

**Final round**  
**Variant of [95e-35-R17-RANSlicing-WI] Version 0.0.2**  
**RAN**

**3GPP TSG RAN meeting #95e RP-220895**

**Electronic Meeting, March 17-23, 2022**

**Agenda Item: 9.5.2.10**

**Source: CMCC (RAN Vice Chair)**

**Title: Summary for [95e-35-R17-RANSlicing-WI]**

**WI code(s): NR\_slice-Core**

**leading WG: RAN WG2**

**Release: Rel-17**

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## 1 Introduction

This NWM discussion will focus on how to handle R17 RAN Slicing WI, based on the following 8 contributions.

1. RP-220637 Status report for Rel-17 WI: Core part: Enhancement of RAN slicing for NR; rapporteur: CMCC RAN2
2. RP-220823 REL-17 WI Exception for Core part: Enhancement of RAN slicing for NR CMCC
3. RP-220638 WI summary for WI Enhancement of RAN slicing for NR CMCC, ZTE
4. RP-220403 Rel-17 Specification Finalization Nokia
5. RP-220386 On RAN slicing Ericsson
6. RP-220387 Discussion on issues with slice based cell reselection Deutsche Telekom
7. RP-220035 Reply LS to R2-2111310 on Slice list and priority information for cell reselection (S2-2201859; to: RAN2, RAN3, CT1; cc: SA, CT, RAN; contact: ZTE) SA2
8. RP-220043 Reply LS to S2-2201859 = RP-220035 on Slice list and priority information for cell reselection (R2-2203807; to: SA2, CT1, RAN3, SA, RAN, CT; cc: -; contact: OPPO) RAN2

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## 2 Discussion

According to the rapporteur input [1-2], the total completion level in status report is 95%. The WI can only be considered completed if the slice prioritization and slice grouping related issues in other WGs (SA2, CT1, RAN3) are completed. Otherwise, the end-to-end function is incomplete. Considering there are still remaining

open items for RAN3/SA2/CT1, [4] proposed to agree on the exception sheet to finalize the specifications by June 2022. It was proposed in [1] and [5] that RAN3 should allocate more TUs to address the RAN3 impacts.

Both slice grouping and slice priority are now under discussion in SA plenary, and will be further discussed in SA2 meeting in April 2022 if needed. Therefore, from the moderator's perspective it is suggested that RAN wait for SA/SA2 decision on slice grouping no later than April SA2 meeting, and update the CRs accordingly in RAN2/RAN3 in May. The potential impact on RAN specifications are manageable and can be handled in next RAN2/RAN3 meeting, e.g. updating the bit size of slice grouping in RAN2 ASN.1, and updating RAN3 specification, e.g., NGAP, XnAP, F1AP.

**Proposal 1: RAN wait for SA/SA2 decision on slice grouping no later than April SA2 meeting, and the CRs are manageable in RAN2/RAN3 in May. For RAN2 discussion the main change can be handled in ASN.1 and for RAN3 discussion, there may be a need to have extra TU.**

### Feedback Form 1: Question 1: Do you agree with proposal 1?

#### 1 – Deutsche Telekom AG

Deutsche Telekom does not agree.

In reference to our tdoc in RP-220387 we prefer to not approve the related RAN2 and RAN3 CRs provided at RAN#95e.

We clearly see the need to have a clear decision in SA first before RAN can approve any on the related RAN2/3 CRs.

Without the outstanding work in SA2 for Rel-17, the feature is incomplete and consequently the "hanging" RAN2/3 parts should be removed from Rel-17.

#### 2 – ZTE Corporation

We agree that RAN wait for SA/SA2 decision on slice grouping no later than April SA2 meeting. While for RAN3 discussion, if SA2 cannot achieve consensus on Slice grouping granularity, there will be no further discussion in RAN3. We would prefer to trigger RAN3 discussion driven by LS

#### 3 – VODAFONE Group Plc

SA2 has to make decision first and all other groups should take it into consideration while designing their protocols. If there is a decision on the SA Plenary level, SA Plenary should send an LS to corresponding groups.

#### 4 – China Mobile Com. Corporation

We agree with the way forward.

Both slice group granularity and slice priority are now under discussion in SA plenary meeting. And SA2 will probably continue to discuss on both topics. We see companies proposing compromised solutions in SA and trying to converge. Considering the RAN2 specification is 100% ready, and RAN3 specification on NG/Xn interface is manageable in next quarter, I think RAN can wait for SA/SA2 progress in April

meeting. Then RAN2 will update the bit size for slice group in ASN.1. And RAN3 will finalize the NG/Xn specification in May meeting.

#### **5 – KDDI Corporation**

We agree with the way forward and share the view with CMCC.

#### **6 – Beijing Xiaomi Mobile Software**

We agree that RAN wait until SA2 April meeting. If finally SA2 cannot make any agreement by then, RAN2 can revert the changes in CRs related to slice priority/slice grouping during ASN.1 review adhoc meeting in April. From our understanding, if slice priority is missing from SA2, either RAN to signalling the slice priority or the whole cell reselection for slicing has to be removed. If slice grouping is missing, SIB based cell reselection and RACH partition for slicing has to be removed as there will be security issue to broadcast slice identity. Further works to make the CRs workable can be handled in RAN2 May meeting.

#### **7 – TELECOM ITALIA S.p.A.**

We share the view expressed by Vodafone. there is a dependency from SA and we need to wait for the SA/SA2 decision before closing the Work Item and approving the CRs

#### **8 – InterDigital Finland Oy**

we agree with the way forward and share the view of KDDI and CMCC

#### **9 – Verizon UK Ltd**

We agree with the way forward i.e., wait for SA/SA2 progress. RAN2 can manage work in ASN.1 review phase and additional TUs can be allocated in RAN3 if needed to cover any NG/Xn impacts.

#### **10 – vivo Mobile Communication Co.**

We agree with the way forward and share the view of KDDI, RAN wait until SA2 April meeting.

#### **11 – Spark NZ Ltd**

We also agree with the way forward and wait for SA2.

#### **12 – CATT**

We think proposal 1 well reflects the current situation and is inline with the latest progress in RAN2/3, therefore we support it.

