**3GPP TSG-RAN Meeting #90eRP-20xxxx**

**Electronic Meeting, Dec 7-11, 2020**

**Agenda item:** 9.8.12

**Source:** Moderator (vivo)

**Title:** Summary of [90E][30][R17\_MultiSIM\_scope]

**Document for:** Discussion and Agreement

# 1 Introduction

This is the kick off of the email thread on finetuning the scope of the Rel-17 WID on MuSIM.

Goal: Generate an agreeable way forward and potential revised WID.

Input contributions covered:  2356, 2647, 2731, 2743, 2649.

* Initial round: collecting views on the detailed proposals, deadline: Dec. 8, 2020 12:29h UTC.
  + Moderator to provide intermediate summary before Dec, 8, 2020 15:29h UTC
* Intermediate round:
  + Collecting views on intermediate summary, deadline: Dec. 9, 2021 11:29h UTC
  + Moderator to provide an updated intermediate summary before Dec. 9, 2021 12:30h, UTC
  + Collecting views on updated intermediate summary, deadline for technical comments: Dec. 10, 2021 12:29h UTC
  + Moderator to provide final proposals and potential revised WID before Dec, 10, 2020 15:29h UTC
* Final round: collecting final comments, deadline: Dec. 11, 2020 11:29h UTC
  + Moderator to provide final proposals compiled based on the final rounds of comments, before Dec. 11, 2020 12:30h UTC

# 2 Contact Information

To make it easier to find the correct contact delegate in each company for potential follow-up questions, the moderator encourages the delegates who provide input to provide their contact information in this table:

|  |  |
| --- | --- |
| Company | Contact: Name (E-mail) |
| vivo | Xueming Pan <panxueming@vivo.com> |
| MediaTek Inc. | Guillaume Sébire <guillaume.sebire@mediatek.com> |
| Vodafone | chris.pudney@vodafone.com |
| Intel | Youn.heo@intel.com |
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| Huawei, HiSilicon | zhaoyang@huawei.com |
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| Samsung | Sangyeob Jung <sy0123.jung@samsung.com> |
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| Volkswagen AG | steffen.schmitz@vwif.com |

# 3 Initial round: collecting views on the initial proposals

## 3.1 Topic 1: Support for E-UTRA/5GS (Option 5) due to Switching notification

Currently it is understood that for E-UTRA/5GS, only NAS based solution can be discussed. Contributions 2356 (Intel), 2647 (vivo) proposed to update the WID so that busy/leaving/swiching indication solutions for 5GS can be discussed in the WI.

**Q1: Do companies agree that the WID should be updated for LTE RRC spec (e.g., 36.331/306/304), so that busy/leaving/switching indication solutions for E-UTRA/5GS(option 5) can be further discussed in the WI?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| MediaTek Inc. | Agree | It is important to ensure solutions get discussed equally for E-UTRA and NR and decision be taken based on the merit of said solution rather than on it being e.g. not available in E-UTRA. |
| Vodafone | Agree | 3GPP has designed the 5GC to be access-agnostic. Hence TSG-RAN should not make isolated decisions to make the 5GC RAT specific.  Also agree with Mediatek. |
| Intel | Agree | The lack of LTE specifications should not be the reason in deciding a solution that will be used in LTE connected to 5GS especially considering that RRC signalling solution could be technically better. |
| Apple | Agree | Both LTE are NR are considered for RAT concurrency, E-UTRA/5GS is also in the scope although it is not explicitly spelled out in the currently WID. |
| ZTE | Disagree | The option 5 has been discussed and excluded intentionally to minimize the impact on LTE network. We don’t see clear need to add it back at this stage, taking the limited time budget into account. |
| Huawei, Hisilicon | Agree | If the RRC-based solution is adopted we are fine to discuss E-UTRA/5GC (option 5). If this is the intention, is there any change to 36304? Or perhaps we can add impacted specifications later once the solution is decided. |
| Qualcomm Incorporated | Agree | We think idle mode requires NAS solution which can be common between NR and E-UTRA/5GC. For RRC Inactive, we are fine to have LTE RRC solution, assuming it can copy NR solution. |
| OPPO | Disagree | Agree with ZTE |
| Charter Communications | Disagree | This WI has received a limited TU and adding above would make it much more difficult to achieve the identified objectives. We continue to believe the focus with the given limited TU should be on NR only. |
| vivo | Agree | This would allow an unified solution for NR and E-UTRA/5GC. |
| Samsung | Disagree | We share same view with ZTE that option 5 was excluded on purpose to minimize LTE impact. Additionally, multi-SIM UE can apply busy/leaving/switching solutions to NR as a default so we do not see a strong need to support option 5. Even though having a unified solution on 5GS is desirable as others commented, we prefer to keep current WI objective. |
| Xiaomi | Disagree | Agree with ZTE |
| Nokia, Nokia Shanghai Bell | Agree (with limitations) | We think this can only be allowed if the NR solution is reused: That way, any extra effort can be minimized to mirroring the NR CRs to LTE CRs. That is, no LTE-specific solutions (i.e. solutions that would be different from what is agreed for NR) shall be developed and this should be made clear in the WI. |
| CATT | Disagree | Agree with ZTE |
| Ericsson | Disagree | For the sake of keeping the specification complexity on reasonable level, we should avoid introducing multiple solution to the same problem. Since SA2 already agreed on usage of NAS for E-UTRA/EPS same solution should be use for E-UTRA/5GS as well. We do not see problems in using NAS (e.g. for leaving indication) since currently some important services (e.g. EPS emergency fallback) are handled by NAS without any issues. So, there should not be problems if NAS procedure is used for MultiSIM procedures, as well. |
| China Telecom | Disagree | Agree with ZTE. |
| Volkswagen AG | Agree | A unified solution should exist across the different deployment scenarios. |

