

**[RAN94e-R18Prep-16] Multiple SIM (MUSIM) Enhancements - Version 0.0.7**  
**RAN**

**3GPP TSG RAN#94e RP-212676**

**Electronic Meeting, December 06 - 17, 2021**

**Agenda Item: 8A.1**

**Source: RAN2 VC (Nokia)**

**Title: Moderator's summary for discussion [RAN94e-R18Prep-16] Multiple SIM (MUSIM) Enhancements**

**Document for: Discussion**

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## 1 Introduction

### 1.1 Outcome of previous R18 scope discussion

The scope of Multiple SIM (MUSIM) Enhancements was discussed in the general RAN1/2/3 set 3 discussion, with the conclusions shown in RP-211666 ([https://www.3gpp.org/ftp/tsg\\_ran/TSG\\_RAN/TSGR\\_93e/Docs/RP-211666.zip](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_93e/Docs/RP-211666.zip)).

The below shows the final status of that discussion.

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**Multiple SIM (MUSIM) Enhancements (WI).** A MUSIM enhancements WI with the scope below seems acceptable. There were some comments on UE capability update misuse, but no concrete arguments were provided. (Possibly this need to be further discussed).

MUSIM Enhancements Areas / Scope:

- Enhancements for staying in RRC\_CONNECTED state simultaneously on two NWs (main target is dual RX dual TX UEs). Support of dual connectivity during network switching scenarios.
  - UE capability coordination/update with NW A when it turns partial TX or RX chains to NW B.
  - Enhancements to UE request for SCell / SCG deactivation, release etc.

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### 1.2 Scope of the discussion

The goal of the discussion is to understand the nature of the project:

- Clarify the intent of the proposed objectives (i.e. What is the problem an objective aims to solve? What is the scope of the objective in solving the problem?)
- Clarify the size and responsibilities of each objective (i.e. how much effort does each objective require and in which WGs? Who leads the work? Are there any linkages to SA/CT?)
- Determine which objectives could be prioritized if SDT work item would be agreed to Rel-18 (i.e. which objective(s) are the most important ones?)

Some of the above questions may not be treated in each round: The intent of each round is as follows:

- Initial round: Clarify the objective descriptions and the justification for each. Confirm affected WGs.
- Intermediate round: Determine priorities for the objectives, including proposed size of the each objective (in terms of needed TUs) and the support level for the work.
- Final round: Finalize draft WI description, including justification, objectives, affected WGs, TUs, identification of SA/CT impacts (if any).

The remainder of the document is structured according to objectives, and the commenting rounds are handled under each objective.

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## 2 Objectives of the proposed work

### 2.1 Dual-Network RRC\_CONNECTED state

#### 2.1.1 Initial Round

The objective for dual-network RRC\_CONNECTED state was last seen as shown in the introduction:

- *Enhancements for staying in RRC\_CONNECTED state simultaneously on two NWS (main target is dual RX dual TX UEs). Support of dual connectivity during network switching scenarios.*
  - *UE capability coordination/update with NW A when it turns partial TX or RX chains to NW B.*
  - *Enhancements to UE request for SCell / SCG deactivation, release etc.*

The justification for this objective seem to have been to reduce interruptions to active RRC connection to those UEs who are capable of using two networks at the same time.

Companies are requested to provide feedback for 1) the the justification, 2) objective wording and 3) affected WGs.

**Feedback Form 1: Justification of the objective: What does this objective aim to do?**

## 1 – HUAWEI TECHNOLOGIES Co. Ltd.

Huawei, HiSilicon Generally, this objective aims to improve the performance of Dual RX/Dual TX UE staying in RRC\_CONNECTED state simultaneously on two NWs.

Specifically:

- for the first sub-objective:

□ The UE's RX&TX hardware capabilities are shared by two SIMs in implementation. To use the RX&TX hardware efficiently and economically, such hardware related capabilities are dynamically split between the two SIMs. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. Hence, in order to avoid the data loss and system resource waste for the Dual RX/Dual TX UE staying in RRC connected state simultaneously on two NWs, it is necessary to have a mechanism of supporting UE capabilities coordination/update with the NW.

- For the second sub-objective:

□ When the hardware conflict occurs for MUSIM temporarily, SCell/SCG should be suspended/resumed as soon as possible. In this case, the UE-requested SCell/SCG deactivation/release is more efficient in order to avoid or minimize the possible service interruption. On the other hand, considering that the hardware sharing between two SIMS is totally dependent on UE-vendor-specific implementation, and the NW cannot predict which SCC has the potential conflict issue, the UE should be allowed to precisely request a specific SCC/SCG for deactivation or release. Hence, it is necessary to specify enhancement(s) for UE-requested SCell/SCG deactivation or release in Rel-18 for MUSIM

## 2 – SHARP Corporation

Sharp Corp. For the first sub-objective we agree with Huawei. However on the second sub-objective we take a broader view in that SCell/SCG may not be the only functionality that introduces conflicts for hardware resources with respect to the operations of MUSIM.

## 3 – Samsung Electronics Co.

With this objective, seamless support of dual-network RRC\_CONNECTED state for dual Tx/dual RX MUSIM UEs can be achieved in a win-win situation. For example,

- A dual Tx/dual Rx MUSIM UE is connected to MN and SN in NW A. While the UE is DC-connected in NW A, the MUSIM UE could enter RRC\_CONNECTED state in NW B and the MUSIM UE shall use one Tx to access NW B. In this case, the MUSIM may encounter SN failure at some point because there is no way for the NW A to know that the MUSIM UE can't transmit and receive to/from SN in NW A. By specifying UE-NW negotiation mechanisms, SN connectivity in NW A could be released without service break in NW A and dual network connectivity with NW A and NW B could be supported. Note that similar scenario is applicable to CA in NW A.

## 4 – DENSO CORPORATION

On the first objective (i.e. capability coordination), overall, the motivation is aligned with previous comments (Huawei, Sharp and Samsung). It is to support operations of so-called DC with two NWs without service interruption. In addition, even though the current consensus is to focus on the RRC\_CONNECTED

state, we start to wonder if the work on capability coordination may encounter potential impact on the idle/i-  
nactive mode operation, e.g. in case the UE is in connected in one NW (DC or non-DC) and in idle in the  
other NW. Perhaps, it doesn't have to be so strict to focus on the connected mode only.

On the second objective (i.e. SCell/SCG deactivation, release), this is also a valid tool for dual Tx/Rx UEs  
to support DC with two NWs. On the other hand, these mechanisms are supposed to be available up to  
Rel-17, albeit the purpose is different, e.g. overheating. It is better to build a common consensus on what  
we should do on top of the Rel-17 spec.

#### **5 – MediaTek Inc.**

The motivation of the objectives seems well understood by companies. We basically agree the explanation  
from Huawei.

#### **6 – NEC Corporation**

For Rel-17 network switching leaving RRC Connected state, the UE has to leave RRC Connected state at  
network A to switch to network B in order to perform service which requires long time switching. This  
results in service interruption on network A. However for UE with dual RF capability, it should be possible  
to perform long time service at both networks. The aim of the objective is to maintain RRC Connected state  
in order to have long time service at both networks for MUSIM UE. And there are two potential directions  
to solve the problem: capability coordination, and SCell/SCG release/deactivation.

#### **7 – Lenovo (Beijing) Ltd**

The motivation is clear.

#### **8 – Spreadtrum Communications**

In order to support Dual-Network RRC\_CONNECTED state, some extra interaction shall be introduced  
between UE and gNB. For example, UE may indicate the assistance information of UE capability division  
between network A and network B, which is due to RAN implementation in DC scenario.

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

Justification for bullet 1 □ Dual-Rx/Dual-Tx capable Multi-USIM device may stay in RRC\_CONNECTED  
state simultaneously on both networks, e.g. file is transferred with Network A and voice call is ongoing with  
Network B. In this case, Network A cannot schedule the UE with full device capability since the device  
turns partial Tx and Rx chains to Network B. Currently, without notifying Network A about the reduction  
of availability capability (such as MIMO layers, DC/CA combinations), it causes the waste of Uu resources  
and packet loss in Network A. The standardized enhancements is expected to improve the performance of  
simultaneous connections in a NW controlled way.

Justification for bullet 2 □ In current UE request for SCell / SCG deactivation, release mechanism, UE only  
reports its preference on SCell / SCG deactivation, release. As a result, the network may ignore UE's  
request. Things are different in MUSIM scenario. In MUSIM case, ignore UE's request will cause bad  
user experience, e.g. delay the connection setup for an incoming call. Hence, the current UE request for  
SCell / SCG deactivation, release mechanism should be enhanced to indicate the network why the request  
is initiated.