#### **13 – HuaWei Technologies Co.**

Agree. Regardless whether it is per PLMN or per TA, we understand for RAN2 CR, the only impact is whether the group size needs to be extended a bit larger, we don't see other impacts as the mapping itself is not visible to RAN2. Therefore we think this can be handled in the correction phase in Q2 for RAN2. For RAN3, if it goes per PLMN, the mapping can be configured via OAM and there should be no impact; if it goes per TA, there may be a need to exchange the slicing group information which requires RAN3 updates, which may require extra TUs. In any case we understand the mapping itself is led by SA2, and therefore SA/SA2 should make a final decision. As long as SA/SA2 makes a final decision before next RAN2/RAN3 meeting, it is feasible to complete RAN2/RAN3 adaptation in May's meeting.

<p><b>14 – Intel Corporation (UK) Ltd</b></p> <p>We are ok with the proposed way forward.</p>
<p><b>15 – Samsung R&amp;D Institute UK</b></p> <p>We are okay with the way forward in general. For RAN3, we think that extra TU or LS triggered discussion is ok.</p>
<p><b>16 – Spreadtrum Communications</b></p> <p>We support the way forward.</p> <p>Slice grouping and slice priority are now under discussion in SA meeting. We can wait for their progress and update the CRs accordingly if something needed to be changed in May, e.g. extra TU arrangement.</p>
<p><b>17 – Kyocera Corporation</b></p> <p>Yes, we agree with Proposal 1 and share the same view with CMCC.</p>
<p><b>18 – DOCOMO Communications Lab.</b></p> <p>We are fine with the proposal.</p>
<p><b>19 – Apple R&amp;D</b></p> <p>We agree with this proposal. RAN2 efforts in updating the spec based on SA2 progress is quite limited. Whether RAN3 needs to capture anything depends on the solution picked up by SA2/SA.</p>
<p><b>20 – LG Electronics France</b></p> <p>We are with the proposal. SA plenary in this week already made decisions to work on required stage-2 work in April and this would mean that corresponding stage-3 work will be done in May.</p>
<p><b>21 – SoftBank Corp.</b></p> <p>We agree with the way forward, we can wait for SA2 progress in April.</p>
<p><b>22 – Guangdong OPPO Mobile Telecom.</b></p> <p>We share a similar view as CMCC and KDDI. Also, we are fine with this way forward.</p>
<p><b>23 – MediaTek Inc.</b></p> <p>In view of SA discussions, <b>all RAN WG CRs on RAN slicing should be put on hold</b> i.e. NOT approved in this plenary for the outcome of SA2 discussions is still unknown. If SA2 can conclude in their April meeting (our understanding from SA plenary recommendation) then it will inform RAN WGs.</p>
<p><b>24 – CTSI</b></p> <p>Yes, we agree with proposal 1.</p>

## **25 – Ericsson LM**

From recent SA2 discussions (now being held at SA), we understand that from RAN2 point of view this issue is not only about the encoding of slice group in RRC ASN.1, but also about procedures, i.e. how UE acquires the slice group identity supported by a neighbouring cell. This is in RAN2 scope of work, and has not been discussed in RAN2 at all. Hence, we think more time for discussion is needed in RAN2.

Also, RAN3 work is needed to sort out and specify the impact of slice grouping on NW interfaces.

We do not agree with proposal 1 as it seems to suggest RAN to sit on our hands waiting for SA/SA2 to sort everything out. That will not work.

RAN plenary should allocate sufficient time in Q2 in RAN2/RAN3 to analyze and specify most feasible solutions based on current 5G functionality.

Given the situation we are in now where the status of this WI is unclear, we suggest waiting with implementing the CRs for slicing until the June-meeting.

## **26 – NEC Corporation**

Firstly we agree that RAN should wait for SA/SA2 decision on slice grouping. For CRs, from the workload point of view, they are manageable, while the main issue here is to discuss and confirm what RAN should do depending on the conclusion in SA/SA2. As the slice grouping is NAS oriented feature, without support (specification) in NAS layer/signaling, the feature cannot be completed as originally expected.

## **27 – Orange**

We also agree that the work in SA2 and CT1 needs to be complete before approving the CRs, which may need to be amended accordingly. We think it is necessary to have a checkpoint in June to check if the WI can be completed. We would like to ensure the scope is not downsized and avoid any leftovers to be postponed to Rel18.

## **28 – ZTE Corporation**

- Regarding the RP-220490 RAN2 CRs to enhancement of RAN slicing for NR, we are expecting them to be agreed this RANP so that we can have a basic version for the ASN.1 review coming-up. The slice group id is captured as FFS in these CRs, allowing us to update after SA2 concludes.
- Also to highlight that the slice specific RACH partitioning is captured in R2-2204241/R2-2203769 Introduction of Common RACH Partitioning Aspects within RP-220487 packet. Apart from Slicing, these CRs also impact Coverage Extension, REDCAP and SDT. In fact these CRs are critical for the ASN.1 review as they span a number of other WIs and hence in order to have a stable version of RRC for the ASN.1 review coming-up, we understand it would be important to keep these common RACH CRs approved in some form (either in RP-220487 package or separately).

**29 – Nokia Corporation**

SA/SA2 decision is needed no matter what else is done. Once that decision is done it's easier to see what is possible in RAN.

If RAN decides now to not approve the RAN slicing CRs, that implicitly moves the WI to Rel-18, which could also impact the entire Rel-18 WI package.

**30 – QUALCOMM JAPAN LLC.**

We support waiting for SA/SA2 decision.

RAN3 work depends on the final SA2 design.

**31 – BT plc**

BT shares Vodafone and Telecom Italia. SA2 needs to conclude before WI is closed and CRs are approved.

**32 – MediaTek Inc.**

Responding to Nokia: We are surprise with this comment. Not approving the slicing CRs *now does not move the WI to Rel-18!* That is precisely why we have some exception sheet under discussion - to keep the work under Rel-17 with an exception. This is business as usual. From discussions in SA plenary we also understand SA plenary is recommending SA2 to continue working on and to conclude on this in Rel-17 in Q2, in a timely manner for RAN2 to implement the changes in Q2. The RAN2 LS sent from RAN2's last meeting already expected a similar event and asked for a timely response anyway. I.e. SA2 is expected to reply in their April meeting.

