 10-2c/2d (i.e., new FGs are not introduced) (depending on [101-e-NR-unlic-NRU-InitAccessProc-07])**

**FL proposal 4:**

* **Send LS to RAN4 for possible FG for “Support of intra-cell guard bands” (based on [FG10-19a]) – Chiou Wei (MTK)**

**FL proposal 5:**

* **FG10-19b for “Support UL transmission with subset of RB sets passing LBT” is kept in the UE features list for NR-U**
  + **Modify component 1 to “When UL BWP has multiple RB sets, support transmission of UL signal or channels when LBT passes for only a subset of the RB sets of the BWP”**

**FL proposal 6:**

* **A new FG10-19c for “UE capability 2 for intra-cell guard band” is added in the UE features list for NR-U (depending on [101-e-NR-unlic-NRU-WB-02])**
  + **Component is “Supporting intra-cell guard band length smaller than the default intra-cell guard band length defined in RAN4”**
  + **Other FG designs are same as 10-19a/b**

**FL proposal 7:**

* **FG[10-31] is removed from the UE features list for NR-U (depending on [101-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-03])**

**Agreements:**

* **A new FG10-21b for “Support UL to DL COT sharing” is added in the UE features list for NR-U**
  + **Components are followings**
    - **1. Support Type 1 LBT for scheduled UL to share COT with gNB for DL without ULtoDL-CO-SharingED-Threshold-r16**
    - **2. Support Type 1 LBT for CG-PUSCH to share COT with gNB for DL without ULtoDL-CO-SharingED-Threshold-r16**
    - **3. Indicate in CG-UCI the COT sharing information**
  + **Other FG designs are same as 10-21a**

[101-e-NR-UEFeatures-NRU-02] Email discussion/approval on capability signaling design for existing FGs for NR-U (25th May – 2nd June) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs
* Discuss and decide any other necessary update for the UE features list for NR-U based on identified issues/proposals in [R1-2004403](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004403.zip)

[101-e-NR-UEFeatures-NRU-03] Email discussion/approval on basic FGs for each NR-U operation/scenario (29th May – 4th June) – Hiroki (DCM)

* Discuss and down-select from Alt.1 or Alt.2 based on the working assumption
* Discuss and decide basic FGs for each NR-U operation/scenario based on finalized FG structure for NR-U

[R1-2003416](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003416.zip) Discussion on UE features for NRU vivo

[R1-2003460](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003460.zip) Discussion on the remaining issues of the UE features for NR-U ZTE, Sanechips

[R1-2003694](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003694.zip) Views on Rel-16 UE features for NR-U MediaTek Inc.

[R1-2003848](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003848.zip) UE features for NR-U Ericsson

[R1-2003894](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003894.zip) UE features for NR-U Samsung

[R1-2004019](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004019.zip) Discussion on UE features for NR-U LG Electronics

[R1-2004091](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004091.zip) Discussion on UE feature for NRU OPPO

[R1-2004152](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004152.zip) Rel-16 UE features for NR-U Huawei, HiSilicon

[R1-2004241](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004241.zip) Discussions on NR-U UE features Apple

[R1-2004402](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004402.zip) UE features for NR-U NTT DOCOMO, INC

[R1-2004477](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004477.zip) Discussion on NR-U UE features Qualcomm Incorporated

[R1-2004560](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004560.zip) On UE features NR Unlicensed Nokia, Nokia Shanghai Bell

***7.2.11.5 UE features for URLLC/IIoT (2)***

[R1-2004406](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004406.zip) Summary on UE features for URLLC/IIoT Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-URLLCIIoT-01] Email discussion/approval on feature group structure for URLLC/IIoT (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether FG11-4b (DL priority indication in DCI with mixed DCI formats) is kept or removed
* Discuss and decide whether FG11-7b (Independent cancellation of the overlapping PUSCHs in an intra-band UL CA) is kept or removed
* Discuss and decide whether FG12-1a (UL priority indication in DCI with mixed DCI formats) is kept or removed
* Discuss and decide whether/how to define FG(s) for support of Rel-15 monitoring capability and Rel-16 monitoring capability on different serving cells
* Discuss and decide whether/how to introduce additional FGs for FG11-3 (e.g., for the number of PUCCHs per slot, the format of PUCCHs per slot, number of times channels can be multiplexed)
* Discuss and decide whether/how to define FG(s) for support of PUSCH repetition type B
* Discuss and decide whether/how to introduce additional FG for support of enhanced UL power control scheme
* Discuss and decide whether/how to introduce additional FG for relative TDRA for DL
* Discuss and decide whether/how to introduce additional FG for supporting Rel-16 PDCCH monitoring capability with non-aligned spans
* Discuss and decide whether any additional FG(s) is added or not based on proposals identified in [R1-2004406](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004406.zip)
* Discuss and decide capability signaling design for a FG decided to be kept/added (if any)