#### **10 – TCL Communication Ltd.**

The motivation and justification are well understood. We basically agree with Vivo.

### **11 – Nokia Corporation**

- The aimed justification seems to be to allow UE to stay connected in NW1 while accessing NW2. This has some obvious drawbacks: UE capabilities in NW1 may be affected, UE has to do traffic splitting, transmit power can be affected. The objective aims to consider the extent to which this is possible. The justification is to allow (high-end) UEs to operate under two networks at the same time
- Note that this work is only relevant for the case when UE uses MUSIM while staying connected to NW1 (i.e. short/long gap from Rel-17) and the objective should clearly state that this enhances existing MUSIM functionality (and does not replace existing solutions).
- We are also fine with the Huawei proposals to clarify the justification.

### **12 – Sony Europe B.V.**

Agree with Sharp and NEC that we shall not limit ourselves unnecessarily in what solution that will be agreed in the end, the objective should focus on the problem to solve. Therefore we support objective 1 but objective 2 should be more open for the solution.

### **13 – ZTE Corporation**

The justification of this is to allow the UE to maintain connection with two networks and to share the capabilities between the networks. The general motivation for these changes seem to be well understood.

### **14 – Intel K.K.**

We understand that the main use case for this objective is to improve the support of MUSIM on UEs with dual-Tx and dual-Rx capability, which was not included in Rel-17 MUSIM WI. The objective is to allow the UE to inform Network A to reduce its configuration by either requesting to deactivate SCell/SCG or reducing capabilities so that UE can connect simultaneously to Network B without interruption to the active connection to network A.

As we commented in the RAN#93e email discussion we are not convinced that a standardised solution for dual tx/rx UEs offer significant benefit to the system over the UE implementation based approaches that are available today. However, as the item seems to have a high level of support we provide comments to the objectives in the interest of ensuring that the work scope is well defined.

### **15 – Charter Communications**

A judicious update of the UE capabilities in one network enables the UE to go to RRC-Connected in the other network, and take care of necessary procedures, all without the need to become Inactive/Idle in the first network. While this incurs some signaling on RAN, it'd save RAN/Core signaling were the UE had to go Inactive/Idle in the first network. We believe that the second sub-bullet, reg SCell/SCG deactivation, would achieve the same goals on a different level. Overall, we agree with the stated objective listed above.

### **16 – Apple (UK) Limited**

The motivation for two SIMs in simultaneous connected state for Dual Rx/Dual Tx is well understood. For the second bullet, "*Enhancements to UE request for SCell / SCG deactivation, release etc.*" is this considered only for Dual Rx/Dual Tx or even for other Rx/Tx architecture? Reading the objective in current form, leads us to think that it is applicable primarily for Dual Rx/Dual Tx. Is that the intent?

**17 – Futurewei Technologies**

Motivation is clear

**18 – China Mobile Com. Corporation**

The motivation looks clear and well understood.

**19 – Ericsson LM**

Define means to allow a dualTx/dualRx UE, currently using MR-DC or CA in one network, to use part of its capabilities to setup a connection in the other network and be in connected state in two networks at the same time.

**20 – LG Electronics France**

On the first bullet, we wonder if this objective is too ambitious; the objective is to enable dynamic capability coordination between two networks based on UE assistance. But it is not clear if such dynamic capability coordination can well coexist with the current UE capability framework that is based on static UE capabilities. Given that we do not intend to design a new capability framework only for MUSIM, we do not think this objective is essential for MUSIM.

The second bullet seems to be a more pragmatic and doable objective; The second objective needs enhancements of existing UE assistance information for MUSIM purposes. This objective is simple but efficient since it can be used as means to avoid capability conflict between networks in many cases based on the existing static capability framework and static capability sharing scenarios.

**21 – China Unicom**

The motivation and justification are clear and well understood.

**22 – VODAFONE Group Plc**

The motivation for work in this area seems clear.

**23 – Qualcomm CDMA Technologies**

Agree that motivation and justification for this WI are well understood. We can use the suggested text by HW as a baseline in the WID justification section. For the Objectives: it may be better to use "dual active" instead of "dual connectivity" as the latter is a well-known and different architecture. Also, "when it turns partial TX or RX chains" seems informal and also excludes the case when the UE is back to single connection in NW A. Since the goal is dual active, we can simply say "*UE capability coordination/update with NW A to support simultaneous connection with NW B*". For the second objective, we can put "(de)-activation" since the UE may request the SCells to be activated when the NW B connection is over.

**Feedback Form 2: Wording of objective: What should be the scope of the objective?****1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We are fine with this objective and the two sub-objectives, but would like to suggest some changes considering that:

- 1) The enhancement should aim for Dual RX/Dual TX UE only considering that we have already done

enhancements for UEs with single RX/single TX and dual RX/single TX UE in Rel.17

2) The wording “Support of dual connectivity during network switching scenarios” is not so clear. We understand the intention with this sentence is that the UE in NW A could be configured with DC when it needs to turn partial TX or RX chains to NW B.

To address the above two issues, we propose to formulate the objectives as below, by referring to the Rel.17 MUSIM WID formulation:

*Enhancements for staying in RRC\_CONNECTED state simultaneously on two NWs including 1) UE capability coordination/update with NW A when it turns partial TX or RX chains to NW B; 2) Enhancements to UE request for SCell / SCG deactivation, release etc.*

- RAT Concurrency: Network A is NR SA or NR DC. Network B can either be LTE or NR.*
- Applicable UE architecture: Dual-RX/Dual-TX UE*

## **2 – SHARP Corporation**

Sharp Corp. The second sub-objective identifies a specific enhancement to the UE’s request for SCell / SCG deactivation, release, etc. However, this objective focuses on a single implementation specific solution, and thus may be too narrow in scope to fully address the generic issue that the UE may need to coordinate with the NW on RF resource assignments so as to facilitate the UE’s MUSIM operations.

The current text should be revised to provide the working groups the flexibility to determine, evaluate and spec the solution(s). For example, *Enhancements that enable the UE to request the NW to (re)configure the UE’s resource assignments in support of MUSIM activity.*

## **3 – Samsung Electronics Co.**

We are fine with current wording of objective in general. To be more in clarity, we would like to suggest to add ‘temporary’ i.e. Temporary UE capability coordination/update with NW A when it turns partial TX or RX chains to NW B.

## **4 – DENSO CORPORATION**

Both the first and second objectives are the intended scope. On the target scenario, it is better to clarify that NR SA (incl. CA and non-CA) and NR DC are included, as Huawei commented. In addition, the objective may not have to be strict only for the connected mode, in case we may find the potential idle mode impact, as commented in the previous discussion.

## **5 – NEC Corporation**

*“Support of dual connectivity during network switching scenarios.” is not very clear. It can be changed like “Support network switching during dual connectivity, which can potentially include both SCG is kept and SCG is released upon network switching.”*

## **6 – MediaTek Inc.**

At least, the sentence “Support of dual connectivity during network switching scenarios” should be removed in the original objective. The term dual connectivity is quite confusing here. It could be interpreted as “connect to both SIM simultaneously”. The version provided by Huawei seems better.

Another comment is that we think clear job description should be defined in the objectives. On this aspect, the current wording for two sub-objectives is okay. Vague wording and wide solution scope that require

long discussion in WG should be avoided. We don't expect large TU for MUSIM as it is 2nd release to have this enhancement.

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

we suggest the below wording

Enhancements for staying in RRC\_CONNECTED state simultaneously on two Networks (main target is dual RX/dual TX UEs). Support of dual connectivity during network switching scenarios [RAN2, RAN3, RAN4]:

- 1) UE capability coordination/update with Network A when UE turns partial Tx and/or Rx chains to Network B [RAN2, RAN3, RAN4].
- 2) Enhancements to UE request for SCell / SCG deactivation, release etc for MUSIM purpose [RAN2, RAN3].

#### **8 – Spreadtrum Communications**

For the two types of procedure in this object, UE assistance is needed, which is against the gNB's controlling rule. For example, if SCell / SCG deactivation or release could triggered by UE, the RRM in gNB may encounter the new challenge.