If proposal 1 is agreeable, can we approve the exception sheet in RP-220823? And furthermore how many TUs should RAN3 allocate to address RAN3 impact?

**Feedback Form 2: Question 2: Can we approve RP-220823?**

**1 – Deutsche Telekom AG**

Given the current situation in SA, in particular SA2, with Stage 2 level discussions, the fact that the CT1 is not ready and the unknown amount of additional RAN3 work we think that getting the work done by June RAN#96 is simply unrealistic.

**2 – ZTE Corporation**

Fine with exception sheet but the explicit requirements for SA2/RAN3 is still missing.

**3 – VODAFONE Group Plc**

It is too early to agree on this exception.

**4 – China Mobile Com. Corporation**

Yes, since the WI should be extended with 1 quarter.

<p><b>5 – KDDI Corporation</b></p> <p>Yes. We are fine with exception sheet.</p>
<p><b>6 – InterDigital Finland Oy</b></p> <p>yes we are fine with the exception sheet</p>
<p><b>7 – Verizon UK Ltd</b></p> <p>Yes, exception sheet is fine. RAN2 has not much impact. 1Q extension should be good any R3 impact.</p>
<p><b>8 – vivo Mobile Communication Co.</b></p> <p>WE are fine to agree with the exception sheet.</p>
<p><b>9 – Spark NZ Ltd</b></p> <p>We agree with the exception.</p>
<p><b>10 – CATT</b></p> <p>We agree with the exception sheet in #0823.</p>
<p><b>11 – HuaWei Technologies Co.</b></p> <p>We are in general fine with the exception sheet in RP-220823, but we understand that 38.331 may need further update?</p>
<p><b>12 – Intel Corporation (UK) Ltd</b></p> <p><b>We are ok with the exception sheet.</b></p>
<p><b>13 – Samsung R&amp;D Institute UK</b></p> <p>We are okay with the exception sheet.</p>
<p><b>14 – Spreadtrum Communications</b></p> <p>Yes.</p> <p>We are fine with exception sheet. Furthermore, slice specific RACH should also be involved because it depends on slice group as well. For TU allocation, from our view, the exact arranged TUs can be set one checkpoint in May.</p>
<p><b>15 – Kyocera Corporation</b></p> <p>Yes, we can approve it.</p>
<p><b>16 – DOCOMO Communications Lab.</b></p> <p>We are fine with the exception sheet.</p>
<p><b>17 – Apple R&amp;D</b></p> <p>Yes, we think the exception sheet can be approved.</p>

**18 – LG Electronics France**

We are fine with the exception sheet.

**19 – SoftBank Corp.**

Yes, we are fine with the exception sheet.

**20 – Guangdong OPPO Mobile Telecom.**

Yes. We are fine with the exception sheet.

**21 – MediaTek Inc.**

The exception sheet is incorrect and inaccurate and in its present form is **not acceptable**. We are OK with an exception sheet, but it is the **entire work** that is subject to an exception, incl. RAN2.

**Specifications affected:**

- RAN2 specifications are affected, and MUST be listed
- Tasks that are not complete
  - o "RAN3, SA2, CT1 may have to get involved [blah]": this statement is highly inaccurate. All these groups WILL be involved, in addition to RAN2

**Abstract of document**

- No remaining open issues for RAN2: this is incorrect. SA2 who owns the system-wide definition of this feature has yet to reach any conclusion on the matter that will impact RAN2. The document must be updated accordingly.

**Contentious Issues**

- Whether RAN2 assumptions are valid need to be informed by SA2, CT1 and RAN3 (see RAN2 LS sent from last RAN2 meeting)

**22 – CTSI**

We are fine with the exception sheet.

**23 – Ericsson LM**

We think that indeed there is open issues in RAN2 for this item. For example, NW should indicate slice priorities to the UE, and given that the NAS-based approach is blocked in SA2, it seems that the most feasible solution is to rely on RRC signalling.

Also, RAN2 specs would be impacted for slice group indications for neighboring cells. This impacts both 38.304 and 38.331.

We therefore think that this is not accurate: ” No remaining open issues for RAN2.”

Also, we should probably update the WID to add RAN3 to this objective to ensure that RAN3 allocates time to this topic in upcoming RAN3 meetings:

- Support slice based cell reselection, specify mechanisms and signalling including [RAN2, **RAN3**]
- a. To assist cell reselection, broadcast the supported slice info of the current cell and neighbour cells, and cell reselection priority per slice in system information message.
- b. To assist cell reselection, include slice info (with similar information as in SI message) in RRCRelease message.

Further, in the ”**Specification(s) affected:**” we should add 38.304, 38.473 to the list of examples, even with adding these examples, the list of example specs impacted may not be complete (TBD in RAN2/RAN3).

**24 – NEC Corporation**

We are basically fine with the exception sheet, while expected RAN3 work can be captured more clearly.

**25 – QUALCOMM JAPAN LLC.**

This is a bit difficult discussion because what RAN2 and RAN3 will need to do is highly depends on the final design choice by SA2.

**26 – Nokia Corporation**

We are fine to be precise in exception sheet (that’s always good) in what’s open. So we are fine to be clearer in this but we think it’s good to approve an exception sheet for the WI.

However, RAN2 has already agreed the slice (group) information comes from NAS, not in AS signalling. Providing information in AS will impact NW signalling even more and we shouldn’t revisit that unless SA2 tells RAN2 that cannot be done.

**Feedback Form 3: Question 3: How many TUs should RAN3 allocate to address RAN3 impact?**

**1 – Deutsche Telekom AG**

This highly depends on the discussion and decision in SA2 - every number is only speculation.

**2 – ZTE Corporation**

It is hard to reserve TU without the mechanism acknowledged in other group (e.g SA/SA2), then it is better to trigger RAN3 work based on driven of LS.

