[94e-21-R18-IDC] - Version 0.0.4
RAN

3GPP TSG RAN Meeting #94-e RP-213501

Electronic Meeting, December 06 - 17, 2021

Agenda Item: 8.6.2

Source: Xiaomi

Title: Moderator's summary of discussion [94e-21-R18-IDC]

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This thread covers the discussion [94e-21-R18-IDC] as identified in the email "[94e-01-Organizational] RAN R18 summary RP-213469, list of email threads for RAN R18 discussion, and Monday's GTW" from the RAN Chair.

Deadlines for the discussion over NWM are provided by the RAN Chair in "Draft RAN#94-e_Timeplanv0.zip" in the first page, "Time plan for RAN#94-e during the meeting week - Week 1."

The summary of the Rel-18 package, the proposed TU budget, and the detailed scope proposed for each potential WI or SI are provided in RP-213469, along with the supporting documents contained therein.

Based on the guidance from the RAN Chair, the objectives and justifications of the WID have been revised according to the detailed scope provided in RP-213469, as the starting point for further discussion during RAN#94-e.

1 Initial Round

The initial round focuses on providing feedbacks on the revised WID based on the detailed scope in RP-213469 provided by the RAN Chair and the draft WID RP-212717 provided by the RAN2 Chair. The revised WID with revision marking can be found at the following link.

ftp://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/%5B94e-21-R18-IDC%5D/Draft%20WID%20on%20IDC%20Enhancements_v01_Moderator.docx

1.1 WID Justification

According to the detailed scope in RP-213469 provided by the RAN Chair and the draft WID RP-212717 provided by the RAN2 Chair, the WID Justification is as follows:

Table 1: Justification

As a general assumption, IDC is assumed to work as follows:
1. The UE detects internal issue or the possibility of internal issue caused by coexistence related to usage of certain radio resources, that the UE cannot resolve by itself.
2. The UE provides information to the gNB to assist that the gNB may restrict radio resource usage to avoid the UE internal issue (or potential issue) caused by coexistence.
The current IDC solution in NR has the following limitations: It does not support well interference mitigation between 3GPP and other RAT, as e.g. the affected frequencies cannot be adequately indicated. Introducing a TDM solution would make it possible to handle scenarios for which alternative non-interfered frequencies are not available. An important scenario for TDM is to address cases of inter-modulation interference in Dual Connectivity, where the UE has at least two uplink frequencies configured. The TDM solution may be used to avoid the interference caused by simultaneous uplink transmission on the UL frequencies to Other RAT.

Feedback Form 1: WID justification

1 – Xiaomi Communications

The above justification is ok to us.

2 – Futurewei

We are OK with the WID justification.

3 – Nokia Germany

Given the earlier discussion on MSD, we could remove ”An important scenario for TDM is to address cases of inter-modulation interference in Dual Connectivity, where the UE has at least two uplink frequencies configured.”

4 – China Mobile Com. Corporation

We are ok with the above justification.

5 – CATT

We are ok with the above justification.

6 – Xiaomi Communications

@Nokia,

”An important scenario for TDM is to address cases of inter-modulation interference in Dual Connectivity, where the UE has at least two uplink frequencies configured.” is to address the interference from 3GPP to WiFi. It is not for the MSD issue currently discussed in Rel-17 RAN4, which is to address the interference from one/two UL 3GPP frequency(ies) to another 3GPP frequency. We can clarify taht this scenario is to ”address the interference from 3GPP to other RAT (e.g. WiFi)”

7 – OPPO

We are fine with the objective.

And it might need a clarification on “Other RAT”, since other RAT for NR may include both 3GPP system (e.g. LTE GSM/GPRS) and non-3GPP system (e.g. Wifi). We suggest to replace “other RAT” by “none-3GPP RAT”.

8 – HuaWei Technologies Co.

We are fine with the justification in general. Same view as Xiaomi, the interference here refers to the case between 3GPP and non-3GPP RATs, and OPPO’s suggestion looks good.

9 – Nokia Germany

@Xiami : this is already clear from the objectives, so let’s keep the text simple, thank you.

10 – MediaTek Inc.

We are also fine with the justification and we agree with OPPO that ”none-3GPP RAT” is better wording.

11 – Lenovo (Beijing) Ltd

We are fine with the current description. also agree with the change from Oppo.

12 – Xiaomi Communications

@Nokia, You are right, and we can clarify in the objective that the interference is to ”non-3GPP RAT” as suggested by OPPO.

13 – Apple R&D

We are fine with OPPO’s modification.