#### **9 – Nokia Corporation**

The objective is written a bit too broadly: We think that the scope has to be restricted to the existing MUSIM enhancements, i.e. UE providing request to use MUSIM, including indication of what it requires for the MUSIM operation to function (similar to the MUSIM gap request in Rel-17). Hence, we would rephrase this part as follows:

*Specify enhanced MUSIM procedures for:*

- *Enhanced MUSIM procedures to enable UE to be in RRC\_CONNECTED state simultaneously in two Nws for dual connectivity-capable UEs with dual Tx and dual Rx, e.g.*
  - o *UE assistance information for starting additional RRC\_CONNECTED operation with NW A when using NW B (e.g. Tx/Rx chains, MIMO layers, etc.)*
  - o *UE assistance information to support dual connectivity UEs in network switching scenarios (e.g. requesting SCG release or deactivation)*

This also limits the objective to the bare minimum, i.e., UE providing request to network and network deciding what to do with the request.

#### **10 – Sony Europe B.V.**

Agree with Sharps proposal for objective 2, the objective should be more open for the solution.

#### **11 – ZTE Corporation**

We are generally fine with the wording of this objective.

#### **12 – Intel K.K.**

We are still not clear what “network switching scenarios” in the “Support of dual connectivity during network switching scenarios” means in the objective, particularly for dual Tx/Rx UEs. This needs to be clarified in our view. Further “dual connectivity” is a term well used today and reusing the same term here

could cause confusion. Without a clear understanding what “*Support of dual connectivity during network switching scenarios*“, we would prefer it to be removed or clarified using an alternative term.

Another issue we see in the objective is that the sub-bullets UE capability coordination and UE requested SCell/SCG deactivation/release are overlapped and can be considered as alternative solutions to address the same issue. Hence, it would be better to indicate that the 2 sub-bullets are example solutions.

Another point on the sub-bullet#1 is that any capability change should be for the lifetime of RRC connection only and hence no impact to the capabilities stored in the CN.

The wording of the objective could be:

*Enhancements for staying in RRC\_CONNECTED state simultaneously on two NWs for dual RX dual TX UEs with the following example solutions:*

- *UE capability coordination/update with NW A when it turns partial TX or RX chains to NW B. Any capability change would be for the lifetime of RRC connection only and hence no impact to the capabilities stored in the CN.*
- *Enhancements to UE request for SCell / SCG deactivation, release etc*

### **13 – Charter Communications**

Agree with others that “dual connectivity” may be confusing here and better to spell it more clearly, e.g. “enable a UE to be in RRC-Connected in both networks simultaneously”.

### **14 – Apple (UK) Limited**

We would prefer the wordings in the lines suggested by Huawei and Vivo. At the same time, we would prefer if the possible solutions given by itself do not restrict the scope of the objective.

### **15 – China Mobile Com. Corporation**

We are generally fine with the objectives.

### **16 – Ericsson LM**

The scope of the objective is:

- Temporary reduction of the UE capabilities to allow the UE to use one Tx/Rx chain to connect to the other network, while being in connected state in the current network.
- Re-enabling of the previously disabled capabilities once the service in the other PLMN is over.
- Enhancements to the current procedures to handle the release of SCell/SGC or CA

We are fine with the text proposed by Huawei but, in RAT Concurrency, Network A should be “NR SA + CA or NR-DC”. Additionally, the text should mention that the UE capabilities are *temporary* updated with NW A when it turns partial TX and/or RX chains to NW B.

### **17 – Futurewei Technologies**

Vivo’s wording seems agreeable.

We are also fine to include Huawei’s proposal to clarify the scope regarding applicable concurrent RATs and UE architectures, as well as Intel’s comments regarding not impacting UE capabilities stored in CN. Perhaps it would be best to capture such clarifications on scope as notes, rather than within the body of the objective.

## 18 – Qualcomm CDMA Technologies

It may be better to use "dual active" instead of "dual connectivity" as the latter is a well-known and different architecture. Also, "when it turns partial TX or RX chains" seems informal and also excludes the case when the UE is back to single connection in NW A. Since the goal is dual active, we can simply say "UE capability coordination/update with NW A to support simultaneous connection with NW B". For the second objective, we can put "(de)-activation" since the UE may request the SCells to be activated when the NW B connection is over.

### Feedback Form 3: Affected WGs: Which WGs (in RAN/SA/CT) would need to work on this objective?

#### 1 – HUAWEI TECHNOLOGIES Co. Ltd.

Huawei, HiSilicon RAN2 should be the leading group. Not sure whether any other RAN WG (e.g. RAN4) needs to be involved currently.

#### 2 – Samsung Electronics Co.

We think RAN2 should be the leading group. At this moment, we are not sure whether SA/CT and other RAN WGs (e.g. RAN1/3/4) needs to be involved.

#### 3 – DENSO CORPORATION

Agree that RAN2 should be the leading WG. If the work is focuses on the capability coordination and SCell/SCG deactivation, release, we're also not sure if the other RAN WGs need to be involved. As the UE capability management is somehow relevant to CN, SA/CT might be involved.

#### 4 – NEC Corporation

RAN2, and maybe RAN3 and RAN4.

#### 5 – MediaTek Inc.

RAN2 should be the leading group. If we limited the solution to "capability coordination" and "UE request SCell/SCG release/deactivation", there should be very limited (or zero?) impact to other WG or SA/CT.

#### 6 – Lenovo (Beijing) Ltd

RAN2 should be leading group. The capabiliyt change may impact CN. e.g SA.

#### 7 – vivo Mobile Communication Co.

To support the RF capability update, RAN4 should be involved. For DC UE in network A, capability update may involve information exchange between MN and SN, hence RAN3 may be involved. We see no impact to other WGs so far.

#### 8 – Spreadtrum Communications

RAN2 should be the leading group. RAN3 and SA2 may be involved if needed.

<p><b>9 – Nokia Corporation</b></p> <p>RAN2, RAN3, RAN4 and possibly SA2/CT1</p> <p>At least RAN2 (basic procedure) and RAN4 (requirements for the procedure) are affected, and most likely also RAN3 (e.g. to indicate changes from UE to CN). It's also possible that SA/CT are also impacted, which would require this to be taken into account in their Rel-18 plans. It could be beneficial to try to avoid SA/CT impacts and keep the solutions inside RAN only.</p>
<p><b>10 – ZTE Corporation</b></p> <p>RAN2 should be the main WG. Other RAN WGs (e.g. RAN4) may also need to be consulted depending on the solution details. It would be good to avoid any RAN1 impacts with this work item.</p>
<p><b>11 – Intel K.K.</b></p> <p>Leading WG should be RAN2. Our preference is to limit the work in RAN2 and not to add complicated solutions that affects other WGs.</p>
<p><b>12 – Charter Communications</b></p> <p>RAN2 should be the lead WG, with possible RAN3 involvement. Due to various reasons, e.g. high likelihood of using scheduling/measurement gaps and UE capability update, we believe that RAN4 should be involved.</p>
<p><b>13 – Apple (UK) Limited</b></p> <p>Leading WG should be RAN2. RAN3 and RAN4 might get impacted as well, but they can be supporting WGs.</p>
<p><b>14 – China Mobile Com. Corporation</b></p> <p>RAN2 should be the leading group. RAN4 maybe impacted.</p>
<p><b>15 – Ericsson LM</b></p> <p>RAN2, RAN3, SA2 (potential)</p>
<p><b>16 – Futurewei Technologies</b></p> <p>RAN2 as leading WG. RAN4 can be consulted if needed.</p>
<p><b>17 – China Unicom</b></p> <p>Agree that RAN2 should be the leading WG, RAN3, RAN4 may be involved.</p>
<p><b>18 – Qualcomm CDMA Technologies</b></p> <p>RAN2 is the leading group. RAN4 involvement may be needed but this decision can be made later based on the solution direction in RAN2. There shouldn't be any impact to RAN3 or SA2 but usual communications can happen as needed.</p>

**Summary:** Most companies agree with the scope but see a need for clarifications, e.g. clearer scope and not using the term "dual connectivity" as that can be misunderstood.

**Justification:** Based on the comments (from proponents), the following is seen as justification for this

objective (combined for both cases as the use case is the same):

*A MUSIM UE's hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, as it may need to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, coordination from UE to network on these temporary UE (capability) restrictions can be beneficial.*

**Objective:** Several companies proposed various updates to the objectives: Many commented that the "dual connectivity" may be misleading and the intent is to allow dual network operation instead of "DC", with UE capabilities being about Dual Tx/Rx (which was not covered in Rel-17 WI), which could be made clear in the similar way the Rel-17 MUSIM WI indicated the UE architectures. It was also commented that the capability update is *temporary*, i.e. no CN changes are required due to that, and that UE may also request "end" to the dual network operation. To accommodate the proposals, below shows the moderators proposal for the objective:

- *Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*
  - *UE request for temporary UE capability update with NW A when UE starts connecting to NW B, e.g. request for SCell / SCG (de)activation for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

**Lead and impacted WGs:** All companies see RAN2 as the lead WG, with potential impacts in RAN3 and RAN4. SA/CT may also need to be consulted during the course of the work. However, it was not clear which groups could be impacted by which objectives, which could be made clearer.