<p><b>3 – VODAFONE Group Plc</b></p> <p>Agree that it is not possible to tell any number yet</p>
<p><b>4 – China Mobile Com. Corporation</b></p> <p>Specification work in RAN3 mainly focus on NG/Xn interface impact to support slice grouping per TA or per PLMN. So we think 1 TU would be appropriate to finalize the RAN3 specification.</p>
<p><b>5 – KDDI Corporation</b></p> <p>Share the view with CMCC.</p>
<p><b>6 – Verizon UK Ltd</b></p> <p>1 TU would be a good estimate for any potential RAN3 (NG/Xn) impact.</p>
<p><b>7 – CATT</b></p> <p>CMCC’s estimation looks reasonable. And we understand as the R2/3 work has largely go into maintenance stage, the exact number of TUs may not matter as much as in the early stage of the release. We simply believe R3 can manage the work based on input from SA WGs.</p>
<p><b>8 – HuaWei Technologies Co.</b></p> <p>We understand 0.5 extra TU for RAN3 could be sufficient.</p>
<p><b>9 – Intel Technology India Pvt Ltd</b></p> <p>We share the same view with CATT.</p>
<p><b>10 – Samsung R&amp;D Institute UK</b></p> <p>We think that LS triggered discussion is also fine and additional TU may not be needed. If extra TU is assigned, 0.5 TU is quite enough.</p>
<p><b>11 – Spreadtrum Communications</b></p> <p>It depends on the response from SA. As there is only one RAN3 meeting in Q2, we think sufficient TUs should be allocated to complete the WI timely.</p>
<p><b>12 – Kyocera Corporation</b></p> <p>We share the same view with CMCC.</p>
<p><b>13 – DOCOMO Communications Lab.</b></p> <p>CMCC’s suggestion looks reasonable. If the decision of SA/SA2 has unexpected impact then we can revisit the TU planning.</p>
<p><b>14 – Apple R&amp;D</b></p> <p>1TU seems a reasonable estimation if SA2 agrees to go with per TA slice group configuration.</p>

<p><b>15 – LG Electronics France</b></p> <p>WE think at least 0.5 TU would be required.</p>
<p><b>16 – SoftBank Corp.</b></p> <p>It is likely to depend on SA/SA2 input, but 1TU is reasonable estimation for now.</p>
<p><b>17 – Guangdong OPPO Mobile Telecom.</b></p> <p>1 TU may be a good suggestion.</p>
<p><b>18 – MediaTek Inc.</b></p> <p>Speculative at this point until SA2 has concluded on the approach. An upper bound should be identified at least based on the largest potential impact (per TA granularity from RAN2 assumption is the most impacting in our understanding). At least [1 TU] is required.</p>
<p><b>19 – Ericsson LM</b></p> <p>1 TUs may be sufficient.</p>
<p><b>20 – NEC Corporation</b></p> <p>This is not so easy question. Given SA/SA2 work is done as expected, the workload in RAN3 will not be so much.</p>
<p><b>21 – Nokia Corporation</b></p> <p>No strong view on what the number of TUs would be, but it's good to acknowledge some work is needed and reserve e.g. 1 TU. Alternatively, the "RAN3 basket TUs" could perhaps be used?</p>

RAN2 assumes that the NAS layer in the UE is able to provide slice group priorities to AS layer in the UE. But whether adding NAS level signalling to provide the priorities from the network to the UE or leaving this to UE implementation is now under discussion in SA plenary and may be discussed in April SA2 meeting. As SA2 is the leading group for this discussion, one potential way forward is that RAN wait for SA/SA2 decision on slice priority no later than April SA2 meeting.

In [5], Ericsson proposed a new RAN level solution of providing slice priority, i.e., Slice priority is resolved by adding RAN2 signalling, e.g. priority indicated in RRC release.

**Question 4: Which option do you prefer for slice priority?**

**Option A: RAN wait for SA/SA2 decision on slice priority no later than April SA2 meeting.**

**Option B: Slice priority will be resolved by adding RAN2 signalling, e.g. priority indicated in RRC release. [5]**

**Feedback Form 4: Question4: Which option do you prefer for slice priority?**

**1 – Deutsche Telekom AG**

Unfortunately Deutsche Telekom's proposal provided in [6] has been "forgotten" here in the list of options. We clearly think that the work is not finalised as the RAN WID [RP-212534] requires:

*b. To assist cell reselection, include slice info (with similar information as in SI message) in RRCRelease message.*

Obviously, what is ment here is, that the **network has the control** with the slice info to influence the cell reselection of the UE ! This is not given if the NAS leaves the priority to the UE implementation and does not provide this information to the AS for inclusion in the RRCRelease message.

We prefer the option to either request that SA2 decidces to provide the information on priorities with network control or we remove the entire feature from Rel-17 and leave more time finding a workable and agreeable end2end solution in a later release.

**2 – ZTE Corporation**

Option A. Option B is actually preventing SA2's solution and at least objected by one Operator [6].

**3 – VODAFONE Group Plc**

It is important that operators have a control about reselections. This is also valid if slice information is used.

**4 – China Mobile Com. Corporation**

Prefer Option A.

Option B haven't been discussed in RAN2. And this seems not align with RAN2 assumption that the NAS layer in the UE is able to provide slice group priorities to AS layer in the UE. And considering SA/SA2 is now discussing whether the slice priority should be signalled by network or by UE implementation, we suggest to wait for SA/SA2's decision. It would be too late to re-evaluate a new solution at this stage.

**5 – KDDI Corporation**

We prefer Option A. We also prefer to have network control on the prioirty, we don't want to leave it to UE implemenation. But we think this should be discussed in SA side and acutally SA colleagues are now discussing so we should wait their conclusion.

**6 – TELECOM ITALIA S.p.A.**

We support to request SA2 to decide on providing the information on priorities with network control

**7 – Deutsche Telekom AG**

We support the Telecom Italia proposal: The only way out of this situation is to request SA2 (which is now tasked by SA to continue) that priority information is provided based on network control (and not UE autonomously).