## 3.2 Topic 2: Support LTE spec change for paging collision

The agreed SA2 Multi-SIM WID (S2-2009247) contained the following objective about paging reception for EPS. Contributions 2356 (Intel), 2647 (vivo) identified the RAN impact (36.304) based on the SA decisions.

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| - Enabling paging reception for EPS according to the conclusions in TR 23.761 clause 8.2.  Editor's note: The objective on enabling paging reception for EPS and the corresponding solution needs to be confirmed by RAN plenary. |

**Q2: Do companies agree that the WID should be updated for LTE RRC spec (e.g., 36.304) for supporting the below SA2 WID bullet?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| MediaTek Inc. | Agree | The IMSI offset approach can help resolving permanent collisions arising from the use of a permanent identifier (i.e. IMSI) in EPS+EPS scenarios. |
| Vodafone | Agree | Agree with Mediatek. At least 36.304 changes that can be implemented in just the UE’s NAS layer behaviour should be allowed. |
| Intel | Agree | We think that the IMSI offset signalling solution is reasonable to resolve collision in EPS as IMSI is permanent and cannot be re-assigned. RAN2 change in TS36.304 is very minimal and it is desirable to respect SA2 agreement. |
| Apple | Agree | It’s desirable to follow SA2 agreement on it. |
| ZTE | Agree | Considering the impact on LTE is quite small, we are fine to support the IMSI offset based solution in LTE as well. |
| Huawei, HiSilicon | Disagree | We understand LTE+LTE is not in the current WI scope. When discussing the Rel-17 scope for MUSIM, this was discussed and companies expressed the view that LTE MUSIM UEs already exist for a long time, and so the scope was limited to NR+NR and LTE+NR. To extend the scope would increase more TUs, and we still need to have more SIs to become WIs by March, and we prefer to keep the existing scope as planned. |
| Qualcomm Incorporated | Agree | Agree with other companies about the addition of IMSI offset to 36.304, which has very minimal impact. |
| OPPO | Disagree | In current RAN2 scope network A is only NR, so to avoid collision between NR and LTE network, it is feasible to shift either NR side or LTE side. The PO calculation of LTE system relies on UE’s IMSI while in NR system it is related to 5G-S-TMSI which can be updated from time to time. So a light solution in NR side is preferred to avoid any modification in LTE NAS layer and AS layer which is obviously more complicated. |
| Charter Communications | Agree | We believe that there is no functional modification to the RAN node with this agreement; the functional change is not visible to RAN as the “UE identity Index value” today is set by the MME. This is merely a “descriptive texts” alignment due to SA2’s solution. |
| vivo | Agree | The objective on enabling paging reception for EPS and the corresponding solution is technically possible in RAN. Potential impacts include the UE capability for PF/PO calculation with IMSI and IMSI offset in TS36.306 and the description on method of PF/PO calculation based on IMSI and IMSI offset in TS36.304. |
| Samsung | Disagree | We understand that addition of IMSI offset may have minimal impact in 36.304. But as OPPO commented, paging collision can be resolved by NR side without any enhancement on EPS. |
| Xiaomi | Disagree | We don’t think there is a need to introduce this to LTE MUSIM Ues which have already been on the market for a long time. |
| Nokia, Nokia Shanghai Bell | Agree (conditionally) | Assuming SA2 specifies this EPS solution, there is no problem from our standpoint to do the necessary (small) changes in RAN2 |
| CATT | agree | Agree with ZTE, |
| Ericsson | Agree | SA2 has concluded to use the extra “offset” parameter for ‘UE identity index value’ calculation for EPS to avoid paging collision. However, the formula for UE identity index value calculation is defined in 36.304, so it is ok to update the 36.304. |
| Volkswagen AG | Agree | We prefer to have consistent solutions applying to the problem statement of the WID. |

