**3GPP TSG RAN WG1 #102e R1-200xxxx**

**e-Meeting, August 17th – 28th, 2020**

**Source: Moderator (NTT DOCOMO, INC.)**

**Title:** **Summary on [102-e-NR-UEFeatures-TEI-01]**

**Agenda Item:** **7.2.11**

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

1. Introduction

This contribution summarizes the following email discussion/approval in AI 7.2.11.

[102-e-NR-UEFeatures-TEI-01] Email discussion/approval on UE features for NR TEI (17th – 20th August) – Hiroki (DCM)

* Whether to change type of FG14-2 to “per UE” and to apply the DSS bands the UE support or not

1. FG14-2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14. NR TEI | 14-2 | PDSCH Type B mapping of length 9 and 10 OFDM symbols | 1. support of PDSCH Type B scheduling of length 9 and 10 OFDM symbols 2. support of DMRS shift for length-10 symbols | 5-6a (PDSCH mapping type B) | Yes | N/A |  | Per band | N/A | N/A (FR1 only) | N/A | For DSS  FG10-8 covers PDSCH type B mapping without DMRS shift due to CRS collision. | Optional with capability signaling |

In [4], following proposal is made.

|  |
| --- |
| We prefer **FG-14-2 PDSCH Type B mapping of length 9 and 10 OFDM symbols FG** to signalled as per UE indication and applies to all potential DSS bands the UE support since this functionality is not band dependent. Hence, we propose:  **FG 14-2 signalled as “per UE” and applies to the DSS bands the UE support** |

Based on the above contribution, it is agreed to discuss following point in the email discussion [5].

**Discussion point**

* **Whether to change type of FG14-2 to “per UE” and to apply the DSS bands the UE support or not**

During the preparation phase email discussion, following comment is provided [5].

|  |  |
| --- | --- |
| Apple | We are fine with the discussion. But FG14-2 should be per band which is similar as other DSS feature in Rel-15 and FG14-8 should not be mandatory feature. |

## 2.1 Proposal and discussion

Based on the contribution and above input in the preparation phase, following proposal is made. The type of FG14-2 was agreed as “per band” after the extensive discussion in RAN1#101-e meeting. Unless the majority proposes/agrees to change the previous agreement e.g., with some clear issue identified after the agreement was made, it should not be changed.

### **FL proposal 1:**

* **The reporting type of FG14-2 is kept as “per band”**

Companies are encouraged to check above FL proposal and to provide feedback if any in below. If you cannot accept the FL proposals, please put your company name after “Cannot accept the proposals” below and please provide your alternative proposal (in your comment) which could be acceptable to all in your consideration.

Cannot accept the proposals:

|  |  |
| --- | --- |
| Company | Comment |
| Ericsson | We proposed this feature as “per UE” because it was not clear from last meeting if there’re more companies would like to support this feature as “per UE”. In our view, at least component 1 can be supported as “per UE”, and component 2 may be as “per Band”. We would appriate more companies sharing your views on this issue. |
| Samsung | Support FL proposal 1. |
| Apple | Support FL proposal 1. I believe both component 1 and 2 are outcomes of addressing some DSS deployment restrictions raised to 3GPP. |

1. Conclusion

**FL proposal 1:**

* **The reporting type of FG14-2 is kept as “per band”**

Reference

[1] R1-2006462 Updated RAN1 UE features list for Rel-16 NR Moderators (AT&T, NTT DOCOMO, INC.)

[2] R1-2005423 Discussion on NR Rel-16 UE Features ZTE

[3] R1-2006677 Remaining aspects of Rel-16 UE features Nokia, Nokia Shanghai Bell

[4] R1-2006874 Remaining details of Rel-16 NR UE features Ericsson

[5] R1-2006714 Summary on UE features for TEIs Moderator (NTT DOCOMO, INC.)

Appendix: UE features list for NR TEI in [1]

