3GPP TSG-RAN WG2 Meeting #113bis-e R2-2104322

Electronic Meeting, April 12 – 20, 2021

**Agenda item: 8.8.3**

**Source: CMCC**

**Title: Summary for [AT113bis-e][252][NR] Slice-specific RACH**

**WID/SID: NR\_slice**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is the summary for the following email discussion during RAN2#113bis-e meeting.

Email discussions ([252]) - not kicked off before online session

* [AT113bis-e][252][NR] Slice-specific RACH (CMCC)

Scope:

* + - Summarize main open issues based on contributions and online agreements.
		- Highlight if there are topics that clearly require online discussion.
		- Identify topics that might benefit from email discussions.

 Intended outcome:

* + - Discussion summary in [R2-2104322](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104322.zip) (by email rapporteur)

 Deadline for providing comments and for rapporteur inputs:

* + - Initial deadline (for companies' feedback): 1st week Fri, UTC 0900
		- Initial deadline (for rapporteur's summary): 2nd week Mon, UTC 1200

**Company Context**

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| **Company** | **Contact** |
| CMCC Ningyu | chenningyu@chinamobile.com |
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# 2 Discussion

This email mainly discusses on the following topics: basic solutions, co-existence with legacy UE and legacy MPS/MCS, RA selection and fallback cases. Some proposals in contributions [1-4] that covers above topics are copied below for discussion.

## 2.1 Basic solutions

In WID RP-210921, it limits that only MO cases should be considered for RACH. It needs to be clarified firstly what is “MO case”, i.e., does it include MO signaling or data traffic?

Proposal: Only MO data arrival triggered RACH can apply slice specific RACH. MO signaling (e.g. mo-Signalling and mo-SMS) triggered RACH is not applied to slice-specific RACH. [1]

**Q1: Do you agree with above proposal?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes | MO signaling should use the common RACH resources. |
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In TR 38.832, it captured IDLE/INACTIVE UE can apply slice specific RACH. Companies are invited to share views on whether slice specific RACH can be applied to CONNECTED UE in below 3 highlighted cases in TS 38.300:

The random access procedure is triggered by a number of events:

- Initial access from RRC\_IDLE;

- RRC Connection Re-establishment procedure;

- DL or UL data arrival during RRC\_CONNECTED when UL synchronisation status is "non-synchronised";

- UL data arrival during RRC\_CONNECTED when there are no PUCCH resources for SR available;

- SR failure;

- Request by RRC upon synchronous reconfiguration (e.g. handover);

- Transition from RRC\_INACTIVE;

- To establish time alignment for a secondary TAG;

- Request for Other SI (see clause 7.3);

- Beam failure recovery;

- Consistent UL LBT failure on SpCell.

**Q2: Whether CONNECTED UE can also apply slice specific RACH when RACH is triggered by MO data arrival (i.e. when UL synchronisation status is "non-synchronised", or there are no PUCCH resources for SR available, or SR failure)?**

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| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes | We don’t have strong preference, ok to consider CONNECTED UE.  |
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Proposal: Slice specific RACH (including RACH isolation and RACH prioritization) is only applied to CBRA rather than CFRA. [1]

**Q3: Do you agree with above proposal?**

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| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes | Dedicated RACH resource is applied for CFRA. |
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## 2.2 Co-existence with legacy UE and non-urgent slice

It is important that the introduction of slice specific RACH resource shall not prevent from accessibility for Rel-15 / Rel-16 legacy UEs. In addition, Rel-17 UEs supporting RACH isolation should also have non-urgent slice, i.e. the Rel-17 should not switch to another BWP to trigger common RACH when non-urgent slice traffic arrival. [1]

Proposal: To support legacy UE and non-urgent slice, if slice specific RACH resource is configured in one BWP, common RACH resource (i.e. legacy CBRA resource) is required to be configured in the same BWP. [1]

**Q4: Do you agree with above proposal?**

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| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes | To support legacy UEs, the common RACH resource need always be configured. |
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## 2.3 RACH type selection and fallback

During the online session, RAN2 agreed to support configuring 2-step RA resources or 4-step RA resources or both for slices, as well as the legacy fallback mechanism. Several contributions [1,2,3,6,7] are supportive to have RA type fallback for slice based RACH. In Qualcomm’s contribution [1], the following 5 cases for RACH type configuration, selection and fallback are proposed. Companies are invited to share views on whether these 5 cases should be supported.