## 3.3 Topic 3: Support of Dual Tx/Dual Rx UEs

Contribution 2731 (China Telecom, vivo, CMCC, China Unicom, Spreadtrum Communications) discussed the issue with dual Tx/ dual Rx UEs with shared Tx or Rx chains between two USIMs and proposed to consider such UE in RRC CONNECTED state in network A to switch its partial Tx chains to network B for activities and hence change its Tx capabilities in NW A. A corresponding WID update is proposed in 2743, i.e. to add the following objective

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| --- |
| 1. Specify mechanism for UE to notify Network A of its update in capabilities when it tune away partial of Tx or Rx chains from Network A (for MUSIM purpose) [RAN2]:    * RAT Concurrency: Network A is NR. Network B can either be LTE or NR.    * Applicable UE architecture: Dual-Rx/Dual-Tx, |

**Q3: Do companies agree that Multi-SIM UEs support dual Tx/ dual Rx with shared Tx or Rx chains between two USIMs should be considered in Rel 17?**

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| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| MediaTek Inc. | Disagree | Existing means enable sync between the network and the UE as to the UE capabilities available for use – it is not clear from the inputs on this subject to this meeting what exactly is missing and what more should be done.  We prefer that focus and priority be put on fulfilling the other objectives first. |
| Vodafone | Candidate for R18? | The Rel 17 timeline is already under pressure, We need to be very careful before adding more work to R17. |
| Intel | Yes with comment | We think that if we reuse the existing UE assistance information to indicate the change of capabilities, the required efforts and spec change would not be significant. |
| Apple | Disagree | RF structure was discussed before RAN plenary approved the R17 MUSIM WID, dual Tx is not in the scope of the R17 WID. We don’t think it should revisited now or extend the scope. In addition, “shared Tx or Rx chains between two SIMs” should be UE implementation dependent, and it’s not clear to us what specifically to be discussed on it in standards. |
| ZTE | Agree, but- | We see some requirements on this aspect and we are fine to discuss this in Rel-17 if time permits. Considering the limited time budget, we think this should be listed as secondary priority task in the WID, and no extra TU shall be allocated to this WI for this new scope. |
| Huawei, HiSilicon | Candidate for future release? | Similar comments as the above. This might be a valid case to be considered, however it is not urgent and could be further discussed in future release, e.g. Rel-18. We prefer the existing WI scope stay as planned. |
| Qualcomm Incorporated | Agree with comment. | We are supportive of the work technically. Only issue is TU allocation. We could do what ZTE proposed above. |
| OPPO | Disagree | Agree with Apple |
| Charter Communications | Disagree | While we see benefits in adding dual TX/RX UEs as described above, we are concerned that the limited TU assigned for this WI makes it difficult to expand the list of objectives. |
| vivo | Agree | In 5G generation, operators can foresee more and more devices supporting dual Rx/ dual Tx for multi-SIM as a result of the increase in numbers of UE Tx chains. It is common for 5G devices to support SA 2Tx/4Rx and NSA dual connection, which requires the RF module to support at least 2 Tx chains and 4 Rx chains working concurrently. For this kind of UEs, it is cost efficient to support Dual Tx/ Dual Rx for Multi-SIM operation by sharing one Tx and multiple Rx chains between two USIMs dynamically. |
| Samsung | Disagree | As others expressed, we also think focusing existing WI scope is of utmost priority in R17. It can be further discussed in future release. |
| Xiaomi | Disagree | Agree with Apple and also we don’t have enough TU for this. |
| Nokia, Nokia Shanghai Bell | Depends (limitations needed) | Normally we don't add objectives to WI while they are ongoing, especially in the already difficult Rel-17 circumstances since this might substantially increase the amount of work in the WI. In particular, it seems this is some sort of dynamic UE capability update, which has been disallowed in RAN several times. We can consider following **limiting** the UE capabilities temporarily if the case is carefully defined (e.g. as was done for overheating purposes), but not full-blown UE capability update. And if something further is done, then also the proposed objectives should be much more specific and restricted and TU increase may be needed. |
| CATT | Disagree | Supporting dual Tx/ dual Rx is not in the scope of the WID.and it is not a critical use case.so we think it is not essential to add it into the scope,especially considering the limited TU of this WI |
| Ericsson | Disagree | This was already discussed when the WID was drafted back in December 2019. As before, this optimization is complex and has significant impact. |
| China Telecom | Agree | There are already some dual Rx/ dual Tx UEs existing in the market. This kind of UEs can maintain RRC connection with two USIMs by sharing Tx/Rx chains between two networks. Interoperability issues have already emerged between these UEs and network. For example, UEs report 2 Tx in UL when USIM-B is in idle status. When USIM-B goes into connection status, UE has to tune away one Tx chain to USIM-B. If the network cannot adapt to the changes in UL ports it will face a demodulation failure or radio link failure and then schedule one layer all the time.  From operators point of view, it is just the time to solve the issues caused by dual Rx/ dual Tx UEs in Rel 17 to avoid the fragmentation in UE and network implementation. |
| China Unicom | Agree | We see some benefits in adding dual TX/RX UEs, and we agree to discuss this case in Rel-17 if time permits. When considering the limited time budget in RAN2, no extra TU shall be allocated to this WI for this new scope. |
| Volkswagen AG | Disagree | 2Tx should be studied in a subsequent WI in Rel-18. |