14 – Facebook

We are fine with the justification and OPPO’s modification.

15 – China Unicom

We are fine with the above justification.

16 – Samsung Electronics Co.

We are fine with the justification and OPPO’s updates.

17 – DOCOMO Communications Lab.

We are fine with the justification and OPPO’s updates.

18 – Ericsson LM

We are fine with the justification and OPPO’s updates.

19 – vivo Mobile Communication Co.

We are fine with the justification and OPPO’s modification.

20 – ZTE Corporation We are fine with the provided justification
21 – Spreadtrum Communications We are fine with the justification and OPPO's modification.
22 – Intel Corporation (UK) Ltd We're OK with the justification in general. Some clarification is needed on "other RAT", e.g. "non-3GPP RAT" as proposed by OPPO, or "other RAT (e.g. WiFi)" as in objective.
23 – VODAFONE Group Plc We are fine with the justification and OPPO's modification.
24 – InterDigital WE are fine with the justification. Oppo's modification seems reasonable.
25 – TELECOM ITALIA S.p.A. in the Justification FDM techniques are not cited, while they are prioritized in the Objectives. A reference to FDM should be inserted in the justification part
26 – Futurewei We are also OK with OPPO's modification.

1.2 WID Objective

According to the detailed scope in RP-213469 provided by the RAN Chair and the draft WID RP-212717 provided by the RAN2 Chair, the WID Objective is as follows:

Table 2: Objective

This WI expects to address Interference between 3GPP (including various MR-DC architectures, i.e. NR-DC and EN-DC) and other RAT (e.g. WiFi). – Prioritize enhancements to FDM solution, to allow more granular indication of affected frequencies (e.g. granularity of BWP or PRB level). (RAN2) – Introduction of TDM solution (e.g. indication of UE preferred TDM pattern for UL/DL). (RAN2). Note: The TDM solution is considered complementary to the FDM solution. Note: LTE should be considered a baseline for the solutions developed in this WI.

Feedback Form 2: WID Objective

1 – Xiaomi Communications The above objective is ok to us.
2 – Futurewei We are OK with the WID justification.
3 – Futurewei We are generally OK with the WID objective, except that it might be too early to prioritize things. If the intention is to indicate that one objective is more important than the other, we recommend replacing the word "Prioritize" with "As a primary objective," (or deleting "Prioritize" and adding "as a primary objective" at the end).
4 – Nokia Germany The above objectives accurately reflect the status of the discussion from the last plenary, including the need for prioritisation to reflect the LTE history, likely deployments and overall workload.
5 – China Mobile Com. Corporation We are ok with the above justification.
6 – CATT We are ok with the above justification.
7 – Xiaomi Communications @Futurewei, In the intermediate round, we can discuss your proposal of replacing the word "Prioritize" with "As a primary objective,".
8 – OPPO We are fine with the objective, but we think per BWP granular is enough, and PRB level could be considered if it deems necessary in the later stage, so we recommend to remove "or PRB level" in the current stage.
9 – HuaWei Technologies Co. We are fine with the objectives.
10 – MediaTek Inc. We are fine with the objectives.
11 – Lenovo (Beijing) Ltd We are fine with the above justification.

12 – Apple R&D We are OK with the objectives.
13 – Facebook Fine with the objectives.
14 – China Unicom We are fine with the above objectives.
15 – Samsung Electronics Co. We are fine with the objectives (as proposed by RAN leadership in RP-213469).
16 – DOCOMO Communications Lab. We are fine with the above objectives.
17 – Ericsson LM We are fine with the above and support OPPOs suggestion.
18 – vivo Mobile Communication Co. We are fine with the above objectives.
19 – Deutsche Telekom AG We are not convinced that this work is absolutely necessary for Rel-18. We propose to drop the topic for workload reasons. If dropping is not execptable a simple LTE like FDM solution should be the only objective !
20 – ZTE Corporation We are fine with the current set of objectives
21 – Spreadtrum Communications We are fine with the above objectives.
22 – Intel Corporation (UK) Ltd We're OK with the objectives in general. Depending on discussion on RAN4 work in section 1.3 below, there might be a need to update the objectives if RAN4 impact is agreed.
23 – VODAFONE Group Plc We are ok with the above objectives.

1.3 Other

Feedback Form 3: Other

1 – Xiaomi Communications

We think that the following modifications are needed in the WID:

1. In the ”Impacted existing TS/TR” table of section 5, we need to add TS 38.300, TS 38.331, TS 38.306, TS 38.133, TS 37.340, TS 36.331 and TS 36.306.