**Conclusion 1:** The overall scope to allow UE to operate in two networks at once in RRC\_CONNECTED seems agreeable but further clarifications are needed on the scope and impacted WGs.

### 2.1.2 Intermediate Round

The intermediate round focuses on finalizing the scope of the objective(s) and understanding the impacts to each WG (including the required TUs).

1. Objective finalization
2. Impacted WGs (including estimated TUs)

The objective wording proposed by the moderator is shown above. companies are requested to provide feedback on whether some aspects could be further clarified.

Similarly, companies are requested to provide feedback on how other WGs would be impacted, and how many TUs would be required. Moderator also notes that in case TUs are required for SA/CT work, a dedicated WI would likely also be required.

**Feedback Form 4: Finalizing the objective wording - comments on the proposed moderator wording?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon

We are generally fine with the objective wording proposed by the moderator but with two comments:

- 1) As we explained in the first round of discussion, the sub-objective on UE request for SCell/SCG (de)activation is not an example of temporary UE capability update. To avoid any confusion during WG discussion, we still prefer to have a separate sub-bullet for it in order to make the objective crystal clear in the WID. In addition, “release” seems to be missed considering that no company proposed to remove it during the first round of discussion.
- 2) The affected WG beside RAN2 seems not clear at the current stage. So we suggest to put it as FFS now and wait for the conclusion from the intermediated discussion.

So based on the above two comments, we proposed the following revision for the objective on top of the moderator’s version.

- *Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, FFS on other WGs ~~RAN3, RAN4~~]*
- UE request for temporary UE capability update with NW A when UE starts connecting to NW B., e.g. request for SCell/SCG (de)activation for MUSIM purpose*
- UE request for SCell/SCG (de)activation and add/release with NW A for MUSIM purpose.*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

Also, a small comment on the Conclusion 1 to make it reflect the discussion more accurately.

**Conclusion 1:** The overall scope to allow **[Dual-RX/Dual-TX]** UE to operate in two networks at once in RRC\_CONNECTED seems agreeable but further clarifications are needed on the scope and impacted WGs.

**2 – Qualcomm CDMA Technologies**

We agree with HW on the objectives. Merging the original two objectives from the first email discussion to one and using “e.g.” can create ambiguity. UE capability update will be a new feature, mainly targeting changes to RF and baseband resources, and can be applicable to non-CA and non-DC. The second sub-bullet is a specific enhancement to existing SCell/SCG change request.

**3 – ZTE Corporation**

We are fine with the current objectives.

#### 4 – Apple (UK) Limited

When we say

**RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*

Are we excluding any CA or NRDC on Network B ? Is that restriction implied ?

If not such restriction exists, then should we say ”*Network B can either be LTE or NR (with CA) or NR DC*” ?

#### 5 – Intel K.K.

The moderator’s current proposed objective looks generally acceptable to us.

We do not see a need to split the second bullet since UE capability coordination and UE requested SCell/SCG deactivation/release are overlapped and can be considered as example solutions to address the same issue.

#### 6 – Futurewei Technologies

Agree with Huawei and QCM. For clarity, it is better not to merge the two objectives.

#### 7 – vivo Mobile Communication Co.

*We are fine with the wording except that for RAT concurrency, the network A can also be NE-DC.*

#### 8 – Samsung Electronics Co.

The proposed objective looks in a good shape. But we also agree with Huawei and Qualcomm i.e. make separate bullets in terms of temporary UE capability update and UE request for SCell/ SCG **release** and deactivation for MUSIM purpose to avoid any confusion. As commented in the initial round discussion, **we are not convinced** whether there is potential SA/CT and RAN3/4 impacts for now.

#### 9 – SHARP Corporation

We support the moderator’s current proposed objective.

#### 10 – Lenovo (Beijing) Ltd

We support the current proposal.

#### 11 – China Mobile Com. Corporation

We are fine with Huawei’s proposal on the objectives.

#### 12 – VODAFONE Group Plc

We are not sure why LTE (and by implication EN-DC) is excluded from being the first network that the UE is using. This is perfectly likely to happen, Then, when the MUSIM device starts a connection for the second SIM (on either NR or LTE) some communication to the eNB is needed.

hence it seems NECESSARY to have something like:

**RAT Concurrency:** *Network A is NR or LTE (either RAT using CA or MR-DC). Network A is NR or LTE (either RAT using CA or MR-DC)*

### 13 – Ericsson LM

We are basically fine with the objective. Two comments:

1. Add "or RRC Inactive" in the below sentence: *For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle or RRC Inactive in NW B..*
2. Add "A" in the below sentence: *To avoid this, coordination from UE to network A on these temporary UE (capability) restrictions can be beneficial.*

### 14 – NEC Corporation

We are fine with the current objectives.

### 15 – China Unicom

We agree with Huawei and QC 's suggestions on the objectives.

### 16 – DENSO CORPORATION

Agree on the proposed objectives from the moderator. It makes sense to merge the SCG/SCell deactivation, release as an example of the capability coordination.

### 17 – Nokia Corporation

We think the "e.g. request for SCell / SCG (de)activation for MUSIM purpose" - part could be removed - that's solution details, not problem statement. For the Huawei comment, the purpose of the UE capability update is for MUSIM. The HW sharing is only applicable for MUSIM purpose, so it's clearly connected to the temporary capability update. The justification given said "When the hardware conflict occurs for MUSIM temporarily", which to us means temporary UE capability restriction, i.e. the same as the first part of the objective.

We also think the wording should use "UE assistance information for" instead of "UE request for" to make it clear this is UE indicating information to network, who then decides what to do. This makes the objective simpler:

- *Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*
  - o *UE assistance information for temporary UE capability update with NW A when UE starts connecting to NW B*
- *RAT Concurrency: Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- *Applicable UE architecture: Dual-RX/Dual-TX UE*

### 18 – LG Electronics France

We support the current proposal.

### 19 – HUAWEI TECHNOLOGIES Co. Ltd.

Huawei, HiSilicon For the SCell/SCG deactivation/release, we would like to provide some further comments as per the request from the moderator.

As we explained in the first round of discussion, the motivation and use case are different for the SCell/SCG deactivation and temporary UE capability update, e.g. if the hardware conflict is between a specific SCell of NW A and NW B, by using the SCell/SCG deactivation procedure can help the NW A knows the exact SCell that the UE cannot support. However, this cannot be achieved by using the temporary UE capabilities

update procedure. In addition, we also share the views from Qualcomm on the difference between these two things.

We understand that having a separate bullet for the SCell/SCG deactivation will not give any negative impact on the WID, but can make the scope/areas more clear and hence can avoid the potential discussion regarding to interpretation of the scope in the future WGs meeting.

**Feedback Form 5: How many TUs are required from RAN2  
(as leading WG)?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We think (at least) 6 TUs in total in RAN2 are needed

**2 – ZTE Corporation**

We think 6 TUs should be enough for this work.

**3 – China Telecommunications**

About the scope, we suggest to include the case that *Network A* is NE-DC.

We think 6 TUs in RAN2 is reasonable.

**4 – Apple (UK) Limited**

Atleast 6 TUs in RAN2 is reasonable.

**5 – Intel K.K.**

As on the TU, we think 0.5-1 TU per RAN2 meeting should be sufficient for this work.

**6 – Futurewei Technologies**

Agree with other companies, 6TUs in total for RAN2 seems reasonable.

**7 – vivo Mobile Communication Co.**

6TUs are OK in RAN2.

**8 – Samsung Electronics Co.**

6 TUs

**9 – SHARP Corporation**

6 TUs for RAN2

**10 – China Mobile Com. Corporation**

6 TUs in RAN2

**11 – Ericsson LM**

0,5 to 1 TU for RAN2 meetings.