Based on v013

**Agreements:**

* **FG11-2a for “Capability on the number of CCs for monitoring a maximum number of BDs and non-overlapped CCEs per span when configured with DL CA with Rel-16 PDCCH monitoring capability on all the serving cells” is added in the UE features list for URLLC**
  + **FFS: details on the FG**
* **FG11-2b for “Mix of Rel. 16 PDCCH monitoring capability and Rel. 15 PDCCH monitoring capability on different carriers” is added in the UE features list for URLLC**
  + **FFS: Type of FG11-2b is “Per FS”**
  + **Prerequisite feature group for FG11-2b is “FG11-2”**
  + **FG11-2b is optional with capability signaling**
  + **FFS: Components other than support of mix of Rel-16 and Rel-15 PDCCH monitoring capability on different carriers**
* **FG11-2c for “Number of carriers for CCE/BD scaling with DL CA with mix of Rel. 16 and Rel. 15 PDCCH monitoring capabilities on different carriers” is added in the UE features list for URLLC**
  + **FFS: Type of FG11-2c is “Per UE” or “Per BC”**
    - **If it is per UE, Need of FDD/TDD differentiation is “No”**
    - **If it is per UE, Need of FR1/FR2 differentiation is “No”**
  + **Prerequisite feature group for FG11-2c is “FG11-2b”**
  + **Components**
    - **Supported combination(s) of (pdcch-BlindDetectionCA-R15, pdcch-BlindDetectionCA-R16)**
      * **Candidate values for pdcch-BlindDetectionCA-R15 is 1 to 15**
      * **Candidate values for pdcch-BlindDetectionCA-R16 is 1 to 15**
  + **Clarify in Note that the summation of the minimum of the capability on the number of CCs with Rel-15 PDCCH monitoring capability and the minimum of the capability on the number of CCs with Rel-16 PDCCH monitoring capability is 3 (depending on [101-e-NR-L1enh-URLLC-PDCCH enhancements-03])**
  + **FG11-2c is optional with capability signaling**

**FL proposal 2:**

* **Further separated FG for FG11-3 is not introduced**
  + **UL Control channel for a single 7\*2symbol subslot based HARQ-ACK codebook (11-3a)**
  + **UL Control channel for a single 2\*7symbol subslot based HARQ-ACK codebook (11-3b)**
  + **2 PUCCH of format 0 or 2 for a single 7\*2 subslot based HARQ-ACK codebook (11-3c)**
  + **2 PUCCH of format 0 or for a single 2\*7 subslot based HARQ-ACK codebook (11-3d)**
  + **1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks (11-3e)**
  + **2 PUCCH transmissions in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks which are not covered by 11-3d and 11-3e (11-3f)**
  + **2 PUCCH of format 0 or 2 for Two HARQ-ACK codebooks with up to one 7\*2-symbol sub-slot based HARQ-ACK codebook (11-4b)**
  + **2 PUCCH of format 0 or 2 in consecutive symbols for two HARQ-ACK codebooks with up to one 2\*7-symbol sub-slot based HARQ-ACK codebook (11-4c)**
  + **2 PUCCH of format 0 or 2 for two subslot based HARQ-ACK codebooks (11-4d)**
  + **1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for HARQ-ACK codebooks with up to one 2\*7-symbol subslot based HARQ-ACK codebook (11-4e)**
  + **1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for two subslot based HARQ-ACK codebooks (11-4f)**
  + **2 PUCCH transmissions in the same subslot for two HARQ-ACK codebooks with up to one 2\*7-symbol subslot which are not covered by 11-4c and 11-4e (11-4g)**
  + **2 PUCCH transmissions in the same subslot for two subslot based HARQ-ACK codebooks which are not covered by 11-4d and 11-4f (11-4h)**
  + **SR/HARQ-ACK multiplexing once per subslot using a PUCCH (or HARQ-ACK piggybacked on a PUSCH) when SR/HARQ-ACK are supposed to be sent with different starting symbols in a subslot (11-3g)**

**Agreements:**

* **FG11-4b is kept in the UE features list for URLLC** 
  + **FG 11-1 and FG 11-4 are prerequisite feature groups for FG11-4b**
  + **FFS: Type of FG11-4b is “Per UE” or “Per FSPC”**
    - **Need of FDD/TDD differentiation is “No”**
    - **Need of FR1/FR2 differentiation is “No”**
  + **Change component 1 to “Support of priority indicator field configured in DCI formats 1\_1 and 1\_2 in a BWP when configured to monitor both DCI formats 1\_1 and 1\_2 in the BWP”**