2. In section 7 Work item leadership, we need to add RAN4 as the secondary WG, to finalize the performance part of the IDC solutions as LTE.

2 – Futurewei

We are generally OK with the WID objective, except that it might be too early to prioritize things. If the intention is to indicate that one objective is more important than the other, we recommend replacing the word “Prioritize” with “As a primary objective,” (or deleting “Prioritize” and adding “as a primary objective” at the end).

3 – Apple R&D

We have no strong view to add RAN4 as the secondary WG. If autonomous denial is to be supported, we agree TS38.133 needs some update, just as what we did in LTE.

4 – Ericsson LM

IDC was added as a RAN2 TEI in Rel-16. Was there anything done in RAN4 on this? Since this Rel-18 WI is to add extensions of the current IDC feature, we do see why RAN4 should be part of this.

5 – Xiaomi Communications

@Ericsson,

Same as LTE, the performance requirements for NR IDC FDM solution in Rel-16 is captured in RAN2 specification, 38.300 (for NR SA) and 37.340 (for MR-DC).

For the NR IDC TDM solution, we would also need to add the performance requirement in RAN4, same as the LTE TDM solution. According to the performance requirement CRs (i.e. R4-126486 and R4-126831) of LTE TDM solution, the RAN4 work is quite small. We would expect 0.25 TU for two RAN4 meetings. The RAN4 TU management can be discussed together with all other WIs, along with the RAN4 chair.

6 – Intel Corporation (UK) Ltd

We’re OK with the impacted TS list proposed by Xiaomi. There might be a need to update objectives as well (e.g. by adding RAN4 for TDM solution) since RAN4 spec TS 38.133 is added in the impacted TS table.

2 Intermediate Round

2.1 Previous Round Report

After the initial round email discussion, the moderate would like to summarize the company feedbacks as follows:

1. Regarding the WID Justification, all companies agree to change ”other RAT” to ”non-3GPP” RAT. And one redundant sentence ”An important scenario for TDM is to address cases of inter-modulation interference in Dual Connectivity, where the UE has at least two uplink frequencies configured.” as notified by Nokia seems can be removed. One comment regarding citing FDM seems reasonable.

2. Regarding the WID Objective, all companies agree to change ”other RAT” to ”non-3GPP” RAT. As only futurewei wants to have a different wording for ”prioritize”, the moderator considers that we can keep the current wording of ”Prioritize enhancements to FDM solution”.

3. Regarding the impacted TS and the performance requirements, it seems that the indicated ”impacted TSs” other than the impacts on RAN4 can be added. Then we would need another round discussion to confirm whether to add the impacted TSs of 36.331.

2.2 WID Justification

After the initial round discussion, the WID Justification capturing companies comments would be as follows:

Table 3: Justification

As a general assumption, IDC is assumed to work as follows: 1. The UE detects internal issue or the possibility of internal issue caused by coexistence related to usage of certain radio resources, that the UE cannot resolve by itself. 2. The UE provides information to the gNB to assist that the gNB may restrict radio resource usage to avoid the UE internal issue (or potential issue) caused by coexistence. The current IDC solution in NR has the following limitations: It does not support well interference mitigation between 3GPP and other RAT, as e.g. the affected frequencies cannot be adequately indicated via the current NR FDM solution. Introducing a TDM solution would make it possible to handle scenarios for which alternative non-interfered frequencies are not available. ~~An important scenario for TDM is to address cases of inter-modulation interference in Dual Connectivity, where the UE has at least two uplink frequencies configured.~~ The TDM solution may be used to avoid the interference caused by simultaneous uplink transmission on the UL frequencies to ~~Other~~non-3GPP RAT.

Feedback Form 4: Is the above WID Justification ok for you?

1 – Xiaomi Communications We are fine with the abve Justification.
2 – Nokia Germany We are also fine with the update above.
3 – CATT We are fine with the updated justification.
4 – Qualcomm CDMA Technologies Also fine.

5 – vivo Mobile Communication Co. We are fine with the update.
6 – DOCOMO Communications Lab. Fine
7 – Spreadtrum Communications We are fine with the update.
8 – Samsung Electronics Co. We are fine with the update.
9 – Apple R&D Fine with the update.
10 – HuaWei Technologies Co. We are fine with the update.
11 – Ericsson LM Fine
12 – Lenovo (Beijing) Ltd Fine to update
13 – MediaTek Inc. We are okay with the update
14 – ZTE Corporation We are fine with the provided justification
15 – Intel Corporation (UK) Ltd We are fine with the above update.
16 – VODAFONE Group Plc We are fine with the updated justification.
17 – InterDigital We are fine with the updated justification.
18 – Facebook Fine with the update.