<p><b>8 – Verizon UK Ltd</b></p> <p>Prefer Option A, wait for SA2. We are also good Telecom Italia proposal to request SA2 on providing information based on network control.</p>
<p><b>9 – CATT</b></p> <p>As SA is now discussing this, and SA2 has one meeting before RAN WG meeting in May, so we expect they will have some conclusion on the same topic, so we prefer Option A.</p>
<p><b>10 – HuaWei Technologies Co.</b></p> <p>Option A. Procedural wise, we understand this issue is led by SA2, and RAN can follow SA/SA2’s decision.</p>
<p><b>11 – Intel Corporation (UK) Ltd</b></p> <p>We definitely prefer to introduce signaling rather than leaving it to UE implementation and also think that RRC signaling is acceptable if SA2 cannot agree on a solution. Nevertheless, since SA2 is still under discussion, we could wait.</p>
<p><b>12 – Samsung R&amp;D Institute UK</b></p> <p>We prefer option A.</p>
<p><b>13 – Spreadtrum Communications</b></p> <p>Support option A.</p> <p>We agree that slice priority should under NW control for the benefit of predictable UE behaviors. But now as SA is discussing the slice priority, we can wait for their conclusion firstly. As for option B, it can be considered if SA2 has decided that 5GC will not provide slice priority to UE. In this case, potential impacts also need more time to analyze.</p>
<p><b>14 – Kyocera Corporation</b></p> <p>Our preference is Option A. We also do not prefer that it is up to UE implementation for slice priority.</p>
<p><b>15 – DOCOMO Communications Lab.</b></p> <p>We support option A. We do not support leaving the priority up to UE implementation, but we think SA/SA2 is the appropriate place to decide and specify it.</p>
<p><b>16 – Apple R&amp;D</b></p> <p>Option A is preferred. Option B has not been discussed in RAN2 and we think it can only address the RRCRelease based cell re-selection but cannot address the general scenario where UE performs cell re-selection based on SIB.</p>
<p><b>17 – LG Electronics France</b></p> <p>We support option A, and this means that SA2 will work on stage-2 work during April meeting. If it turns that this option is not possible during April (the situation would be clear after the SA2 meeting), then RAN2 should work on option B at May.</p>

**18 – Guangdong OPPO Mobile Telecom.**

We prefer Option A. As the RAN slicing LS is already sent to other WGs, e.g. SA/SA2, it is better to wait for SA/SA2 discussion. Also, it may be a bit late to re-consider another solution at this stage.

**19 – MediaTek Inc.**

As is the case for this entire work, RAN (and WGs) cannot proceed until SA2 has reached a conclusion. In view of this Option A is sensible.

**20 – CTSI**

We prefer option A.

**21 – SoftBank Corp.**

We support option A.

**22 – Ericsson LM**

Option B. It is not acceptable to leave to UE implementation since this could negatively impact the network as the UE may perform cell reselection in a way which is not optimal from a system point of view and may interfere with current network policies, e.g. load distribution, paging strategies, etc.

An issue with Option A is that we cannot leave to SA/SA2 to decide how cell reselection should be performed, since this is clearly a RAN issue and RAN WGs should be in control of this topic.

**23 – Orange**

We need to ensure network control, and it is also necessary to wait for SA2 completion. We support Telecom Italia's proposal to request SA2 to provide information on network control, and not leave it to UE implementation.

**24 – NEC Corporation**

We support the Option A. As commented to Q1, the slice grouping is NAS oriented feature and thus definitely Option A is applied. It should be avoided to discuss the Option B which does not fit the original intention.

**25 – QUALCOMM JAPAN LLC.**

Option A (as originally intended by RAN2).

**26 – Nokia Corporation**

Option A: this is as per latest RAN2 decisions and going for option B may cause additional work for the WI.

**27 – BT plc**

The network should be in control of slice prioritization for cell reselection, same as for cell selection. Leaving this to UE implementation is not acceptable to us.

Option A: support

Option B: not support. This was never discussed in RAN2

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### 3 Initial Round Summary

Regarding Q1, 30 companies replied to Question 1. Companies' comments are summarized as follows:

Agree with the WF to wait for SA/SA2 decision: 28 companies (ZTE, Vodafone, CMCC, KDDI, Xiaomi, Telecom Italia, InterDigital, Verizon, vivo, Spark, CATT, Huawei, Intel, Samsung, Spreadtrum, Kyocera, Docomo, Apple, LG, SoftBank, OPPO, MTK, CTSI, NEC, Orange, Nokia, Qualcomm, CT).

Don't agree with proposal 1: 1 company (DT)

Don't agree to wait for SA2, but RAN2/3 should specify feasible solutions in Q2: Ericsson

RAN should not approve the CRs before SA2 complete their work: 5 companies (DT, Telecom Italia, MTK, Orange, BT).

25 companies think the CRs are manageable in Q2. ZTE commented that the RAN2 CR for slicing and common RACH partitioning should be approved in this meeting for a basic version for ASN.1 review.

Nokia commented that If RAN decides now to not approve the RAN slicing CRs, that implicitly moves the WI to Rel-18, which could also impact the entire Rel-18 WI package.

In conclusion, majority companies (27/30) support proposal 1, moderator suggest to agree on proposal 1. While 5 companies prefer not to approve the CRs, moderator suggest to discuss on the CR handling in next round.

**(28/30)Conclusion 1: RAN wait for SA/SA2 decision on slice grouping no later than April SA2 meeting, and the CRs are manageable in RAN2/RAN3 in May.**

Regarding Q2, 26 companies replied to question 2.

Agree with exception sheet: 21 companies (ZTE, CMCC, KDDI, InterDigital, Verizon, vivo, Spark, CATT, Huawei, Intel, Samsung, Spreadtrum, Kyocera, Docomo, Apple, LG, SoftBank, OPPO, CTSI, NEC, Nokia)

Don't agree with exception sheet: 4 companies (DT, Vodafone, MTK, Ericsson)

DT think it's unrealistic to finish in Jun RAN#96.

Qualcomm commented what RAN2/3 need to do is highly depends on final design choice by SA2.

In conclusion, all companies think an exception is needed due to we cannot finish the WI on time, and majority companies (21/26) agree with the exception sheet.

**(21/26)Conclusion 2: Exception sheet in RP-220823 should be approved.**

Regarding Q3, 21 companies replied.

1 TU: 14 companies (CMCC, KDDI, Verizon, CATT, Intel, Spreadtrum, Kyocera, Docomo, Apple, SoftBank, OPPO, MTK, Ericsson, Nokia)

0.5 TU: 3 companies (Huawei, Samsung, LG)

4 companies thought it hard to estimate the exact TU.