**FL proposal 4:**

* **FG11-5 for “PUSCH repetition type B” is added in the UE features list for URLLC**
  + **Following components are kept**
    - **1) For a transport block, one dynamic UL grant or one configured grant schedules two or more PUSCH repetitions that can be in one slot, or across slot boundary in consecutive available slots.**
    - **2) Dynamic indication of the nominal number of repetitions in the DCI scheduling dynamic PUSCH.**
    - **3) The time window within which valid symbols are used for transmission is L\*K, starting from the first symbol indicated by the SLIV in TDRA field.**
    - **4) PUSCH repetition type B is supported for DCI format 0\_1 and DCI format 0\_2 (for DG and type 2 CG).**
    - **5) S and L are separately indicated (4-bit for S and 4-bit for L). L <= 14.**
    - **6) Handling of interaction with DL/UL directions depending on whether dynamic SFI is configured or not, including both cases with and without higher layer parameter InvalidSymbolPattern configured**
    - **7a) Supported maximum number of PUSCH transmissions within a slot for all TB(s), where each actual repetition for PUSCH repetition type B is counted as 1 PUSCH transmission, for UE processing capability 1**
    - **7b) Supported maximum number of PUSCH transmissions within a slot for all TB(s), where each actual repetition for PUSCH repetition type B is counted as 1 PUSCH transmission, for UE processing capability 2**
    - **8) Supported PUSCH hopping scheme**
  + **Type of FG11-5 is “Per UE”**
    - **Need of FDD/TDD differentiation is “No”**
    - **Need of FR1/FR2 differentiation is “No”**
  + **Following Notes are kept for FG11-5**
    - **Candidate value for component 7a) and 7b): {2, 3, 4, 7, 8, 12}**
    - **PUSCH repetition type B with configured grant is applied only if UE reports the support of FG 5-19 or FG 5-20, and subjected to the capability of FG 5-19 and FG 5-20**
    - **The case that both dynamic SFI and InvalidSymbolPattern are configured is applied only if UE reports the support of FG3-6**
  + **Note that separate FGs related to 11-5 are not introduced**
    - **Separate FG for component 7 (Handling of interaction with DL/UL directions depending on whether dynamic SFI is configured or not, including both cases with and without higher layer parameter InvalidSymbolPattern configured)**
    - **“PUSCH repetition type B with up to 1 unicast PUSCHs per slot with UE processing time capability 1”**
    - **“PUSCH repetition type B with up to 2 unicast PUSCHs per slot with UE processing time capability 1”**
    - **“PUSCH repetition type B with up to 4 unicast PUSCHs per slot with UE processing time capability 1”**
    - **“PUSCH repetition type B with up to 7 unicast PUSCHs per slot with UE processing time capability 1”**
    - **“PUSCH repetition type B with up to 1 unicast PUSCHs per slot with UE processing time capability 2”**
    - **“PUSCH repetition type B with up to 2 unicast PUSCHs per slot with UE processing time capability 2”**
    - **“PUSCH repetition type B with up to 4 unicast PUSCHs per slot with UE processing time capability 2”**
    - **“PUSCH repetition type B with up to 7 unicast PUSCHs per slot with UE processing time capability 2”**

**Agreements:**

* **FG11-7b is kept in the UE features list for URLLC** 
  + **~~FFS: Component description (UE “may” cancel)~~**
  + **FG 6-23 and FG 11-7 are prerequisite feature groups for FG11-4b**
  + **Type of FG11-7b is “Per band”**
  + **Remove FFS text in Note**
  + **If UE indicates 6-23 but does not support this FG, UE is not expected to be scheduled simultaneous PUSCHs on multiple carriers but receiving UL CI only for subset of carriers in intra-band carriers**

**Agreements:**

* **FG11-8 for “Enhanced UL power control scheme” is added in the UE features list for URLLC**
  + **Change component description to “For DG-PUSCH, one bit (separately from SRI) in UL grant is used to indicate the P0 value if SRI is present in the UL grant, and 1 or 2 bits is used to indicate the P0 value if SRI is not present in the UL grant”**
  + **FFS: Type of FG11-8 is “Per UE” or “Per band”**
    - **If it is per UE, Need of FDD/TDD differentiation is “No”**
    - **If it is per UE, Need of FR1/FR2 differentiation is “No”**

**FL proposal 7:**

* **A new FG11-1b for “Relative TDRA for DL” is added in the UE features list for URLLC**
  + **FFS: Type of FG11-1b is “Per FS”**
  + **[FG11-1] is prerequisite feature group for FG11-1b**
  + **FG11-1b is “Optional with capability signaling”**

**Alt. “Relative TDRA for DL” is added as component for FG11-1**

**Agreements:**

* **FG12-1a is kept in the UE features list for URLLC** 
  + **FG 12-1 and 11-1 are prerequisite feature groups for FG12-1a**
  + **FFS: Type of FG12-1a is “Per UE” or “Per FSPC”**
    - **Need of FDD/TDD differentiation is “No”**
    - **Need of FR1/FR2 differentiation is “No”**
  + **Change component 1 to “Support of priority indicator field configured in DCI formats 0\_1 and 0\_2 in a BWP when configured to monitor both DCI formats 0\_1 and 0\_2 in the BWP”**