19 – Futurewei

We are fine with the updated justification.

20 – Nokia Germany

Looks good.

2.3 WID Objective

After the initial round discussion, the WID Objective capturing companies comments would be as follows:

Table 4: Objective

This WI expects to address Interference between 3GPP (including various MR-DC architectures, i.e. NR-DC and EN-DC) and ~~other~~non-3GPP RAT (e.g. WiFi).

- Prioritize enhancements to FDM solution, to allow more granular indication of affected frequencies (e.g. granularity of BWP or PRB level). (RAN2)
- Introduction of TDM solution (e.g. indication of UE preferred TDM pattern for UL/DL). (RAN2).

  Note: The TDM solution is considered complementary to the FDM solution.

Feedback Form 5: Is the above WID objective ok for you?

1 – Xiaomi Communications

We are fine with the above objective.

2 – Nokia Germany

We are also fine with the update above.

3 – CATT

We are fine with the updated objective.

4 – Qualcomm CDMA Technologies

We don't think prioritization is really necessary and we should introduce both FDM and TDM. From editorial perspective, starting the objective with "prioritize ..." means that the objective itself is "prioritization" so one suggestion would be:

- Enhancements to FDM solution to allow more granular indication (e.g. BWP or PRB level) of the affected frequencies (RAN2)

  Note: This will be prioritized.
- Introduction of TDM solution (e.g. indication of UE preferred TDM pattern for UL/DL). (RAN2)

  Note: The TDM solution is considered complementary to the FDM solution.

5 – vivo Mobile Communication Co.

We are fine with the update.

6 – DOCOMO Communications Lab.

Fine

7 – Xiaomi Communications

@Qualcomm, using a normaltive text or a Note seems no big difference to me, as we would anyway discuss both solutions during work item phase, but we should definitely avoid introducing only TDM without the enhancements to the FDM. Maybe we can try to hear more views from others.

8 – Spreadtrum Communications

We are fine with the update.

9 – Nokia Germany

Wording from Qualcomm is also acceptable for us.

10 – Samsung Electronics Co.

We are fine with the update.

11 – Apple R&D

Fine with the update.

12 – HuaWei Technologies Co.

We are fine with the update.

13 – Ericsson LM

We are also fine with the change from QC.

14 – Lenovo (Beijing) Ltd

We are fine with the update.

15 – MediaTek Inc.

Current wording is fine and QC suggestion is basically the same. We can accept both.

16 – ZTE Corporation

We are fine with the objective. We are also okay with the update from Qualcomm

17 – Intel Corporation (UK) Ltd

We're fine with the update above. Depending on discussion on RAN4 work in section 2.4 below, there might be a need to update the objectives if RAN4 impact is agreed.

18 – VODAFONE Group Plc We are fine with the objective, but QC wording that removes the word prioritise is perhaps a bit better.
19 – InterDigital We are also fine with the proposed text from Qualcomm.
20 – Facebook Fine with the update.
21 – Futurewei We are OK with using the Note on prioritization as suggested by Qualcomm.

2.4 Other

Feedback Form 6: Do you think that the performance requirement can be added in the WID?

1 – Xiaomi Communications We think that the performance requirement can be added in the WID, as we did the same thing in the LTE TDM solution for IDC.
2 – Qualcomm CDMA Technologies Yes, this will be the safe approach so that appropriate RAN4 time is allocated.
3 – CATT It is reasonable to add RAN4 foreseen work in the WID.
4 – Apple R&D We see no harm in adding the performance requirement, no strong views though.
5 – Ericsson LM With a small RAN4 allocation, we are OK with this.
6 – MediaTek Inc. Yes.
7 – ZTE Corporation This depends on the solutions chosen in the end. We think it is worth keeping the performance part for now

8 – Intel Corporation (UK) Ltd

We're OK to update the objective (e.g. by adding RAN4 for TDM solution) since RAN4 RRM **core** part (TS 38.133) needs update for TDM solution, as in LTE IDC. One comment regarding "performance requirement" is that in LTE IDC, RAN4 core part is updated for TDM solutions, while there are no RAN4 performance part for IDC. We assume the same applies for NR, i.e. RAN4 core part is updated for TDM solution.

9 – VODAFONE Group Plc

Yes, this makes sense.

10 – InterDigital

yes, we agree. It makes sense.

11 – HuaWei Technologies Co.