In conclusion, if SA2 will make their decision in April, RAN3 will need extra TU to finalize the work. If SA2 failed to converge, the TU will be released. So there is no harm to estimate the potential requirement of RAN3 TU. Based on majority view, moderator suggest we go with 1 TU.

**(14/21)Conclusion 3: RAN3 should allocate 1 TU for May meeting for RAN slicing WI.**

Regarding Q4, 26 companies replied.

Option A: 23 companies (ZTE, CMCC, KDDI, Telecom Italia, Verizon, CATT, Huawei, Intel, Samsung, Spreadtrum, Kyocera, Docomo, Apple, LG, OPPO, MTK, CTSI, SoftBank, Orange, NEC, Qualcomm, Nokia, BT)

Option B: 3 companies (Intel, LG, Ericsson)

Intel, LG, Spreadtrum commented that if SA2 cannot converge at April, RAN2 can work on option B with RRC signalling.

Vodafone, Telecom Italia, DT, Orange, Ericsson commented that slice priority should under network control. DT commented RAN should request SA2 to provide slice priority under network control. As majority think this should be handled in SA2, moderator suggest DT to raise this in SA2.

Based on the summary above, moderator suggest to go with majority view on option A.

**(23/26)Conclusion 4: RAN wait for SA/SA2 decision on slice priority no later than April SA2 meeting.**

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## 4 Intermediate Round

Regarding the conclusion of initial round, moderator found that all the conclusions are coming from significant majority view and actually no action is needed for RAN this meeting except Q3. So moderator thinks it is not needed to discuss other conclusions further.

**Conclusion 3: RAN3 should allocate 1 TU for May meeting for RAN slicing WI**

**Feedback Form 5: Question 5: Is conclusion 3 acceptable?**

**1 – China Mobile Com. Corporation**

Yes, I agree 1 TU for RAN3 May meeting is necessary for the RAN3 impact in May.

If SA2 successfully converge in April meeting, RAN3 will discuss on the specification impact, potentially NG/Xn interface, as well as finalize the CRs. On the other hand, in case the worst situation occurs that the

progress in SA2 is blocked unfortunately in April and decide to do nothing in Rel-17, RAN3 will probably release the TU.

As RAN slicing rapporteur, here are my further comments, SA2 R18 packet is already full, blocking and postponing SA2 R17 slicing normative work doesn't mean RAN slicing will have any chance to be discussed in SA2 R18. Companies need to compromise to majority view, otherwise our whole effort for R17 RAN slicing WI will be wasted.

**2 – QUALCOMM JAPAN LLC.**

Agree.

**3 – CATT**

Agree. We think CMCC comments make a lot of sense.

**4 – Guangdong OPPO Mobile Telecom.**

Agree, and we echo CMCC.

**5 – Apple R&D**

Agree.

**6 – ZTE Corporation**

RAN3 Chair's feedback:

Considering RAN3 May meeting is mainly focus on R17 WI maintainances and TEI issues, 1 TU is fine to be allocated if the objectives to be discussed in RAN3#115e can be confirmed based on inputs from SA/SA2.

**7 – KDDI Corporation**

Agree. We share the view with CMCC.

**8 – HuaWei Technologies Co.**

We in general think the moderator's explanation makes sense. How much TU needed is largely dependent on SA2 output, we prefer to have 0.5 TU now, but can accept 1 TU if the majority believes so.

**9 – Beijing Xiaomi Mobile Software**

Agree

**10 – Spreadtrum Communications**

Agree. And we also share similar views with CMCC.

**11 – SoftBank Corp.**

Agree with CMCC.

<p><b>12 – Samsung R&amp;D Institute UK</b></p> <p>Agree</p>
<p><b>13 – DOCOMO Communications Lab.</b></p> <p>Agree</p>
<p><b>14 – MediaTek Inc.</b></p> <p>We agree with Conclusion 3.</p> <p>Please note on the exception sheet: we do support an exception sheet be approved in this meeting (as we have stated in the Initial Round) however we think the exception sheet needs revision (see our comment).</p>
<p><b>15 – NEC Corporation</b></p> <p>Considering majority views in the initial round, it is acceptable.</p>
<p><b>16 – Deutsche Telekom AG</b></p> <p>We do not agree with Conclusion 3.</p> <p>As said earlier: every number is speculation as long as we do not know if and what SA2 will conclude in their April meeting.</p> <p>It is also quite strange that we think about reserving up to 1 TU for discussions which are stage 2 in SA2 and the Rel-17 stage 3 is finalised this meeting, while on the other hand also the work for Rel-18 is about to start ...</p>
<p><b>17 – ZTE Corporation</b></p> <p>We prefer 0.5 TU but fine for 1 TU is favored by majorities.</p>
<p><b>18 – Nokia Corporation</b></p> <p>We are fine with this conclusion.</p>
<p><b>19 – Verizon UK Ltd</b></p> <p>We are fine with this conclusion</p>

Here are the CRs that impacted by RAN slicing WI.

[9] RP-220490 RAN2 CRs to Enhancement of RAN slicing for NR RAN2

[10] RP-220232 RAN3 CRs for Enhancement of RAN slicing for NR RAN3

[11] R2-2204241 Introduction of Common RACH Partitioning Aspects (within SDT CR packet RP-220487)

[12] R2-2203769 Introduction of common RACH partitioning aspects in MAC (within SDT CR packet RP-220487 )

RAN2 slicing CR packet [9] contains slice grouping and slice priority, if SA2 can reach consensus in April, the potential change in May 2022 is on the bit size for slice group ASN.1.

RAN3 slicing CR packet [10] contains nothing related with slice grouping nor slice priority, but slice SMBR and service continuity. If SA2 finish their work in April, the potential change in May is on Xn/NG interface.

[11-12] are common RACH partitioning CRs, which containing Slicing, Coverage Extension, REDCAP and SDT.

4 CRs are all related with slicing, companies are invited to share views on how to handle the CRs in [9-12]

**Feedback Form 6: Question 6: How to handle the RAN slicing related CRs in [9-12], whether should we approve or postpone these 4 CRs?**

**1 – T-Mobile USA Inc.**

CRs in [9-12] need to be postponed until SA plenary makes a decision on slice grouping granularity and slice grouping priority.