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| --- | --- | --- | --- | --- |
| Cases | RACH resource configuration in one BWP | RACH type selection | Fallback after MSGA attempt number beyond threshold | Notes |
| Case 1 | 2-step slice specific RACH 4-step common RACH | Always perform 2-step slice specific RACH  | UE switch to MSG1 of 4-step common RACH  | Via only configuring 2-step slice RACH resource, high priority slice may only trigger 2-step RACH to reduce latency |
| Case 2 | 2-step slice specific RACH 4-step slice specific RACH 4-step common RACH  | RACH type selection based on RSRP threshold | UE can switch to MSG1 of 4-step slice specific RACH  | No fallback from 4-step slice specific RACH to 4-step common RACH |
| Case 3 | 4-step slice specific RACH 2-step common RACH  | Always perform 4-step slice specific RACH  | No fallback  |  |
| Case 4 | 4-step slice specific RACH 4-step common RACH  | Always perform 4-step slice specific RACH  | No fallback  |  |
| Case 5 | 2-step slice specific RACH 2-step common RACH4-step slice specific RACH 4-step common RACH | RACH type selection based on RSRP threshold | UE can switch to MSG1 of 4-step slice specific RACH  | No fallback from 4-step slice specific RACH to 4-step common RACH. Not preferred due to large RACH resource usage |

**Q5: Do you support above 5 cases for RA configuration, selection and fallback?**

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| **Company** | **Yes/No/Part of them** | **Comments** |
| CMCC | Yes | We support to have flexible RA configuration for slices. And we are also ok with the RA selection and fallback in the table. |
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## 2.4 co-existence with MPS/MCS

**For the topic of prioritization parameter collision with MPS/MCS, here are the candidate approaches:**

Option 1: It should be clearly specified in the specification.

Option 1a: slice specific RA prioritization parameter should override MPS/MCS specific RA prioritization parameter. [2][13]

Option 1b: MPS/MCS specific RA prioritization parameter should override slice specific RA prioritization parameter. [3][12]

Option 2: It should be configurable by network. [4]

**Q6: which option do you prefer**

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| **Company** | **Option** | **Comments** |
| CMCC | 1a | In order to guarantee the fairness among UEs initiating the same slice, we prefer the slice specific RA prioritization parameter should override MPS/MCS specific parameter |
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# 3 Conclusion

TBD

# 4 References

1. [R2-2102697](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102697.zip) Slice specific RACH Qualcomm Incorporated discussion
2. [R2-2103696](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103696.zip) Discussion on slice based RACH configuration CMCC discussion Rel-17
3. [R2-2102761](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102761.zip) Considerations on slice based RACH configuration Beijing Xiaomi Software Tech discussion
4. [R2-2104019](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104019.zip) Analysis on slice based RACH configuration CATT discussion
5. [R2-2102832](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102832.zip) Considerations of slice based RACH Intel Corporation discussion Rel-17
6. [R2-2102989](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102989.zip) Considerations on slice-based PRACH configuration Lenovo, Motorola Mobility discussion Rel-17
7. [R2-2103089](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103089.zip) Slice based RACH configuration Samsung discussion Rel-17
8. [R2-2103214](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103214.zip) Consideration on slice-specific RACH OPPO discussion Rel-17
9. [R2-2103240](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103240.zip) Consideration on slice based RACH configuration Spreadtrum Communications discussion Rel-17
10. [R2-2103376](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103376.zip) Slice based RACH configuration vivo discussion Rel-17
11. [R2-2103548](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103548.zip) RACH prioritisation for slices Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_slice
12. [R2-2103882](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103882.zip) Discussion on slice based RACH Apple discussion Rel-17
13. [R2-2104005](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104005.zip) Discussion on slice based RACH configuration Huawei, HiSilicon discussion Rel-17
14. [R2-2104064](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104064.zip) Discussion on slice specific RACH resources and RACH prioritization ZTE corporation, Sanechips discussion Rel-17
15. [R2-2104099](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104099.zip) Slice-specific RA procedure LG Electronics UK discussion