**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-2Step-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-2Step-01] Email discussion/approval on UE features for two-step RACH (17th – 19th August), Hiroki (DCM)

·                 Whether the note in description field of FG9-1 is removed or not

·                 Whether FG9-6 is removed or not

1. FG9-1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9. NR\_2step\_RACH | 9-1 | Basic channel structure and procedure of 2-step RACH | 1. Fallback procedures from 2-step RACH to 4-step RACH 2. msgA PRACH resource and format determination 3. msgA PUSCH configuration 4. Validation and transmission of MsgA PRACH and PUSCH 5. Mapping between preamble of MsgA PRACH and PUSCH occasion with DMRS resource of MsgA PUSCH 6. msgB monitoring and decoding 7. PUCCH transmission for HARQ-ACK feedback to a msgB 8. Power control for msgA PRACH, msgA PUSCH and PUCCH carrying HARQ-ACK feedback to msgB   Note:  1. Components are not exhaustive list and whether/how to capture them is up to RAN2  2. From RAN1 perspective, UE behavior supported for msgB window extended up to 40ms is a part of basic feature group for 2-step RACH separately from NR-U feature group, i.e., FG10-2f. It is up to RAN2 to capture the above description if needed. |  | Yes (but gNB does not need to know whether FG9-1 is supported or not for UEs before RRC connection) | N/A | UE cannot initiate a 2-step RACH process, and thus would not be expected understand the 2-step RACH configurations | per UE | No | No | N/A |  | Optional with capability signalling |

In [2], following proposal is made.

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| Rel-16 UE feature capabilities [2][3] were approved in RAN#88e meeting. The note in description field of FG 9-1 components shall be removed.  ***Proposal 12: Remove the note in description field of FG 9-1.*** |

Based on the above contribution, it is agreed to discuss following points in the email discussion [3].

**Discussion point#1**

* **Whether the note in description field of FG9-1 is removed or not**

## 2.1 Proposal and discussion

Based on the contribution, following proposal is made.

### **FL proposal 1:**

* **Remove the note in description field of FG9-1.**

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| 9. NR\_2step\_RACH | 9-1 | Basic channel structure and procedure of 2-step RACH | 1. Fallback procedures from 2-step RACH to 4-step RACH 2. msgA PRACH resource and format determination 3. msgA PUSCH configuration 4. Validation and transmission of MsgA PRACH and PUSCH 5. Mapping between preamble of MsgA PRACH and PUSCH occasion with DMRS resource of MsgA PUSCH 6. msgB monitoring and decoding 7. PUCCH transmission for HARQ-ACK feedback to a msgB 8. Power control for msgA PRACH, msgA PUSCH and PUCCH carrying HARQ-ACK feedback to msgB |  | Yes (but gNB does not need to know whether FG9-1 is supported or not for UEs before RRC connection) | N/A | UE cannot initiate a 2-step RACH process, and thus would not be expected understand the 2-step RACH configurations | per UE | No | No | N/A |  | Optional with capability signalling |

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 |
| Huawei, HiSilicon | Agree |
| ZTE | Agree with the FL proposal |
| vivo | Agree with the FL proposal |
| Apple | Agree with the FL proposal |
| Nokia, NSB | Agree with the FL proposal |
| Qualcomm | FL Proposal 1 looks good to us |
| Intel | Agree with the FL proposal |
| CATT | We are fine with FL proposal |
| Spreadtrum | Agree with the FL proposal |
| DOCOMO | We are fine with FL proposal. According to RAN2 LS(R1-2005204), all 2step RA UEs should support extended RAR. |

1. FG[9-6]

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9. NR\_2step\_RACH | [9-6] | [up to X of msgBs per slot/within the msgB window] | [up to X of msgBs per slot/within the msgB window] | TBD | Yes | N/A |  | [Per band] | N/A | N/A | N/A | RAN2 to make final decision on whether this FG is needed or not considering the maximum payload size of msgB | Optional with capability signalling |

In [2], following proposal is made.