**Q4: Do companies agree the scenario that UE mentioned in Q3 in RRC CONNECTED state in network A switches partial of Tx chains to network B for activities and hence change its Tx capabilities in NW A should be considered in Rel 17?**

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| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| MediaTek Inc. | See above | See above |
| Intel | Agee | It seems worthwhile for RAN2 to discuss for further optimization. |
| Apple | Disagree | See our response to Q3 |
| ZTE | Agree, but | We see some requirements on this aspect and we are fine to discuss this in Rel-17 iif time permits. Considering the limited time budget, we think this should be listed as secondary priority task in the WID, and no extra TU shall be allocated to this WI for this new scope. |
| Huawei, HiSilicon | See above | See above |
| Qualcomm Incorporated | Agree with comment. | We are supportive of the work technically. Only issue is TU allocation. We could do what ZTE proposed above. |
| OPPO | Disagree | See above |
| Charter Communications | Disagree | Same as Q3. |
| vivo | Agree | UE may temporary change its capability in NW A to allow simultaneous transmission in both NW A and B. |
| Samsung | Disagree | See our previous comments on Q3. |
| Xiaomi | Disagree | See Q3 |
| Nokia, Nokia Shanghai Bell | See comments | We think this depends on the intent: UE should not be allowed to change its capabilities, but it might be possible to allow UE temporarily limit the capabilities (e.g. UE indicates it cannot support DC for the moment) in this specific multi-SIM scenario but not in general manner.  We also note that the objective doesn't currently make it clear that this mechanism only applies when UE is in RRC\_CONNECTED with network A, which should be made clear to avoid any confusion during this discussion. |
| CATT | Disagree | Same comment as Q3. |
| Ericsson | Disagree | See comment in Q3. |
| China Telecom | Agree | Sharing one Tx chain between two USIMs is a very common solution to realize dual Rx/ dual Tx. UE capabilities should always be synchronized with network otherwise there will be interoperability issues. |
| China Unicom | Agree | See Q3. |

**Q5: Do companies agree the scenario that UE mentioned in Q3 in RRC CONNECTED state in network A switches partial of Rx chains to network B for activities and hence change its Rx capabilities in NW A should be considered in Rel 17?**

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| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| MediaTek Inc. | See above | See above |
| Intel | Agee | It seems worthwhile for RAN2 to discuss for further optimization. |
| Apple | Disagree | See our response to Q3 |
| ZTE | Agree, but | We see some requirements on this aspect and we are fine to discuss this in Rel-17 if time permits. Considering the limited time budget, we think this should be listed as secondary priority task in the WID, and no extra TU shall be allocated to this WI for this new scope. |
| Huawei, HiSilicon | See above | See above |
| Qualcomm Incorporated | Agree with comment. | We are supportive of the work technically. Only issue is TU allocation. We could do what ZTE proposed above. |
| OPPO | Disagree | See above |
| Charter Communications | Disagree, but | Same as in Q3, however we are open for addition of a limited case if there’s majority support. |
| vivo | Agree | UE may temporary change its capability in NW A to allow simultaneous reception in both NW A and B. |
| Samsung | Disagree | See our previous comments on Q3. |
| Xiaomi | Disagree | See Q3 |
| Nokia, Nokia Shanghai Bell | see comments | See our reply to Q3 and Q4. |
| CATT | Disagree | Same comment as Q3. |
| Ericsson | Disagree | See comment in Q3. |
| China Telecom | Agree | If Partial of the 4 Rx chains for NR in USIM-A are sharing with USIM-B. The supported downlink MIMO layers of UE will change in network A when USIM-B enters RRC CONNECTED states.  If Partial of the Rx chains for NR SCell in USIM-A are sharing with USIM-B. The supported CC combination of UE will change in network A when USIM-B enters RRC connected states.  UE capabilities should always be synchronized with network otherwise there will be interoperability issues. |
| China Unicom | Agree | See our reply to Q3 and Q4 |