**2 – China Mobile Com. Corporation**

Considering the 4 CRs are all related with the finalization of RAN slicing WI, the handling of these 4 CRs should keep consistency.

The conclusion in RAN2#117e slicing WI is that "RAN2 considers the the WI is completed if the issues related to other WGs (RAN3, SA2, CT1) can be completed. WI can proceed to ASN.1 review." So the RAN2 CRs are 100% complete. The only hanging thing is in other WG. ASN.1 review is so important to guarantee the high quality specification. So we see no reason to block these RAN2 CRs in this meeting.

Then, the RAN3 CRs in the packet captures nothing about slice grouping or priority but only service continuity and SMBR. These RAN3 CRs is also 100% complete and should be approved. Anything new for slice grouping can be added into a new RAN3 CR in May, if any change is needed according to SA2 latest conclusion in April.

Based on above analysis, we recommend RAN to approve all these 4 CRs.

**3 – QUALCOMM JAPAN LLC.**

Support approving all CRs agreed by WGs.

RAN2 CRs should be put forward for ASN.1, while we understand further changes may be needed after SA2 conclusion.

RAN3 CRs so far have nothing to do with the key open point discussed here, so no reason to postpone them.

**4 – CATT**

We don't see strong reason why these CRs from WGs cannot be approved by RAN. As many companies already pointed out in round 1, RAN WG already sent LS to SA and the situation should be pretty clear. This means RAN WGs just wait for progress and do maintenance work (just as for the other WIs) in May meeting.

So we support that these CRs are approved by RAN.

**5 – Guangdong OPPO Mobile Telecom.**

We support the approval of all CRs agreed by WGs.

RAN2 CRs are considered 100% complete from the RAN2 perspective. On the slice grouping or priority, the RAN2 LS sent out already describes the status and requires consistent handling among WGs. Based on SA#95e progress, SA agrees to ask SA2 to complete the work related to RAN slicing by April 2022 SA2#150e meeting. Thus, we see no reason to postpone RAN2 CRs.

RAN3 CR captures nothing about slice grouping or priority and can be approved.

**6 – Intel Corporation (UK) Ltd**

We prefer to approve the CRs in RAN plenary. Even if the CRs are postponed, they would be still included in ASN.1 review.

**7 – Apple R&D**

In order to have the CR(s) included in the upcoming ASN.1 review, we support to approve those CR(s) in RAN. Necessary handling could be done once SA2/SA achieve conclusion on slicing group configuration and slice group priority provision.

**8 – HuaWei Technologies Co.**

We support approving CRs in general. RAN3 CRs have nothing to do with cell reselection and therefore we don't see any problem to approve it. For RAN2 CRs, as we explained in the first round, regardless it is per TA or per PLMN, the modification of RAN2 spec is not big. It is useful to approve CRs as they are to allow ASN.1 review. In any case the slicing CRs and RACH partitioning CRs shall be handled in the same way, otherwise the specification is not consistent any more.

**9 – KDDI Corporation**

We are fine with approving CRs in this RAN plenary.

**10 – Beijing Xiaomi Mobile Software**

We suggest to approve/in-principle agree/agree as WA the CRs for ASN.1 review. FFS may be added to the CRs for slice grouping/slice priority

**11 – Spreadtrum Communications**

We support to approve these CRs by WGs as the related standard work had been completed. If necessary, additional new CRs can be provided at next WGs' meetings according to the response from SA2.

**12 – SoftBank Corp.**

We support approving the CRs in RAN plenary.

**13 – Samsung R&D Institute UK**

We support to approve the CRs in this RAN plenary. We think that slice group/priority part can be updated later accordingly.

#### **14 – DOCOMO Communications Lab.**

We support approving the CRs in RAN plenary. By incorporating the CRs we can review the ASN.1 more reliably (e.g. cross-WI ASN.1 impact). We also think that slice group/priority part can be updated later accordingly.

#### **15 – ZTE Corporation**

We also support approving all these CRs. As pointed out by a number of companies, these CRs are needed for stable ASN.1. It should be noted that R2-2204241 and R2-2203769 contain the implementation of not just RAN slicing but also a number of other features including REDCAP, Coverage Extension and SDT. RAN2 took a conscious decision to keep these together. Stability of the RRC for ASN.1 depends on approval of these for a number of features in RAN2. So, these CRs have to be approved in some form to ensure the availability of stable version of ASN.1 in time for the adhoc.

#### **16 – TELECOM ITALIA S.p.A.**

We share the view of T-Mobile USA. the CR approval should be postponed after SA2 conclusion.

#### **17 – MediaTek Inc.**

It should be documented somewhere (exception sheet and SR are the right places - but at least as a **conclusion of this email discussion**) that **RAN2 will need to discuss in their May meeting any conclusion from SA2 April meeting (as per SA#95e action) and update its specifications as necessary. Provided this is documented, proceeding with the CRs in this meeting is ok.**

#### **18 – NEC Corporation**

In order to achieve ASN.1 review for RAN Slicing, approving the CRs in this plenary is necessary. Anyway, an outcome of SA2 April meeting should be considered further in RAN WG(s).

#### **19 – Ericsson LM**

Also we think that RAN shall not approve the CRs until RAN3/SA2 progresses its parts. The CRs are not consistent, meaning they don't work together. Slice grouping is missing from RAN3 CRs and corresponding SA2 specification changes are also missing.

Conditions for future approval of the CRs would be the following:

- RAN3/SA2 parts will also be completed in Q2. If RAN3/SA2 do not conclude their part of the specification in Q2, CRs cannot be approved and the work on slicing enhancements would have to be moved to Rel18. Namely, if RAN3 or SA2 or RAN2 (to the extent concerning RAN2) cannot conclude in Q2, plenary would move the work to Rel18.
- If RAN/RAN2/RAN3 should "wait" for SA2, we should task RAN2 to specify RRC signalling for providing the slice priorities if SA2 does not specify NAS signalling for this. Meaning that if SA2 fails to specify NAS signalling for this, RAN2 must add RRC signalling for this to make sure we don't leave slice prioritization (which impacts cell reselection) to UE implementation. If both SA2 and RAN2 fails to specify NAS or RRC signalling for slice priority until June, RAN plenary should move the work to Rel18.