<p><b>12 – NEC Corporation</b></p> <p>we think 4 TUs are required. which is 0.5-1 TU per RAN2 meeting.</p>
<p><b>13 – China Unicom</b></p> <p>6 TUs for RAN2</p>
<p><b>14 – DENSO CORPORATION</b></p> <p>0.5 to 1 TU per RAN2 meeting</p>
<p><b>15 – Nokia Corporation</b></p> <p>We estimate roughly 3-4 TU for RAN2 are needed for this (roughly 0.5-1 TU per meeting). As the leading WG, we expect 4-5 meetings needed to complete the work.</p>
<p><b>16 – LG Electronics France</b></p> <p>We think TU can be no larger than 6 in total</p>

**Feedback Form 6: RAN3 impacts: Is RAN3 impacted by the work and how? How many TUs would be required?**

<p><b>1 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon the first round of discussion, some companies commented that for the temporary UE capability with NW A in case of DC, RAN3 may be involved. However, in our understanding, the UE capability update between MN and SN could be done by using RRC container as in legacy procedure. So we don't see the what would need RAN3 work at this moment.</p>
<p><b>2 – ZTE Corporation</b></p> <p>We also think RAN3 impacts can be avoided in this work.</p> <p>If capability updates for DC are necessary, the current capability negotiation framework can be reused and we don't think RAN3 impacts are needed for this. If there is any specific impact identified based on a given solution agreed in RAN2, we can consult RAN3 at this point.</p>
<p><b>3 – China Telecommunications</b></p> <p>We don't see any impact on RAN3 if we only consider temporary UE capability update.</p>
<p><b>4 – Apple (UK) Limited</b></p> <p>The extent or scope of RAN3 work would depend on the solution that get agreed. In terms of capability negotiation, solutions should try to minimize or if not completely avoid any RAN3 impact. Any adhoc impact in RAN3 can be achieved using our regular LS process.</p>
<p><b>5 – Intel K.K.</b></p> <p>Our preference is to limit the work in RAN2 and not to add complicated solutions that affects other WGs. Since the UE capability update is temporary, we do not see the solutions impacting RAN3 (e.g. deactivating/releasing of SCells and SCG should be able to re-use existing procedures without affecting RAN3).</p>

<p><b>6 – Futurewei Technologies</b></p> <p>We do not see a need to impact RAN3 specs.</p>
<p><b>7 – vivo Mobile Communication Co.</b></p> <p>According to current procedure, UE’s capability is informed from MN to SN in SN addition procedure. It is not clear which Xn procedure can be used for MN to inform SN when the UE’s capability is updated. We think RAN3’s work can be triggered by LS from RAN2.</p>
<p><b>8 – Qualcomm CDMA Technologies</b></p> <p>This should not have any impact on Xn and Ng and any new signaling should be part of RRC transparent containers. So no need to add RAN3 at this stage.</p>
<p><b>9 – Samsung Electronics Co.</b></p> <p>We are still not convinced about RAN3 impacts. Hence, we prefer to NOT discuss required RAN3 TU allocation at this moment. As we did in R17 MUSIM WI, TU(s) can be allocated later on if needed or any identified impact(s) on RAN3 can be addressed by our regular LS process.</p>
<p><b>10 – Charter Communications</b></p> <p>Perhaps no need to include RAN3 at this time</p>
<p><b>11 – Lenovo (Beijing) Ltd</b></p> <p>We don’t see the impact on RAN3.</p>
<p><b>12 – China Mobile Com. Corporation</b></p> <p>As we commented during the initial round, we don’t see a clear impact on RAN3 for now. The potential impact on RAN3 can be triggered by the solution and LS.</p>
<p><b>13 – VODAFONE Group Plc</b></p> <p>We expect that there is some need for RAN 3 work (perhaps, for example, when RACS is in use and only the UE Capability ID and not the full UE RAC is sent from MN to SN). However, it appears that the total amount of work should be low (0.5 - 1TU).</p>
<p><b>14 – VODAFONE Group Plc</b></p> <p>An additional comment having looking at the next question: RAN 3 may also need to address how the temporary UE capability restriction is handled at S1/NG handover (including inter CN node and inter-RAT cases) and when RACS is, and is not, in use.</p>
<p><b>15 – Ericsson LM</b></p> <p>Depends on the solution discussed in RAN2, 0.5 TU for 1 -2 RAN3 meetings.</p>
<p><b>16 – NEC Corporation</b></p> <p>For dual connectivity scenario, the SCG may be released/deactivated. Some coordination may be required between MCG and SCG. Considering RAN3 impact may not be so much, 2 TUs should be sufficient for RAN3.</p>

**17 – China Unicom**

We are not sure about RAN3 impacts. Hence, RAN3 TU allocation can be discussed later.

**18 – DENSO CORPORATION**

Agree that RAN2 can work on the potential specification impact regarding inter-node RRC messages. In that sense, the necessity of involving RAN3 is not clear at this moment.

**19 – Nokia Corporation**

We estimate 0-1 TU for RAN3 are needed for this (roughly 0.5 TU per meeting for RAN3). Whether RAN3 work is needed should be assessed by RAN2 - hence, this topic could be handled as part of the "basket TUs" in RAN3.

**20 – LG Electronics Finland**

We expect that the temporary capability update can be discussed within RAN2 scope. We prefer to avoid RAN3 impacts for this.

**Feedback Form 7: RAN4 impacts: Is RAN4 impacted by the work and how? How many TUs would be required?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon At this moment, it is not clear to us what would need RAN4 work. This may depend on the detailed solution, so we suggest to not add RAN4 in the WID at the current stage and that could be updated after the solution direction is clear.

**2 – ZTE Corporation**

We agree that RAN4 impact is a bit unclear and can be added later if needed (the proposal from moderator that other WGs can be consulted later as needed seems to cover this intention).

**3 – China Telecommunications**

Same view as HUAWEI and ZTE.

**4 – Apple (UK) Limited**

Agree with Huawei and ZTE. RAN4 can be consulted as and when the proposals/solutions become clear.

**5 – Intel K.K.**

Our preference is to limit the work in RAN2 and not to add complicated solutions that affects other WGs. We do not see any impact to RAN4, if the temporary UE capability update is simply deactivating/releasing of SCells and SCG upon UE assistant/request information.

**6 – Futurewei Technologies**

Agree with other companies. It would be better to limit scope to RAN2. RAN4 can be consulted, if needed, when solution becomes clear.

<p><b>7 – vivo Mobile Communication Co.</b></p> <p>The update on RF capability may cause RAN4 to define new requirements for the procedure. And new band combinations may be defined in case NW A and B are belonging to different operators. We think at least 3 TUs are needed in RAN4.</p>
<p><b>8 – Qualcomm CDMA Technologies</b></p> <p>Also support to keep this limited to RAN2 at this point. RAN4 involvement can be added as needed.</p>
<p><b>9 – Samsung Electronics Co.</b></p> <p>Agree with Huawei and ZTE.</p>
<p><b>10 – Charter Communications</b></p> <p>Agree with vivo that updating UE capabilities would likely require RAN4 input.</p>
<p><b>11 – Lenovo (Beijing) Ltd</b></p> <p>Agree with HW.</p>
<p><b>12 – China Mobile Com. Corporation</b></p> <p>We don't see a clear impact on RAN4 for now. The potential impact on RAN4 may be triggered by the solution and LS.</p>
<p><b>13 – VODAFONE Group Plc</b></p> <p>An objective of the design should be that there is no SA/CT impact.</p>
<p><b>14 – VODAFONE Group Plc</b></p> <p>sorry.. wrong box for that comment :-)</p>
<p><b>15 – Ericsson LM</b></p> <p>RAN4 impacts need to be identified first.</p>
<p><b>16 – NEC Corporation</b></p> <p>Maybe. For capability coordination solution, new band combination and parameters for MUSIM UE maybe need to be defined by RAN4, since the current band combinations are only targeted for single operator system. At least 2 TUs are required for RAN4 if there is consensus on RAN4 impact.</p>
<p><b>17 – China Unicom</b></p> <p>RAN4 impacts can be further discussed if the solutions become more detailed and clear.</p>
<p><b>18 – DENSO CORPORATION</b></p> <p>The potential RAN4 specification impact is not clear so far.</p>

**19 – Nokia Corporation**

All in all we share the Huawei view that how much work is needed in RAN4 is unclear. However, we don't want to just not allocate anything to RAN4 and then notice work is needed (as is currently happening in Rel-17 MUSIM) - at the very least, the RAN4 TU need should be considered at planning stage. There might be some leftover Rel-17 RAN4 work for MUSIM, and whatever RAN2 solutions are created, some RRM requirements could be impacted.