RAN4 Chair: two things were done for LTE IDC. One is to add some clarification that UE with IDC solution should fulfill the RRM core requirements. The other is for IDC autonomous denial. When there is IDC autonomous denial, the longer delay is expected for many RRM core requirement. In my view the first one would not be quite essential. I am not sure if there is clear consensus on whether IDC autonomous denial is included or not. If yes, fine for me.

It is not clear to me that company said "performance requirement" with small number of TU is needed, since for LTE there is core requirement, which does not need too much TU. Please clarify whether core requirement is needed or not. For performance part, please think about the testability issue since it is test with non-3GPP technique. Is the test feasible? It is better to make those things clear to save unnecessary debating time in RAN4 considering TU is the most precious resource in the industry.

I am OK to change TU based on the consensus for RAN4 objective later.

12 – Xiaomi Communications

@RAN4 Chair,

The WID considers to reuse the LTE TDM solutions (which includes autonomous denial as the UL-only TDM) as the baseline, in which we consider that the similar amount of small work (as the LTE RAN4 CRs "R4-126486 and R4-126831") can be done in RAN4. We can follow the RAN4 chair's suggestion on whether to allocated specific small amount of TUs, or to use some reserved TUs for IDC, or to even use some email discussion approval without using RAN4 TUs, as we would anyway discuss the full TU package with other items. In the work item description, we can firstly add 38.133 as impacted TS.

To my understanding, the two LTE RAN4 CRs "R4-126486 and R4-126831" seem core requirement, as they used "SPIA_IDC_LTE-Core". And the two LTE RAN4 CRs does not require "test with non-3GPP technique". We have already got the Note in the WID using the LTE baseline, and this Note should also be applicable to the RAN4 work.

Feedback Form 7: Do you have any other issues?

3 Final Round

3.1 Previous Round Report

After the initial round email discussion, the moderate would like to summarize the company feedbacks as follows:

1. All companies are ok to change ”prioritize enhancements to FDM solution” to a Note.

2. All companies are ok to add RAN4 performance requirements.

3.2 WID in general

It seems that the WID is now converged in many aspects. Companies are invited to check whether the latest version ”v03” as uploaded in the FTP server is fine and provide your willingness as a supporting company for the work item. Then we will provide a final version of the WID with a separate tdoc number for final approval. The latest version of the draft WID can be found in the following link:

ftp://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/%5B94e-21-R18-IDC%5D/Draft%20WID%20on%20IDC%20Enhancements_v03_Moderator.docx

Feedback Form 8: Is the updated draft WID in v03 in drafts folder (TSGR_94e/Inbox/Drafts/[94-21-R18-IDC]/) agreeable? And are you wiling to be a supporting company for the WID?

1 – Xiaomi Communications The updated WID in v03 is agreeable.
2 – Futurewei v03 is agreeable.
3 – HuaWei Technologies Co. It looks good to us. Perhaps the below Note can be improved on the wording: LTE **IDC solution** should be considered **as the** ~~a~~ baseline for the solutions developed in this WI.
4 – Xiaomi Communications @Huawei, Thanks to huawei for improvidng the wording. I will in-corporate the changes in the final version for approval.

5 – Qualcomm CDMA Technologies We are also fine with v03
6 – Samsung Electronics Co. We are fine with v3, and also Huawei's suggestion looks good. You may add Samsung as a supporting company. Thanks!
7 – OPPO v03 is agreeable, and it's ok to list OPPO as the supporting company list.
8 – vivo Mobile Communication Co. We are fine with v03, and happy to be the supporting company.
9 – Spreadtrum Communications Thank Yumin great efforts. We are fine with v03, and happy to be the supporting company.
10 – DOCOMO Communications Lab. Thanks for leading the discussion. We are fine with v03, and NTT DOCOMO, INC. is happy to be listed as a supporting company.
11 – InterDigital We are fine with v03.
12 – ZTE Corporation The WID looks fine and please add "ZTE Corporation, Sanechips" as supporting companies! Thank you!
13 – CATT The WID looks fine for us. Please add CATT as supporting company.
14 – Intel Corporation (UK) Ltd We're fine with v03, and Huawei's suggestion also looks good. Please add Intel as supporting company. Thanks!
15 – VODAFONE Group Plc We are also fine with v03.
16 – VODAFONE Group Plc Please add Vodafone as a supporting company.

4 Report and Conclusions

After the final round discussion, no more concerns are received. The updated WID by adding the supporting company list and some edits can be found in RP-213552. The moderator considers that the discussion can be concluded as follows:

The Rel-18 IDC WID in RP-213552 is approved.