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
| 14. NR TEI | 14-1 | Multiple LTE-CRS rate matching patterns | 1. Maximum number of LTE-CRS rate matching patterns in total within a NR carrier using 15 kHz SCS 2. Maximum number of LTE-CRS non-overlapping rate matching patterns within a NR carrier using 15 kHz SCS | 5-28 (Rate-matching around LTE CRS) | Yes | N/A |  | Per band | N/A | N/A (FR1 only) | N/A | For DSS  The number of the additional CRS rate matching patterns reported in Rel-16 is accounted in the total number of rate matching pattern reported by the UE for Rel-15 by using pdsch-RE-MappingFR1-PerSymbol/pdsch-RE-MappingFR1-PerSlot and pdsch-RE-MappingFR1-PerSymbol/pdsch-RE-MappingFR1-PerSlot  UE reporting component 1 for 14-1 also reports component 2.  Reporting of values of Component 1 larger than two is only applicable when reporting values of Component 2 larger than one. | Optional with capability signalling  Component 1:{2, 3, 4, 5, 6}  Component 2: {1, 2, 3} |
| 14. NR TEI | 14-1a | Two LTE-CRS overlapping rate matching patterns within a part of NR carrier using 15 kHz overlapping with a LTE carrier | 1. Support of two LTE-CRS overlapping rate matching patterns within a part of NR carrier using 15 kHz SCS overlapping with a LTE carrier | 14-1 | Yes | N/A |  | Per band | N/A | N/A (FR1 only) | N/A | For DSS  The number of the additional CRS rate matching patterns reported in Rel-16 is accounted in the total number of rate matching pattern reported by the UE for Rel-15 by using pdsch-RE-MappingFR1-PerSymbol/pdsch-RE-MappingFR1-PerSlot and pdsch-RE-MappingFR1-PerSymbol/pdsch-RE-MappingFR1-PerSlot | Optional with capability signaling |
| 14. NR TEI | 14-2 | PDSCH Type B mapping of length 9 and 10 OFDM symbols | 1. support of PDSCH Type B scheduling of length 9 and 10 OFDM symbols 2. support of DMRS shift for length-10 symbols | 5-6a (PDSCH mapping type B) | Yes | N/A |  | Per band | N/A | N/A (FR1 only) | N/A | For DSS  FG10-8 covers PDSCH type B mapping without DMRS shift due to CRS collision. | Optional with capability signaling |
| 14. NR TEI | 14-3 | One slot periodic TRS configuration for FR1 | 1. UE can be configured with one-slot periodic TRS configuration only when no two consecutive slots are indicated as downlink slots by tdd-UL-DL-ConfigurationCommon or tdd-UL-DL-ConfigDedicated | 2-51 (CSI-RS for tracking) | Yes | N/A |  | Per band | N/A (TDD only) | N/A (FR1 only) | N/A | UE can be configured with one-slot periodic TRS configuration only when no two consecutive slots are indicated as downlink slots by tdd-UL-DL-ConfigurationCommon or tdd-UL-DL-ConfigDedicated.  This FG is not also applicable for the case that all slots are indicated as flexible | Optional with capability signalling |
| 14. NR TEI | 14-4 | SRS Tx switch with allowing downgrading configuration | 1) Support SRS Tx port switch | 2-55 | Yes | N/A |  | Per BC (same reporting type as srs-TxSwitch in Rel-15) | N/A | N/A | N/A | Agreement:  •Rel-16 UE capability design for SRS antenna switching in conjunction with the existing Rel-15 UE capability should allow UE to indicate support of one of the following combinations  o{t1r1, t1r2}  o{t1r1, t1r2, t1r4}  o{t1r1, t1r2, t2r2, t2r4}  o{t1r1, t2r2}  o{t1r1, t2r2, t4r4}  o{t1r1, t1r2, t2r2, t1r4, t2r4}  oNote: Detailed signaling design is up to RAN2 | Optional with capability signalling  Component 1: Candidate value set:  {  o{t1r1, t1r2}  o{t1r1, t1r2, t1r4}  o{t1r1, t1r2, t2r2, t2r4}  o{t1r1, t2r2}  o{t1r1, t2r2, t4r4}  o{t1r1, t1r2, t2r2, t1r4, t2r4}  }  Component2: Candidate value set: {yes, no}  Component 3: Candidate value set: {yes, no} |
| 14. NR TEI | 14-5 | Half-duplex UE behaviour in TDD CA for same SCS | 1. Support for directional collision handling between reference and other cell(s) for half-duplex operation in CA with same SCS | 6-5 and simultaneousRxTxInterBandCA not supported | Yes | N/A |  | Per BC | N/A (TDD only) | N/A | N/A | Half duplex UEs that do not indicate this capability should still be able to operate half-duplex TDD CA (i.e. simultaneousRxTxInterBandCA not supported) per Rel15 specifications if network ensures same transmission direction across all the serving cells | Optional with capability signaling |
| 14. NR TEI | 14-6 | New RACH configuration for FR1 TDD | 1. new RACH configuration entries with subframe number 2 and/or 7 for RACH periodicity longer than 10 ms |  | No | N/A |  | N/A | N/A (TDD only) | N/A (FR1 only) | N/A | Agreement:  •A new UE capability is not introduced for this TEI, i.e., it is a mandatory UE feature for Rel-16. | Mandatory without capability signalling |
| 14. NR TEI | 14-7 | New capability for beamSwitchTiming values of 224 and 336 | 1. 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’  * Candidate values: {224, 336} | 2-28 | Yes | N/A |  | Per band | N/A | N/A (FR2 only) | N/A | Agreements:  ・48 is used as the beam switching threshold for Ues reporting 224 or 336  ØWhen using the higher values of the feature (sym224 and sym336), beamSwitchTiming indicates the minimum number of OFDM symbols between the DCI triggering of aperiodic CSI-RS and aperiodic CSI-RS transmission in a CSI-RS resource configured with repetition ‘ON’ to apply TCI indication in CSI-RS triggering DCI. | Optional with capability signaling |
| 14. NR TEI | 14-8 | CSI trigger states containing non-active BWP | 1. CSI trigger states containing non-active BWP |  | Yes | N/A |  | Per UE | No | No | N/A | Agreements:  TEI – “CSI trigger states containing non-active BWP”  ・When a UE is triggered with a CSI report for a DL BWP that is non-active, the UE is not expected to report the CSI for the non-active BWP and the CSI report associated with the BWP is omitted.  ・When a UE is triggered with aperiodic CSI-RS in a DL BWP that is non-active, the UE is not expected to measure the aperiodic CSI-RS.  ・The above non-active BWP is the non-active BWP when receiving the associated CSI-RS with the following relaxation for UE processing.  In the CC of the associated CSI-RS, if the active BWP when receiving the CSI-RS is different from the active BWP when receiving the triggering DCI  The last symbol of the PDCCH span of the DCI carrying the BWP switching shall be no later than the last symbol of the PDCCH span of the CSI trigger DCI, irrespective of whether they are in the same CC or not and irrespective of whether they are in the same SCS or not.  The UE is not expected to have any other BWP switching in that CC after the last symbol of the PDCCH span covering CSI trigger DCI and before the first symbol of the triggered CSI-RS resource.  ・Note: the UE is not required to measure P/SP-CSI-RS in the non-active BWP per current specification | [Mandatory or Optional] with capability signaling |