**20 – LG Electronics Finland**

At this moment, we don't think the temporary capability update give an impact on RAN4 since the raised issues are likely resolved by the current capability coordination.

**Feedback Form 8: SA/CT impacts: Are SA or CT WGs impacted by the work and how? If they are, would they require TUs (i.e. dedicated WI) for MUSIM?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We agree with other companies (e.g. Intel, Futurewei) that the temporary UE capability update should be limited to RAN domain, and not impact the UE capabilities stored in the CN. So, we don't see the impact to SA and CT WGs.

**2 – ZTE Corporation**

We prefer to avoid impacts to SA and CT.

**3 – China Telecommunications**

We don't see any impact on CN if we only consider temporary UE capability update.

**4 – Apple (UK) Limited**

Temporary UE capability update should be limited to RAN (access network). Ideally no impact on SA/CT WGs.

**5 – Intel K.K.**

Our preference is to limit the work in RAN2 and not to add complicated solutions that affects other WGs. Since the UE capability update is temporary, we do not see "e.g. deactivating/releasing of SCells and SCG" will affect stored UE AS capability in CN and hence not impact SA/CT.

**6 – Futurewei Technologies**

As we stated in the initial round, we do not see a need to impact CN specs.

**7 – vivo Mobile Communication Co.**

we see no impact to SA/CT at this moment.

**8 – Samsung Electronics Co.**

Agree with others.

<p><b>9 – Lenovo (Beijing) Ltd</b></p> <p>We dont see the impact on SA/CT.</p>
<p><b>10 – China Mobile Com. Corporation</b></p> <p>We don't see any impact on SA and CT.</p>
<p><b>11 – VODAFONE Group Plc</b></p> <p>An objective of the design should be that there is no SA/CT impact.</p>
<p><b>12 – Ericsson LM</b></p> <p>Probably no or minor involvement is expected -&gt; 0 TU</p>
<p><b>13 – NEC Corporation</b></p> <p>No. The two directions (capability coordination and SCG/SCell release/deactivated) in the objective should be transparent to upper layer.</p>
<p><b>14 – China Unicom</b></p> <p>Agree with above comments. We see no need to impact CN specs at this moment.</p>
<p><b>15 – DENSO CORPORATION</b></p> <p>Not sure as this moment.</p>
<p><b>16 – Nokia Corporation</b></p> <p>We prefer to keep the capability changes within RAN and not updated to the CN (since they are "temporary" by definition). We agree with Huawei that perhaps no SA/CT time is needed for this work, and that could be mentioned clearly: no CN impacts are allowed from the solutions introduced in this WI.</p>
<p><b>17 – LG Electronics Finland</b></p> <p>Currently, there are no SA/CT issues within the proposed objectives, i.e. temporary capability update.</p>

**Summary:** Most companies find the intermediate round proposal acceptable, but there are several companies who think the objectives on SCG/SCell release/(de)activation and UE temporary capability update would need to be split (as they were initially).

**Objective wording:** Most companies (9) find the intermediate round proposal on one objective acceptable, but there are several (6) companies who think the objectives on SCG/SCell release/(de)activation and UE temporary capability update would need to be split (as they were initially), including retaining the (accidentally dropped) part on SCG/SCell release. The companies wishing the objective splitting indicate this is needed for clarity, but moderator sees that the more objectives there are, the more (separate) solutions are usually sought. As the use cases are the same and (as several companies also commented), the SCG/SCell release are just example solutions of UE indicating assistance information on reducing its NW A capabilities, it seems unclear why the objective should be split. One company even commented that those should be removed as they are example solutions, and WI do not normally indicate those. To accommodate the disparate views and capture the start/stop aspect of the process, moderator proposes the following:

*Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*

- *Specify UE assistance information to start/stop temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE starts/stops connection to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

Note that this doesn't yet account the questions on the network concurrency: Specifically, that LTE/EN-DC or NE-DC as NW A should be allowed, but there were only few companies commenting on these. Adding LTE would also enlarge the scope by requiring LTE procedure changes, and the same would apply if NE-DC is added. This would likely make the WI bigger, and it's preferred not to increase the scope in any of the discussions beyond what was agreed before.

**Impacted WGs and TU estimations:** The consensus seems to be that 1 TU / meeting is required from RAN2, and possibly 1 TU from RAN3 (to be determined based on RAN2 progress). The WI shall also avoid SA/CT impacts. For RAN4, the consensus seems to be that there may be small impact, but it's unclear at the moment and companies prefer not to consider it now. The moderator notes that if there is **any** RAN4 time needed later on, it should be planned or there might be no time available, which could cause scheduling issues. Therefore, the easiest solution for this would be to request some RAN3/4 time to be "reserved", with objectives stating that the RAN2 work should identify any requests for RAN3/4 as early as possible.

**Conclusion 2:** Continue according to above objective wording. The work would be RAN2-led WI, with no impacts to SA/CT but potential impacts to RAN3 and RAN4, to be determined by RAN2 as part of the work (and reflected in objectives). Discuss TUs for RAN2/3/4 (including how to identify RAN3/4 impacts, if any) in the final round.

Additionally, it was noted that conclusion 1 from initial round didn't make the "dual Tx/Rx part clear. The moderator thinks this is a correct observation of the intent and therefore the conclusion 1 is corrected as follows:

**Corrected Conclusion 1:** The overall scope to allow dual Tx/Rx UE to operate in two networks at once in RRC\_CONNECTED seems agreeable but further clarifications are needed on the scope and impacted WGs.

### 2.1.3 Final Round

The proposed WI justification text is shown below (as per Initial Round discussion):

**Justification text:** *A MUSIM UE's hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, as it may need to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, coordination from UE to network on these temporary UE (capability) restrictions can be beneficial.*

The proposed objective wording to finalize is shown below (as per intermediate round proposed conclusion):

**Objective text:** *Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*

- *Specify UE assistance information to start/stop temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE starts/stops connection to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

If companies have any final comments to the justification and objectives, those can be provided here.

**Feedback Form 9: Finalization of the justification of the MUSIM objective: Any comments on the justification text?**

<p><b>1 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon We are fine with the justification text.</p>
<p><b>2 – Nokia Corporation</b></p> <p>Overall the justification text is fine, but we have some editorial clarifications to propose:</p> <ul style="list-style-type: none"> <li>o Better use "which may require UE to release" in the second sentence, i.e. " <i>This can lead to a temporary hardware conflict for the UE, <u>which may require UE</u> to release some resources (e.g. SCell/SCG) from one SIM</i> "</li> <li>o Using "Tx chain" may be incorrect, as there could be also impacts "Rx chains". to that end, we would propose to use "RF chain" in the text as that can refer to both UL and DL</li> <li>o The UE could also be in RRC_INACTIVE in NW B, hence we propose to add that, i.e. " <i>UE's SIM B is in RRC Idle <u>or RRC inactive</u></i> "</li> <li>o We would change the "coordination from UE to network" in the last sentence to "assistance from UE to network" to make it clear that UE is NOT telling network what to do, i.e. use "To avoid this, <u>assistance from UE to network on these temporary UE (capability) restrictions can be beneficial</u>": UE is (configured for) sending information to network, who then decides on the appropriate action.</li> </ul>
<p><b>3 – Intel K.K.</b></p> <p>The justification looks acceptable to us</p>
<p><b>4 – Qualcomm CDMA Technologies</b></p> <p>We are fine with the Justification as well and also with the edits from Nokia.</p>
<p><b>5 – Futurewei Technologies</b></p> <p>The justification text is generally acceptable. We are also fine to include Nokia's clarifications.</p>
<p><b>6 – Charter Communications</b></p> <p>The provided text and edits by Nokia are fine with us</p>

<p><b>7 – Sony Europe B.V.</b></p> <p>We are fine with the current text after Nokia’s proposed changes are included.</p>
<p><b>8 – vivo Mobile Communication Co.</b></p> <p>We are fine with the justification text and also with the Nokia’s clarification.</p>
<p><b>9 – Ericsson LM</b></p> <p>We are fine with the justification. Two comments, for clarification:</p> <p>1. Add ”<b>or RRC Inactive</b>” in the below sentence:  <i>For example, when the UE’s SIM A is in RRC connected state in NW A while the UE’s SIM B is in RRC Idle or RRC Inactive in NW B...</i></p> <p>2. Add ”A” in the below sentence:  <i>To avoid this, coordination from UE to network A on these temporary UE (capability) restrictions can be beneficial.</i></p>
<p><b>10 – Spreadtrum Communications</b></p> <p>We are fine with the current bullets. However, when UE start/stops connection to NW B, how to understand its starting/stopping is <b>for MUSIM purpose?</b></p>
<p><b>11 – Lenovo (Beijing) Ltd</b></p> <p>Fine with the current description.</p>
<p><b>12 – LG Electronics Finland</b></p> <p>The justification looks okay to us</p>
<p><b>13 – ZTE Corporation</b></p> <p>We are fine with the current justification</p>
<p><b>14 – China Telecommunications</b></p> <p>We are fine with current discription. As to the suggestion from Nokia, we perferre “<i>coordination from</i>” than “<i>assistance from</i>”.</p>