# 4 Intermediate round: collecting views on intermediate summary

Companies are invited to comment on proposals the rapporteur summarized from 1st round discussion.

* **Topic 1: Support for E-UTRA/5GS (Option 5) due to Switching notification**
* Summary of the initial round discussion:

17 companies provide input.

* 9 companies agree to update the WID to include LTE RRC discussion so that busy/leaving/switching indication solutions for E-UTRA/5GS(option 5).
* 8 companies disagree with the update.

The main concern from the oppoenent company was the time budgut limitation. However, as proposed by Qualcomm Incorporated and Nokia, Nokia Shanghai Bell, it can be done without requiring extra TU if the NR solution is copied to LTE. Moderator therefore would like to propose the following as the compromise.

**Proposal 1: Update the WID to include solutions for E-UTRA/5GS(option 5) that mirror the NR CRs to LTE CRs.**

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| --- | --- |
| Company | Comments |
| InterDigital | We agree that aligning LTE and NR is a exactly is a reasonable solution, but would be open to looking at it further |
| OPPO | It is obvious there is no clear majority to add new objective into this work item. We don’t understand how can we agree on the proposal1. |
| Charter Communications | We are concerned that Proposal 1 expands a WID objective where almost half the responding companies disagree. Also, there is no guarantee that a solution for LTE can be entirely copied from NT, hence consuming time from the already limited TU available for this WI. |
| vivo | We are fine with the proposal |
|  |  |

* **Topic 2: Support LTE spec change for paging collision**

Summary of the initial round discussion:

16 companies provide input.

* 12 companies agree to update the WID to allow solution that enable paging reception for EPS according to the conclusions in TR 23.761 clause 8.2.
* 4 companies disagree to the above proposed update.

As majority of companies agreed with the update, so the moderator propose the following

**Proposal 2: Update the WID to allow solution that enable paging reception for EPS.**

|  |  |
| --- | --- |
| Company | Comments |
| InterDigital | Agree |
| OPPO | We think this issue is related to proposal1 also. In case option5 is not supported i.e. only NR is network A, then I don’t get the point why solution in EPS side is needed when solution in NR side is feasible. |
| vivo | We are fine with the proposal.  In response to OPPO, this proposal is not related to proposal1 as they are addressing two different topics. Proposal 1 is on switching notification of Objective 2 of the WID, and Proposal 2 is on paging collision of Objective 1 of the WID. |
|  |  |

* **Topic 3: Support of Dual Tx/Dual Rx UEs**

Summary of the initial round discussion:

For Q3:

17 companies provide input to Q3, that is whether Multi-SIM UEs support dual Tx/ dual Rx with shared Tx or Rx chains between two USIMs should be considered in Rel 17.

* 6 companies clearly agree to this proposed WID update.
* 9 companies oppose to the proposed update.
* Others companies comments that, as this was not part of the WID, Rel-17 may not have TU to handle this part.

Q4 and Q5 are all related to Q3 and there are less support for extending the WID to include scenarios proposed by Q4 nd Q5. Therefore, the moderator proposes the following:

**Proposal 3: The scenario of Multi-SIM UEs support dual Tx/ dual Rx with shared Tx or Rx chains is not considered in this release.**

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| --- | --- |
| Company | Comments |
| InterDigital | Agree |
| OPPO | Agree |
| Charter Communications | Agree |
| vivo | Agree, but we are open to consider the scenario later. |
| China Telecom | Disagree.  As the majority concern about the TU, we can restrict the use case of dual Tx/ dual Rx in Rel 17, for example, only consider updating several capabilities and aim at solving essential issues. Other optimizations can be left to Rel 18. In addition, if the existing framework such as UE assistance information can be reused the work will not consume much time. |

# 5 Conclusion