We want to clarify that adding the CRs in June would not be a problem even if ASN.1 review is done also until June. The RAN2 slicing CRs would be reviewed (including its ASN.1) before potential approval in June to make sure the CRs work with the rest of the specification. Hence it is **not** a valid argument that we must add these CRs now. Procedural-wise it is rather the other way around: Adding these CRs now creates more problems than it would to add them later.

We understand that holding back the Slicing CRs one more quarter will result in that we also may need to revisit the RACH Indication and Partitioning CRs, but those CRs already have open issues and Editor's notes on the Slicing related aspects so approving/not approving the Slicing CRs will result in inconsistent specs anyway and those inconsistencies needs to be resolved in Q2 regardless of outcome of this discussion.

To summarize, we do not think it is a good idea to implement the CRs now since it would cause inconsistencies which are unclear if they can be resolved in Q2. And if those inconsistencies are unresolved in June, the work on slicing shall be moved to Rel18.

#### **20 – Deutsche Telekom AG**

For the reason given already earlier in this discussion, we see **no way to approve** the CRs [9-12] during RAN#95e ! We also explicitly flagged these CRs by email ...

The CRs have been created on what basis ? ... It seems "no basis" as SA2 has not been able to decide on a stage 2 concept and is now tasked by SA to again discuss.

For Deutsche Telekom any solution which is not based on network control is unacceptable and will be rejected.

#### **21 – Nokia Corporation**

We are fine to document that the CRs relate to the SA/SA2 decision in the exception sheet.

Note that if we don't approve the RAN slicing CRs now, they will not be implemented and therefore the RRC CR can't be part of Rel-17 ASN.1 review. And the RACH partitioning CRs are common for multiple WIs in RAN2, so will RAN approve those CRs or not (since they contain RAN slicing related parts)?

So almost no matter what we do, there will be some RRC clean-up to do in May. That's why we said that not approving the CRs now could be seen as implicitly pushing the WI to Rel-18 (to answer the MediaTek comment to our views in the initial round) and were fine to approve the CRs to allow the WI chance to be completed in Rel-17 (same as with all other WIs).

#### **22 – VODAFONE Group Plc**

We would prefer to wait with approval till the progress in SA2/RAN3 and possible CT1 groups and the impact of RAN2 is clear.

#### **23 – BT plc**

Postpone.

It is required that SA2/RAN3 finalize their work. Currently, the impact in RAN2 cannot be assessed until these WG finalize their work. We share DT view, it is not acceptable to us a solution where UE prioritize slices based on its own implementation.

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## 5 Summary for intermediate round

### Summary for Q5

Regarding Q5, 17 companies replied to Question 5. Companies' comments are summarized as follows:

Support 1 TU for RAN3 May meeting: 16 companies (CMCC, Qualcomm, CATT, OPPO, Apple, ZTE, KDDI, Huawei, Xiaomi, Spreadtrum, SoftBank, Samsung, DOCOMO, MTK, NEC, Nokia)

Not support to add TU for RAN3 May meeting: 1 company (DT). The objecting company comments that whether SA2 will conclude in their April meeting is unknown. And the company thinks it strange to reserve up to 1 TU for discussions which are stage 2 in SA2 and the Rel-17 stage 3 is finalized this meeting, while on the other hand also the work for Rel-18 is about to start.

Huawei and ZTE prefer 0.5 TU but fine with 1 TU.

Moderator suggests to follow the majority view to agree on the conclusion that RAN3 should allocate 1 TU for May meeting for RAN slicing WI in order to finalize the corresponding normative work for the RAN3 part on slice grouping.

**Conclusion 5: RAN3 should allocate 1 TU for May meeting for RAN slicing WI.**

### Summary for Q6

Regarding Q6, 23 companies replied to Question 5. Companies' comments are summarized as follows:

Support to approve all 4 CRs: 17 companies. (CMCC, Qualcomm, CATT, OPPO, Intel, Apple, Huawei, KDDI, Xiaomi, Spreadtrum, SoftBank, Samsung, DOCOMO, ZTE, MTK, NEC, Nokia). Supporting companies emphasize the need to process the upcoming ASN.1 review to guarantee high quality and stable ASN.1.

Postpone the CRs after SA2 conclusion: 6 companies (T-mobile, Telecom Italia, Ericsson, DT, Vodafone, BT)

MTK commented that it should be documented that RAN2 will need to discuss in May meeting on any conclusion from SA2 April meeting and update its specifications as necessary.

Ericsson commented that if RAN3/SA2 do not conclude their part in Q2, the whole RAN slicing enhancement should be moved to Rel-18. And Ericsson propose to task RAN2 to specify RRC signalling for providing slice priorities if SA2 fails

Moderator suggests to reflect MTK and Ericsson's comments in the conclusion in the way by saying RAN2 and RAN3 will need to discuss and update specifications in May meeting based on the conclusion in SA2 April meeting, as necessary.

Based on companies' view, considering all the CRs are approved by the working groups and the open points are mainly in SA2, moderator suggests to approve all these 4 CRs for ASN.1 review to guarantee the stable and

high-quality specifications. If SA2 failed to converge on slice grouping and slice priority before RAN#96e, the RAN slicing enhancement will be moved to Rel-18.

**(17/23)Conclusion 6: The CR packets for RAN slicing and Common RACH partitioning should be approved in RAN#95e.**

**Conclusion 7: RAN2 and RAN3 will need to discuss and update specifications in May meeting based on the conclusion in SA2 April meeting on slice grouping and slice priority, as necessary. Exception sheet is revised to capture this conclusion.**

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## 6 Way forward after the intermediate round

### Way Forward:

- 1: RAN wait for SA/SA2 decision on slice grouping and slice priority no later than April SA2 meeting, and the CRs are manageable in RAN2/RAN3 in May.**
- 2: The CR packets for RAN slicing and Common RACH partitioning should be approved in RAN#95e.**
- 3: RAN2 and RAN3 will need to discuss and update specifications in May meeting based on the conclusion of SA2 April meeting on slice grouping and slice priority, as necessary. RAN3 allocate 1 TU for May meeting for RAN slicing**
- 4: Exception sheet is revised according to WFs.**