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| RAN2 has already decided not to support FG 9-6. It shall be removed from RAN1 UE feature list.  ***Proposal 13: Remove FG9-6 from 2 step RACH FG list.*** |

Based on the above contribution, it is agreed to discuss following points in the email discussion [3].

**Discussion point#2**

* **Whether FG9-6 is removed or not**

## Proposal and discussion

Based on the contribution, following proposal is made.

### **FL proposal 2:**

* **Remove FG[9-6].**

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 |
| Huawei, HiSilicon | Agree |
| ZTE | Agree with the FL proposal |
| vivo | Agree with the FL proposal |
| Apple | Agree with the FL proposal |
| Nokia, NSB | Agree with the FL proposal |
| Qualcomm | FL Proposal 2 looks good to us |
| Intel | Agree with the FL proposal |
| CATT | We are fine with FL proposal |
| Spreadtrum | Agree with the FL proposal |
| DOCOMO | We are fine with FL proposal |

1. Conclusion

**FL proposal 1:**

* **Remove the note in description field of FG9-1.**

**FL proposal 2:**

* **Remove FG[9-6].**

Reference

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

[2] R1-2005666 Remaining issues on Rel-16 UE features CATT

[3] R1-2006708 Summary on UE features for two-step RACH Moderator (NTT DOCOMO, INC.)

Appendix: UE features list for two-step RACH in [1]

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 9. NR\_2step\_RACH | 9-1 | Basic channel structure and procedure of 2-step RACH | 1. Fallback procedures from 2-step RACH to 4-step RACH 2. msgA PRACH resource and format determination 3. msgA PUSCH configuration 4. Validation and transmission of MsgA PRACH and PUSCH 5. Mapping between preamble of MsgA PRACH and PUSCH occasion with DMRS resource of MsgA PUSCH 6. msgB monitoring and decoding 7. PUCCH transmission for HARQ-ACK feedback to a msgB 8. Power control for msgA PRACH, msgA PUSCH and PUCCH carrying HARQ-ACK feedback to msgB   Note:  1. Components are not exhaustive list and whether/how to capture them is up to RAN2  2. From RAN1 perspective, UE behavior supported for msgB window extended up to 40ms is a part of basic feature group for 2-step RACH separately from NR-U feature group, i.e., FG10-2f. It is up to RAN2 to capture the above description if needed. |  | Yes (but gNB does not need to know whether FG9-1 is supported or not for UEs before RRC connection) | N/A | UE cannot initiate a 2-step RACH process, and thus would not be expected understand the 2-step RACH configurations | per UE | No | No | N/A |  | Optional with capability signalling |
| 9. NR\_2step\_RACH | 9-3 | Parallel MsgA and SRS/PUCCH/PUSCH transmissions across CCs in inter-band CA | Parallel MsgA and SRS/PUCCH/PUSCH transmissions across CCs in inter-band CA with msgA in PCell/PScell | 4-26, 9-1 | Yes | N/A | UE cannot transmit an MsgA and other UL transmissions in parallel across CCs in inter-band CA | Per BC | N/A | N/A | N/A |  | Optional with capability signalling |
| 9. NR\_2step\_RACH | 9-4 | MsgA operation in a band combination including SUL | MsgA operations in a band combination including SUL | 9-1, 6-16 | Yes | N/A | UE does not support msgA operations in a band combination including SUL | Per BC | N/A | N/A | N/A |  | Optional with capability signalling |
| 9. NR\_2step\_RACH | [9-6] | [up to X of msgBs per slot/within the msgB window] | [up to X of msgBs per slot/within the msgB window] | TBD | Yes | N/A |  | [Per band] | N/A | N/A | N/A | RAN2 to make final decision on whether this FG is needed or not considering the maximum payload size of msgB | Optional with capability signalling |