**FL proposal 10:**

* **A new FG 12-7 for “TB CRC for cancelled initial PUSCH with CBG based re-transmission” is added in UE features list for IIoT**
  + **Component description is “PUSCH TB CRC calculated according to Section 6.2.1 of TS 38.212 for a re-transmission of a TB in case the initial transmission was cancelled and CBG-based re-transmission is configured”**
  + **Type of FG12-7 is “Per band”**
  + **FG5-25 is prerequisite feature group for FG12-7**
  + **FG12-7 is “Optional with capability signaling”**

[101-e-NR-UEFeatures-URLLCIIoT-02] Email discussion/approval on capability signaling design for existing FGs for URLLC/IIoT (25th May – 2nd June) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs
* Discuss and decide any other necessary update for the UE features list for URLLC/IIoT based on identified issues/proposals in [R1-2004406](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004406.zip)

[R1-2003316](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003316.zip) UE features for URLLC China Unicom

[R1-2003333](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003333.zip) Discussion on UE feature for URLLC/IIoT ZTE

[R1-2003418](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003418.zip) Discussion on URLLC/IIOT UE features vivo

[R1-2003446](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003446.zip) On UE Features for URLLC and IIoT Ericsson

[R1-2003606](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003606.zip) Discussion of UE features for NR URLLC/IIoT CATT

[R1-2003695](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003695.zip) Views on Rel-16 UE features for NR URLLC/IIoT MediaTek Inc.

[R1-2003755](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003755.zip) On UE features for Rel-16 eURLLC and IIoT Intel Corporation

[R1-2003897](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003897.zip) UE features for URLLC/IIoT Samsung

[R1-2004036](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004036.zip) Discussion on UE features for URLLC/IIoT LG Electronics

[R1-2004122](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004122.zip) Discussion on UE features for URLLC/IIoT OPPO

[R1-2004157](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004157.zip) Rel-16 UE features for URLLC Huawei, HiSilicon

[R1-2004243](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004243.zip) Discussions on UE Features for URLLC/IIoT Apple

[R1-2004405](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004405.zip) Rel-16 UE features for URLLC/IIoT NTT DOCOMO, INC

[R1-2004480](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004480.zip) Discussion on eURLLC and IIOT UE features Qualcomm Incorporated

[R1-2004563](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004563.zip) On UE features for URLLC/IIOT Nokia, Nokia Shanghai Bell

***7.2.11.8 UE features for NR positioning (2)***

[R1-2004408](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004408.zip) Summary on UE features for NR positioning Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-positioning-01] Email discussion/approval on feature group structure for NR positioning (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether FG13-7/7a (Support of SSB from neighbor cell (DL PRS from serving/neighbor cell) as QCL source of a DL PRS) is kept or removed
* Discuss and decide whether FG13-11 (UE Rx-Tx Measurement Report for Multi-RTT) is kept or removed
* Discuss and decide whether FG13-12/12a (NR E-CID DL SSB (CSI-RS) RRM measurements with LPP support for NR Positioning) is kept or removed
* Discuss and decide whether a new FG 13-1a (Common DL PRS Processing Capability without MG) is introduced or not, and if not, what is the expected UE behavior if MG is not configured (according to outcome of the email discussion/approval in 7.2.8)
* Discuss and decide whether a new FG 13-10g (AP-SRS with carrier switching) is introduced or not (according to outcome of the email discussion/approval in 7.2.8)
* Discuss and decide whether FG13-9c, FG13-9d, FG13-10 and FG13-10a are combined into a new single basic FG
* Discuss and decide whether a new FG (Parallel LTE/NR PRS processing) is introduced or not, and if not, what is the expected UE behavior if both NR and LTE PRS are configured

Based on v014

**FL proposal 1:**

* **A new FG 13-1a for “Common DL PRS Processing Capability without MG” is added in the UE features list for Positioning (depending on [101-e-NR-Pos-01])**
  + **Components are same as component 3 and 4 for FG13-1**
  + **13-1 is prerequisite feature group for FG13-1a**
  + **Type of FG13-1a is “Per band”**
  + **FG13-1a is “Optional with capability signaling”**

**Agreements:**

* **FG 13-7 for “Support of SSB from neighbor cell as QCL source of a DL PRS” is kept in the UE features list for Positioning**
  + **Component 1 is kept as below**
    - **1. Support of SSB from neighbor cell as QCL source of a DL PRS**
      * **Support of reuse SSB measurement from RRM for receiving PRS**
  + **13-1 is prerequisite feature group for FG13-7**
  + **Type of FG13-7 is “Per band”**
* **FG 13-7a for “Support of DL PRS from serving/neighbor cell as QCL source of a DL PRS” is kept in the UE features list for Positioning**
  + **Component 1 is kept**
  + **13-1 is prerequisite feature group for FG13-7a**
  + **Type of FG13-7a is “Per band”**
  + **Add a Note “DL PRSs are in the same band”**