**Feedback Form 10: Finalization of the MUSIM objective text:  
Is the final text agreeable?**

<p><b>1 – HUAWEI TECHNOLOGIES Co. Ltd.</b></p> <p>Huawei, HiSilicon</p> <p>We are generally fine with the current text but we have (only) one comment. Considering that the temporary UE capability update has been suggested only quite recently as a mechanism to achieve the objective, how to achieve should be left open instead of restricting it to use the ”UE assistance information framework”. This can be discussed RAN2. So we propose to have the following update:</p> <p><i>Specify <del>UE assistance information</del> a <u>mechanism</u> to start/stop temporary UE capability restriction (e.g.</i></p>
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*capability update, release of cells, (de)activation of configured resources) with NW A when UE starts/stops connection to NW B for MUSIM purpose*

**2 – Nokia Corporation**

We still don't see it necessary to include the "(e.g. capability update, release of cells, (de)activation of configured resources)" part in the objective - that is about solutions, not about objective, but we can accept the moderator proposal.

**3 – Intel K.K.**

The objective looks acceptable to us

**4 – SHARP Corporation**

The objective as proposed by the moderator are acceptable.

**5 – Qualcomm CDMA Technologies**

The objectives at the very top coming from the September discussion were actually much clearer. This one is acceptable but would prefer HW's edit as "UE assistance information" is the name of an RRC procedure and can cause confusion.

**6 – Futurewei Technologies**

The objective looks generally Ok. We agree with the comments from Huawei and Nokia. It is best to avoid stating specific solutions in the statement of the objective.

**7 – Charter Communications**

Agree with others to avoid narrowing possible solutions in the objective.

**8 – Sony Europe B.V.**

We agree that the objective should be focusing on the problem and not narrow down the solution, so we support the Huawei and Nokia proposals. With these we are fine with the Objective text.

**9 – vivo Mobile Communication Co.**

The objective proposed by the moderator is acceptable.

**10 – NEC Corporation**

We agree with Huawei that "Specify UE assistance information" is too specific. We prefer to change it to something like "Specify procedures/mechanisms".

**11 – Ericsson LM**

The objective text could be updated to align with the current UE Assistance Information framework:

*Specify UE assistance information to ~~start/stop~~ **send a preference on** temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE **prefers to** starts/stops connection to NW B for MUSIM purpose*

## 12 – Spreadtrum Communications

We are fine with the current text in general, but with a small updation as following:

*Specify UE assistance information to start/stop/**update** temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE starts/stops connection to NW B for MUSIM purpose*

## 13 – China Unicom

We agree with Huawei's modification with *Specify UE assistance information a mechanism to...*, and then the objectives are acceptable to us.

## 14 – VODAFONE Group Plc

We received no technical (or other) answer to our points on RAT concurrency in the intermediate round. Hence (as EN-DC might be a major cause of the MUSIM device having uplink transmitter shortages) we re-suggest the following:

**RAT Concurrency:** *Network A is NR or LTE (either RAT using CA or MR-DC). Network A is NR or LTE (either RAT using CA or MR-DC)*

and in the absence of some answers, we object to:

**RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*

## 15 – LG Electronics Finland

The objective text looks okay to us

## 16 – ZTE Corporation

We are fine with the current set of objectives.

## 17 – China Telecommunications

The wording "Specify UE assistance information" seems like a solution. We agree with Huawei's suggestion.

Also we want to echo VODAFONE's comment. Network A can also be NE-DC. Network B should not be restricted.

**Final WI Justification wording:** Based on the company comments, the justification was stable for the most part but small clarifications seemed reasonable. The moderator thinks the following adequately captures all the comments from companies:

**Justification text:** *A MUSIM UE's hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, which may require UE to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle or RRC Inactive in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, assistance from UE to network A on these temporary UE (capability) restrictions can be beneficial.*

**Final WI objective wording:** Based on the company comments, most companies were already fine with the

moderator proposal but there were some slightly controversial parts: The "UE assistance information" was seen to be too solution-oriented, with some companies preferring "mechanism" instead. However, this seems to lack the aspect of UE indicating information to network, who then makes the actual decision, which is better implied by the UE assistance information. To make this clearer, the moderator proposes alternative formulation "mechanism to indicate preference on UE temporary capability restriction", combining aspects from different companies. Additionally, some companies still want to consider also LTE and other MR-DC variants, but moderator thinks these are best discussed in RAN based as they would impact the workload. Therefore, moderator proposes the following as the objective text (including the text from 3.1.1 as well on RAN3/4 impacts):

*Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*

- *Specify mechanism to indicate preference on temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE prefers to start/stop connecting to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

*The work item shall identify whether the WI will have RAN3 or RAN4 impacts by RAN#99 [RAN2].*

These are stated with formal conclusions below.

**Conclusion 3:** The WI justification text for the Rel-18 MUSIM work is proposed as: "MUSIM UE's hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, which may require UE to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle or RRC Inactive in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, assistance from UE to network A on these temporary UE (capability) restrictions can be beneficial."

**Conclusion 4:** The WI objective text for the Rel-18 MUSIM work is proposed as: "Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]"

- *Specify mechanism to indicate preference on temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE prefers to start/stop connecting to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

*The work item shall identify whether the WI will have RAN3 or RAN4 impacts by RAN#99 [RAN2]."*

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### 3 Organizational aspects

#### 3.1 WGs impacted and estimated TUs

##### 3.1.1 Final Round

The proposed TU allocation for discussion is shown below. Note that the RAN3/4 allocations are tentative, to be decided according to RAN2 input by RAN2#121 / RAN3#119 / RAN4#106 (i.e. latest during RAN#99, which is the midpoint of the WI): If RAN2#121 determines RAN3/4 TUs are not needed, it is up to RAN4 chair to reallocate them to other topics. In other words, the RAN2 task in the first 3 meetings would be to identify whether there will be any RAN3 impacts and report back to RAN#98 with the results. This could be reflected by having the following text in the objectives:

- *Identify whether the WI will have RAN3 or RAN4 impacts by RAN#99 [RAN2].*

This ensures that the RAN3/4 TU allocations are not ignored, and also that the work can be done if any work is identified.

**Table 1: RAN2/3/4 TU allocations to be discussed**

<u>RAN2/RAN3/RAN4 meeting</u>	<u>RAN2</u>	<u>RAN3</u>	<u>RAN4</u>
R2#119, R3#117, R4#104 (08/22)	0.5		
R2#119b, R3#117b, R4#104b (10/22)	1		
R2#120, R3#118, R4#105 (11/22)	1		
R2#121, R3#119, R4#106 (2/23)	0.5	0.5	0.5
R2#121b, R3#119b, R4#106b(4/23)	1	0.5	0.5
R2#122, R3#120, R4#107 (5/23)	1	0.5	0.5
R2#123, R3#121, R4#108 (8/23)	1	0.5	0.5

Companies are requested to provide comments to the proposed TU allocation (if any), including how to handle the potential RAN3/4 allocations.

**Feedback Form 11: Comments to the proposed RAN2/3/4 TU allocation proposal?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon After some more thinking, we think we should try to limit the RAN2 TUs to 0.5 TU per meeting for 6 meetings or 1 TU for 3 meetings.

**2 – Nokia Corporation**

The TU allocations seems reasonable, but how to handle the RAN3/4 needs joint discussion with other WIs. We would be fine to have it in the objectives that RAN2 shall determine the need for RAN3/4 TUs and RAN decides on the final allocation.

**3 – Intel K.K.**

RAN2 TUs are aligned with our view. Though we prefer not to have solutions that will affect other WGs, we are fine with the moderator's proposal to include some provisional TUs for RAN3 and RAN4 and for RAN2 to first identify whether there is any impact.

**4 – Samsung Electronics Co.**

We are fine with the way forward and TU allocations by the moderator.