**Agreements:**

* **Not to combine FG13-9c, FG13-9d, FG13-10, FG13-10a into a single basic FG**
* **FG [13-9d] (OLPC for SRS for positioning based on SSB from serving cell) is removed**
  + **OLPC for SRS for positioning based on SSB from serving cell is a part of 13-8**
* **FG 13-9e for “PathLoss estimate maintenance” is kept in the UE features list for Positioning**
  + **Component 1 and 2 are kept (FFS: component 1 is for all cells across all bands or on a band)**
  + **One of {13-9, 13-9a, 13-9b, 13-9c} is prerequisite feature group for FG13-9e**
  + **FFS: Type of FG13-9e is “Per band”**

**Updated FL proposal 4:**

* **FG 13-10f for “Spatial relation maintenance” is kept in the UE features list for Positioning**
  + **Component 1 and 2 are kept (FFS: component 1 is for all cells across all bands or on a band)**
  + **One of {13-10, 13-10a, 13-10b, 13-10d, 13-10e} is prerequisite feature group for FG13-10f**
  + **FFS: Type of FG13-10f is “Per band”**
  + **Add the note that “SRS and SSB and/or PRS are in the same band”**
* **A new FG 13-10g for “AP-SRS with carrier switching” is added in the UE features list for Positioning (depending on [101-e-NR-Pos-01])**
  + **13-8 is prerequisite feature group for FG13-10g**
  + **Type of FG13-10g is “Per band”**
  + **FG13-10g is “Optional with capability signaling”**

**Agreements:**

* **FG 13-11 for “UE Rx-Tx Measurement Report for Multi-RTT” is kept in the UE features list for Positioning**
  + **Component 1 and 2 are kept**
    - **Value for component 1: {1,2,3,4}**
    - **Note for component 1 is removed, and clarify that DL PRS resource/sets are on the same frequency layer**
    - **Note for component 2 “If the UE reports value 1 for component 2, same number of RSRP measurements supported as UE Rx-Tx measurements for component 1” is added**
  + **FFS: Type of FG13-11 is “Per band” or “Per UE”**
    - **If FG13-11 covers the case that SRS and DL PRS are on the same band**

**Agreements:**

* **FG 13-12 for “NR E-CID DL SSB RRM measurements with LPP support for NR Positioning” is kept in the UE features list for Positioning**
  + **Component 1 is kept**
  + **1-1 is prerequisite feature group for FG13-12**
  + **Working assumption: Type of FG13-12 is “Per UE”**
    - **Need of FDD/TDD differentiation is “No”**
    - **Need of FR1/FR2 differentiation is “No”**
* **FG 13-12a for “NR E-CID DL CSI-RS RRM measurements with LPP support for NR Positioning” is kept in the UE features list for Positioning**
  + **Component 1 is kept**
  + **1-4 is prerequisite feature group for FG13-12a**
  + **Working assumption: Type of FG13-12a is “Per UE”**
    - **If it is Per UE, Need of FDD/TDD differentiation is “No”**
    - **If it is Per UE, Need of FR1/FR2 differentiation is “No”**

**Agreements:**

* **A new FG 13-18 for “Support of parallel processing of LTE PRS and NR PRS” is added in UE features list for Positioning**
  + **Note that introduction of this FG does not introduce any new additional DL PRS processing capabilities in LTE and in NR**
  + **FFS: details of FG design**

[101-e-NR-UEFeatures-positioning-02] Email discussion/approval on capability signaling design for existing FGs for NR positioning (25th May – 2nd June) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs and for already agreed new FGs (simultaneous SRS transmission for intra/inter-band CA)
* Discuss and decide any other necessary update for the UE features list for NR positioning based on identified issues/proposals in [R1-2004408](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004408.zip)

[R1-2003421](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003421.zip) Discussion on UE features for NR positioning vivo

[R1-2003477](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003477.zip) NR positioning UE features ZTE

[R1-2003609](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003609.zip) Discussion of UE features for NR positioning CATT

[R1-2003693](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003693.zip) Views on Rel-16 UE features for NR positioning MediaTek Inc.

[R1-2003758](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003758.zip) On UE features for NR positioning Intel Corporation

[R1-2003899](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003899.zip) UE features for NR positioning Samsung

[R1-2004060](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004060.zip) Discussion on UE features for NR Positioning OPPO

[R1-2004139](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004139.zip) Discussion on UE features for NR positioning LG Electronics

[R1-2004154](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004154.zip) Rel-16 UE features for NR positioning Huawei, HiSilicon

[R1-2004483](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004483.zip) Discussion on NR Positioning UE features Qualcomm Incorporated

[R1-2004566](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004566.zip) On UE features for NR Positioning Nokia, Nokia Shanghai Bell

[R1-2004648](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004648.zip) View on UE features for NR positioning Ericsson

***7.2.11.10 UE features for MR-DC/CA (2)***

[R1-2004410](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004410.zip) Summary on UE features for MR-DC/CA Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-MRDCCA-01] Email discussion/approval on feature group structure for MR-DC/CA (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether FG18-4b (Support of SCell dormancy indication without data scheduling within active time) is kept or removed
* Discuss and decide whether FG18-5c (DL cross-carrier scheduling with different SCS and PDSCH processing capability 2) and FG18-5d (UL cross-carrier scheduling with different SCS and PUSCH processing capability 2) are kept or removed
* Discuss and decide whether any additional FG(s) related to cross-carrier scheduling is added or not based on proposals identified in [R1-2004410](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004410.zip)
* Discuss and decide whether any other new FG(s) is added or not based on proposals identified in [R1-2004410](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004410.zip)
* Discuss and decide capability signaling design for FG(s) decided to be kept/added in this email discussion (if any)

Based on v006

**FL proposal 1:**

* **FG[18-4b] is removed from the UE features list for MR-DC/CA**

**Updated FL proposal 2:**

* **FG18-5c is kept in the UE features list for MR-DC/CA enhancements**
  + **Prerequisite feature groups of FG18-5c is “18-5”**
  + **Add a note “Note: Processing capability 2 can be configured for serving cell(s) in FR1”**
  + **Component 1 description is changed to “Support of DL cross-carrier scheduling with different SCS and PDSCH processing capability 2 on serving cells in FR1 and PDSCH processing capability 1 on serving cell in FR2”**
  + **Type is “Per BC”**
  + **Other FG design is same as 18-5 (including component 2 if it is kept for 18-5)**
  + **No additional RAN1 specification impact due to introduction of FG18-5c**
* **FG18-5d is kept in the UE features list for MR-DC/CA enhancements**
  + **Prerequisite feature groups of FG18-5d is “18-5b”**
  + **Add a note “Note: Processing capability 2 can be configured for serving cell(s) in FR1”**
  + **Component 1 description is changed to “Support of UL cross-carrier scheduling with different SCS and PDSCH processing capability 2 on serving cells in FR1 and PDSCH processing capability 1 on serving cell in FR2”**
  + **Type is “Per BC”**
  + **Other FG design is same as 18-5b (including component 2 if it is kept for 18-5b)**
  + **No additional RAN1 specification impact due to introduction of FG18-5d**

**Updated FL proposal 3:**

* **No additional FG related to cross-carrier scheduling (18-5x other than 18-5/5a/5b/5c/5d) is added to the UE features list for MR-DC/CA enhancements**
  + **Component 2 of FG18-5/5b are kept**
  + **UE is not required to support following cases**
    - **For DL cross-carrier scheduling with same SCS, both the scheduling and scheduled carriers support processing capability 2**
    - **For UL cross-carrier scheduling with same SCS, both the scheduling and scheduled carriers support processing capability 2**
    - **For DL cross-carrier scheduling with same SCS, only the scheduling carrier supports processing capability 2**
    - **For UL cross-carrier scheduling with same SCS, only the scheduling carrier supports processing capability 2**
    - **For DL cross-carrier scheduling with same SCS, only the scheduled carrier supports processing capability 2**
    - **For UL cross-carrier scheduling with same SCS, only the scheduled carrier supports processing capability 2**
    - **For DL cross-carrier scheduling with different SCS, only the scheduling carrier supports processing capability 2**
    - **For UL cross-carrier scheduling with different SCS, only the scheduling carrier supports processing capability 2**
    - **For DL cross-carrier scheduling with different SCS, only the scheduled carrier supports processing capability 2**
    - **For UL cross-carrier scheduling with different SCS, only the scheduled carrier supports processing capability 2**

**FL proposal 4:**

* **A new FG(s) for up to 2 NR PUCCH groups per CG are not introduced in the UE features list for MR-DC/CA enhancements**

[101-e-NR-UEFeatures-MRDCCA-02] Email discussion/approval on capability signaling design for existing FGs for MR-DC/CA (25th May – 2nd June) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs
* Discuss and decide any other necessary update for the UE features list for MR-DC/CA based on identified issues/proposals in [R1-2004410](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004410.zip)

[R1-2003335](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003335.zip) Discussion on UE feature for MR-DC ZTE

[R1-2003677](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003677.zip) Views on Rel-16 UE features for MR-DC/CA MediaTek Inc.

[R1-2003760](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003760.zip) UE feature for MR-DC Intel Corporation

[R1-2003901](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003901.zip) UE features for MR-DC/CA Samsung

[R1-2004144](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004144.zip) Rel-16 UE features for MR-DC/CA Huawei, HiSilicon

[R1-2004369](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004369.zip) Discussion on UE features for MR-DC Ericsson

[R1-2004409](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004409.zip) Discussion on UE features for MR-DC/CA enhancement NTT DOCOMO, INC.