**5 – Qualcomm CDMA Technologies**

We are fine with Moderator's proposal.

**6 – Futurewei Technologies**

At this point we don't see the need for allocation of RAN3 TUs.

**7 – Charter Communications**

Agree with the suggested proposal

**8 – vivo Mobile Communication Co.**

We are fine with Moderator's proposal.

**9 – Ericsson LM**

The allocation is acceptable

**10 – Lenovo (Beijing) Ltd**

seems acceptable.

**11 – LG Electronics Finland**

We are fine with the proposed TU allocation.

**12 – ZTE Corporation**

We are fine with the proposed TU allocation.

**13 – China Telecommunications**

We are fine with the proposed TU allocation.

Additionally, companies are requested to provide comments if the addition of checkpoint on RAN3/4 work is agreeable (as proposed above).

**Feedback Form 12: How to ensure RAN3/4 TUs are reserved in case MUSIM work is needed? Is the proposed way agreeable?**

**1 – HUAWEI TECHNOLOGIES Co. Ltd.**

Huawei, HiSilicon We agree with way proposed by moderator

**2 – Nokia Corporation**

For RAN3, we assume the "basket TUs" could be used for this topic. For RAN4, we are not sure how many TUs are needed but are fine to reserve time from several meetings: If there is something to do, just 1-2 meetings will likely not be sufficient.

**3 – Intel K.K.**

The proposed way forward is acceptable to us.

**4 – Samsung Electronics Co.**

Looks good.

**5 – Qualcomm CDMA Technologies**

Agree with the Moderator

**6 – Futurewei Technologies**

We agree with the moderator's proposal

**7 – vivo Mobile Communication Co.**

We are fine with Moderator's proposal.

**8 – Ericsson LM**

The proposal in 3.1.1 is fine.

**9 – Lenovo (Beijing) Ltd**

Fine with the proposal.

**10 – LG Electronics Finland**

We are fine with the proposal.

## 11 – ZTE Corporation

We are fine with this.

## 12 – China Telecommunications

We are fine with this.

**Summary:** Most companies support the moderator proposals for RAN2 identification of RAN3/4 impacts within 3-4 meetings, with roughly 1 TU / RAN2 meeting allocated. In case RAN3/4 TUs are needed, roughly 0.5 TU / meeting would be reserved but the exact need would be determined at the time of assessing the impacts. One company commented that the whole scope could be possible to accomplish in 3 meetings with 1 TU / meeting, or 6 meetings with 0.5 TU / meeting. Moderator thinks that having 3 meetings is quite ambitious and past has shown this doesn't often work, and planning for 4-7 meetings seems more realistic as time is needed to converge in WGs.

**Conclusion 5:** The Rel-18 MUSIM work is estimated to require 0.5-1 TU / RAN2 meeting for 4-7 meetings. RAN2 shall identify whether there are any impacts to RAN3/4 by RAN#99, but 0.5 TU / meeting for RAN3/RAN4 need to be reserved in advance.

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## 4 Summary and conclusions

### 4.1 Summary of initial round

As conclusion from the initial round, the objective on MUSIM should focus on allowing UE to maintain RRC\_CONNECTED state simultaneously with two networks. The ambiguities lie in how each WG could be affected by this (including TU estimate), and finalizing the exact objective wording.

**Conclusion 1:** The overall scope to allow UE to operate in two networks at once in RRC\_CONNECTED seems agreeable but further clarifications are needed on the scope and impacted WGs.

### 4.2 Summary of intermediate round

As conclusion from the intermediate round, the main discussion is on how to word the proposed objective. Majority can accept the moderator proposal, but minority would like to make the SCG/SCell release more explicit. Moderator proposal for the objective is as follows:

*Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*

- *Specify UE assistance information to start/stop temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE starts/stops connection to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

Additionally, whether RAN3/4 are impacted was still in question. Most companies think they may be no impacts, but it should be discussed how to ensure TUs are available if there is any impact.

**Conclusion 2:** Continue according to above objective wording. The work would be RAN2-led WI, with no impacts to SA/CT but potential impacts to RAN3 and RAN4, to be determined by RAN2 as part of the work (and reflected in objectives). Discuss TUs for RAN2/3/4 (including how to identify RAN3/4 impacts, if any) in the final round.

Finally, the initial round conclusion wording was slightly corrected (**bolded** part) to reflect the intention:

**Corrected Conclusion 1:** The overall scope to allow **dual Tx/Rx** UE to operate in two networks at once in RRC\_CONNECTED seems agreeable but further clarifications are needed on the scope and impacted WGs.

### 4.3 Summary of final round

Both the justification and objective text as per initial and intermediate round were mostly agreeable with some minor alterations. The objective text still had some unstable aspects, and the latest version tries to sort those out but may not be final. The rough TU estimates and WI timeline were also discussed, with 4-7 meetings for RAN2, during which RAN2 shall also identify the RAN3/4 impacts. If RAN3/4 impacts are needed, then 2-3 meetings with 0-0.5 TU / meeting for RAN3/RAN4 were considered sufficient, but need to be identified by RAN at the time.

**Conclusion 3:** The WI justification text for the Rel-18 MUSIM work is proposed as: *"MUSIM UE's hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, which may require UE to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE's SIM A is in RRC connected state in NW A while the UE's SIM B is in RRC Idle or RRC Inactive in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE's SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE's capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, assistance from UE to network A on these temporary UE (capability) restrictions can be beneficial."*

**Conclusion 4:** The WI objective text for the Rel-18 MUSIM work is proposed as: *"Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4]*

- *Specify mechanism to indicate preference on temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE prefers to start/stop connecting to NW B for MUSIM purpose*
- **RAT Concurrency:** *Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
- **Applicable UE architecture:** *Dual-RX/Dual-TX UE*

*The work item shall identify whether the WI will have RAN3 or RAN4 impacts by RAN#99 [RAN2]."*

**Conclusion 5:** The Rel-18 MUSIM work is estimated to require 0.5-1 TU / RAN2 meeting for 4-7 meetings. RAN2 shall identify whether there are any impacts to RAN3/4 by RAN#99, but 0.5 TU / meeting for RAN3/RAN4 need to be reserved in advance.

The draft WI based on these conclusions can be found in **RP-212716**.

## 4.4 Conclusions

**Proposal 1:** Rel-18 MUSIM would be RAN2-lead WI, with RAN3/RAN4 as possible secondary groups. RAN2 shall identify whether there are impacts to RAN3/4 by RAN#99.

**Proposal 2:** The Rel-18 MUSIM WI scope is proposed to be as per below justification and scope.

- **Justification text:** *”MUSIM UE’s hardware capabilities are shared by the SIMs, and to use the hardware efficiently and economically, the related capabilities need to be dynamically split between the two SIMs. This can lead to a temporary hardware conflict for the UE, which may require UE to release some resources (e.g. SCell/SCG) from one SIM. For example, when the UE’s SIM A is in RRC connected state in NW A while the UE’s SIM B is in RRC Idle or RRC Inactive in NW B, the two TX chains will be occupied by the SIM A for the communication in NW A. Once the UE’s SIM B enters into RRC connected state, one of the TX chain needs to be switched to SIM B. In this case, if the NW A is not aware of the reduced UE’s capability change in TX chain, there may be data loss due to demodulation failure and wasting radio resources in NW A. To avoid this, assistance from UE to network A on these temporary UE (capability) restrictions can be beneficial.”*
- **Objective text:** *Enhancements for MUSIM procedures to operate in RRC\_CONNECTED state simultaneously in NW A and NW B. [RAN2, RAN3, RAN4].*
  - *Specify mechanism to indicate preference on temporary UE capability restriction (e.g. capability update, release of cells, (de)activation of configured resources) with NW A when UE prefers to start/stop connecting to NW B for MUSIM purpose*
  - *RAT Concurrency: Network A is NR SA (with CA) or NR DC. Network B can either be LTE or NR.*
  - *Applicable UE architecture: Dual-RX/Dual-TX UE*
- *The work item shall identify whether the WI will have RAN3 or RAN4 impacts by RAN#99 [RAN2].”*

**Proposal 3:** The Rel-18 MUSIM work is estimated to require 0.5-1 TU / RAN2 meeting for 4-7 meetings. RAN2 shall identify whether there are any impacts to RAN3/4 by RAN#99, but 0.5 TU / meeting for RAN3/RAN4 need to be reserved in advance.

**Proposal 4:** Further discussion on Rel-18 MUSIM WI should be based on the draft WI in RP-212716.