[R1-2004485](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004485.zip) Discussion on UE features for MR-DC/CA Qualcomm Incorporated

[R1-2004568](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004568.zip) On UE features for MR-DC/CA Nokia, Nokia Shanghai Bell

***7.2.11.11 UE features for CLI/RIM (1)***

[R1-2004412](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004412.zip) Summary on UE features for CLI/RIM Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-CLIRIM-01] Email discussion/approval on remaining issues on UE features for CLI/RIM (25th – 29th May) – Hiroki (DCM)

* Discuss and decide whether/how to handle licensed/unlicensed differentiation for FG17-1/2
* Discuss and decide whether to keep the current notes for FG17-3/4 or to remove them

[R1-2003491](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003491.zip) Discussion on UE feature for CLI ZTE

[R1-2004140](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004140.zip) Discussion on UE features for NR CLIRIM LG Electronics

[R1-2004145](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004145.zip) Rel-16 UE features for CLI/RIM Huawei, HiSilicon

[R1-2004411](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004411.zip) Discussion on UE features for CLI/RIM NTT DOCOMO, INC.

[R1-2004486](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004486.zip) Discussion on UE features for CLI Qualcomm Incorporated

[R1-2004587](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004587.zip) UE features for CLI/RIM Ericsson

***7.2.11.12 UE features for TEIs (2)***

[R1-2004414](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004414.zip) Summary on UE features for TEIs Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-TEIs-01] Email discussion/approval on feature group structure for NR TEI (25th – 27th May)- Hiroki (DCM)

* Discuss and decide whether FG14-5a (Half-duplex UE behaviour in TDD CA with different SCS) is kept or removed
* Discuss and decide whether FG14-7 (New capability for beamSwitchTiming values of 224 and 336) is kept or removed
* Discuss and decide whether FG14-8 (Active BWP when receiving the CSI triggering DCI and when receiving the associated CSI-RS) is kept or removed
* Discuss and decide capability signaling design for FG(s) decided to be kept/added in this email discussion (if any)

Based on v005

**FL proposal 1:**

* **FG[14-5a] is removed from the UE features list for NR TEIs (depending on [101-e-NR-TEIs-02])**

**FL proposal 2:**

* **FG14-7 is kept in the UE features list for NR TEIs (depending on [101-e-NR-TEIs-03])**
  + **Update the component to “Indicates the minimum number of required OFDM symbols {224, 336} between the DCI triggering aperiodic CSI-RS and the corresponding aperiodic CSI-RS transmission in a CSI-RS resource set configured with repetition ‘ON’”**
  + **Prerequisite feature group for FG14-7 is “2-28”**
    - **UE reporting FG14-7 shall report beam switching timing of 48 for FG2-28**
  + **Candidate values for FG14-7 are {224, 336}**
* **An RRC configuration parameter is added to indicate whether 48 symbol or less is assumed by the gNB when UE reports FG14-7**

**FL proposal 3:**

* **FG14-8 is kept in the UE features list for NR TEIs**
  + **“TBD” is removed from prerequisite feature groups for FG14-8**

[101-e-NR-UEFeatures-TEIs-02] Email discussion/approval on capability signaling design for existing FGs for NR TEI (25th – 29th May) – Hiroki (DCM)

* Discuss and decide capability signaling design (including components, candidate values, reporting type, xDD/FRx differentiations) for existing FGs
* Discuss and decide any other necessary update for the UE features list for NR TEI based on identified issues/proposals in [R1-2004414](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004414.zip)

[R1-2003422](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003422.zip) Discussion on UE features for TEI 14-7 vivo

[R1-2003478](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003478.zip) NR TEI UE features ZTE

[R1-2003604](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003604.zip) Discussion on UE features for TEI CATT

[R1-2003691](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003691.zip) Views on Rel-16 UE features for NR TEIs MediaTek Inc.

[R1-2003761](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003761.zip) UE features for NR TEI Intel Corporation

[R1-2004061](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004061.zip) Discussion on Rel-16 UE features for TEIs OPPO

[R1-2004161](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004161.zip) Discussion on Rel-16 UE features for TEIs Huawei, HiSilicon

[R1-2004177](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004177.zip) Remaining issues of UE features for TEIs Ericsson

[R1-2004413](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004413.zip) Discussion on UE features for NR TEI NTT DOCOMO, INC.

[R1-2004487](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004487.zip) Discussion on UE features for TEIs Qualcomm Incorporated

[R1-2004569](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004569.zip) On UE features for TEIs Nokia, Nokia Shanghai Bell

***7.2.11.13 Others (1)***

*Including interactions among UE features across WIs*

[R1-2004415](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004415.zip) Summary on NR UE features for others Moderator (NTT DOCOMO, INC.)

[101-e-NR-UEFeatures-Others-01] Email discussion/approval on potential new FGs that are not dedicated to a specific Rel-16 work item/TEI (25th – 27th May) – Hiroki (DCM)

* Discuss and decide whether or not to introduce any new FG(s) (or which WI will handle the new FG) based on identified issues/proposals in [R1-2004415](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004415.zip)
* Discuss and decide whether/how to introduce a new FG for uplink Tx switching according to the agreements made at RAN1#100bis-e
* Discuss and decide capability signaling design for FG(s) decided to be added in this email discussion (if any)

Based on v005

**Agreements**

* **A new FG for indicating supported option for UL Tx switching for inter-band UL CA is added in the UE features list**
  + **Candidate values set is {option1, option2, [both option 1 and option 2]} (depending on [101-e-LS-TxSwitching-01])**
  + **FFS: Type of the FG is “Per UE” or “Per BC”**
  + **FFS: The FG is “Optional with capability signaling”**
  + **6-6 and [RAN4 cap] are prerequisite feature groups for the new FG**
  + **Further discussion on FFS parts – Ruyue (ZTE)**

**FL proposal 2:**

* **New FGs for up to 3 unicast PDSCHs/PUSCHs per slot per CC for different TBs are introduced**
  + **5-11c: Up to 3 unicast PDSCHs per slot per CC for different TBs for UE processing time Capability 1**
  + **5-12c: Up to 3 unicast PUSCHs per slot per CC for different TBs for UE processing time Capability 1**
  + **5-13d: Up to 3 unicast PDSCHs per slot per CC for different TBs for UE processing time Capability 2**
  + **5-13g: Up to 3 unicast PUSCHs per slot per CC for different TBs for UE processing time Capability 2**

**FL proposal 3:**

* **New FGs for simultaneous use of CBG-based transmission for PUSCH(s) with UE processing time capability 2 are introduced**
  + **11-3a: CBG based transmission for UL with 1 unicast PUSCHs per slot per CC for different TBs with UE processing time Capability 2**
  + **11-3b: CBG based transmission for UL with up to 2 unicast PUSCHs per slot per CC for different TBs with UE processing time Capability 2**
  + **11-3c: CBG based transmission for UL with up to 7 unicast PUSCHs per slot per CC for different TBs with UE processing time Capability 2**
  + **11-3d: CBG based transmission for UL with up to 4 unicast PUSCHs per slot per CC for different TBs with UE processing time Capability 2**
  + **11-3e: CBG based transmission for UL with up to 3 unicast PUSCHs per slot per CC for different TBs with UE processing time Capability 2**
* **Introduce a FG, which defines whether the UE, when configured with DL CBG-based operation and capable of processing time capability 1, supports reception of up to one, two, four or seven unicast PDSCHs for several transport blocks with PDSCH scrambled using C-RNTI or CS-RNTI in one serving cell within the same slot per CC that are multiplexed in time domain only.**
* **Introduce a FG, which defines whether the UE, when configured with UL CBG-based operation and capable of processing time capability 1, supports reception of up to one, two, four or seven unicast PUSCHs for several transport blocks with PUSCH scrambled using C-RNTI or CS-RNTI in one serving cell within the same slot per CC that are multiplexed in time domain only.**

**FL proposal 4:**

* **No more new FGs for simultaneous use of UE processing time capability 2 with a certain Rel-16 features in the same CC is introduced**
  + **Adopting “Per FSPC” for UE processing time capability 2 for Rel-16**
  + **FFS: Cap2 with PUSCH repetition**
* **Add a Rel-15 FG for supporting offset between the end of PDCCH triggering A-SRS and the SRS transmission for CB PUSCH and antenna switching for UEs supporting PDCCH capabilities besides FG 3-1.**
* **Add a Rel. 15 FG for supporting partial cancellation of configured PUCCH/PUSCH/PRACH due to dynamic SFI, dynamically granted PDSCH and CSI-RS.**

[R1-2003336](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003336.zip) Remaining issues on Rel-16 NR UE features ZTE

[R1-2003762](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003762.zip) Rel-16 UE feature - Others Intel Corporation

[R1-2003902](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2003902.zip) UE features for other aspects Samsung

[R1-2004062](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004062.zip) Discussion on the support of SRS transmission in all symbols of a slot OPPO

[R1-2004488](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004488.zip) Discussion on UE features for Others Qualcomm Incorporated

[R1-2004682](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004682.zip) General discussion on NR Rel-16 UE features Ericsson

Revision of [R1-2004586](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004586.zip)

[R1-2004628](file:///C:\Users\Hiroki%20Harada\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_101\Docs\R1-2004628.zip) Other aspects of Rel-16 NR UE features Huawei, HiSilicon