[97e-08-R18-RAN4-OtherSpectrumRelated] - Version 0.0.2
RAN

3GPP TSG-RAN Meeting #97-e RP-22xxxx

Electronic Meeting, September 12 – 16, 2022

Agenda item: 9.1.5, 10.1.5

Source: Moderator (RAN4 Chair)

Title: Email discussion summary for [97e-08-R18-RAN4-OtherSpectrumRelated]

Document for: Information

1 Introduction

In this email thread we will discussion the following topics:

- New basket WI proposal for adding new channel bandwidth for NR bands
- New basket WI proposal for simultaneous Rx/Tx band combinations
- New basket WI proposals for 4Rx
- New WI proposal of MPR requirements for LTE intra-band non-contiguous CA with >35MHz CC gap
- New WI proposal for reference sensitivity degradation mitigation for HPUE on sub-1GHz FDD bands

The following contributions will be covered.

Table 1:

TDoc	Title
RP-222012	Basket WID: adding new channel bandwidth(s) support to existing NR bands
RP-222514	New WID: Simultaneous Rx/Tx band combinations for NR CA/DC, NR SUL and LTE/NR DC in Rel-18
RP-222451	Proposed new WID: 4Rx support for NR FR1 bands (<2.6GHz) in Rel-18
RP-222452	Motivation on basket WID on 4Rx support for NR FR1 bands (<2.6GHz) in Rel-18
RP-222307	MPR requirements for LTE itrabCA with >35 MHz CC gap
RP-222370	Motivation for MPR requirements for LTE itrabCA with >35 MHz CC gap
RP-222340	New WID: Reference sensitivity degradation mitigation for High-Power UEs in NR FDD sub-1GHz bands
RP-222320	New WID: PC1.5 Inter-band and Intra-band uplink CA

In this document, we capture comments and conclusions for this email thread.

2 Topic #1: Basket for adding new CBW for NR bands

2.1 Companies' contributions summary

Table 2:

T-doc number	Title	Sourcing company
RP-222012	Basket WID: adding new channel bandwidth(s) support to existing NR bands	Ericsson

2.2 Initial round

2.2.1 Comments & responses

Sub-topic 1-1: Any question or comment on the justification or any other general comment for WI?

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 1:

1 – Nokia Japan We support this WI.
2 – Apple (UK) Limited We wonder if FR2: {50 MHz, 100 MHz, 200 MHz, 400 MHz} needs to be included in the WID objective as all the listed channel BWs are already supported by all FR2-1 bands. On the other hand, to be more precise, the channel BW list above is only for FR2-1.
3 – Huawei Technologies France We support the WI proposal.
4 – ZTE Wistron Telecom AB Fine with the WI proposal. As Apple stated, the CBW set {50/100/200/400} should be for FR2-1.
5 – Ericsson LM Replying to Apple comments and agree with ZTE: tee CBW set {50 MHz, 100 MHz, 200 MHz, 400 MHz} is for FR2-1. Same sentence exists in Rel-17 basket WI on new CBW. But we can update the sentence as below in the revised WID:

FR2-1 {50 MHz, 100 MHz, 200 MHz, 400 MHz}

Sub-topic 1-2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

——————————————————— Core part ———————————————————-

Specify channel bandwidth – sub-carrier spacing combinations to be supported for each considered band according to Table 4.1.3-1. The channel bandwidth should be one of the following list: FR1: {5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 35 MHz, 40 MHz, 45 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz}. FR2: {50 MHz, 100 MHz, 200 MHz, 400 MHz} The band should be a specified NR band, including SUL and SDL bands.

Analyze and specify requirements: Reference sensitivity and associated RB allocation. When needed: MPR (relative bandwidth criteria) Additional Maximum Power Reduction (A-MPR) NS signalling. Any other RF requirement which might be relevant. CA or EN/DC combinations updates are not in the scope of this WI.

——————————————————- Way of working
————————————————————

Refer to RP-222012

——————————————————— Request overview
————————————————————————-

Refer to RP-222012

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Companies are invited to provide comments and responses in the following table.

Feedback Form 2:

1 – Qualcomm Korea

In many cases, especially for the refarmed bands from LTE, wider bandwidths require A-MPR and/or MSD. We suggest that as part of a new request within this basket WID, the proponent identify the expected impairments for example that A-MPR for NS_xx is expected to be impacted. The WG can then properly understand the work required and more efficiently address it.

Sub-topic 1-3: Comments and responses on impacted/new specifications and target completion date & time budget

Companies are invited to provide comments and responses in the following table.

Feedback Form 3:

2.2.2 Summary

Sub-topic 1-1: Any question or comment on the justification or any other general comment for WI?

No objection was received from this WI proposal and no comment on justification part.

Sub-topic 1-2: Comments and responses on the proposed objectives

The first comment is on FR2 bandwidth. The question is whether FR2: {50 MHz, 100 MHz, 200 MHz, 400 MHz} should be included since the CBWs have already been supported, and FR2 should be changed to FR2-1. In the moderator view, this objective is not wrong and since it is there from Rel-17 it could be kept, but we need change FR2 to FR2-1.

The second comment is to request the proponent to identify the impacts on A-MPR and/or MSD when requesting the new channel bandwidth.

Based on the comments, the moderator proposes:

- **Proposal 1-1**: for objectives of basket WI for adding new CBW for NR bands
  - Change the objective for FR2 channel bandwidth to
    - FR2-1: {50 MHz, 100 MHz, 200 MHz, 400 MHz}
  - Change the way of working by adding the rule
    - The new request adding support for channel bandwidth in existing NR band should be submitted on RAN4 reflector before tdoc submission deadline the next RAN4 meeting (1 week before the meeting). **When requesting the new channel bandwidth, the proponent should identify the expected impairments including A-MPR and/or MSD and capture them in "Additional information" column in Table 4.1.3-1.**

2.3 Intermediate round

2.3.1 Comments & responses

Sub-topic 1-2: Comments and responses on the proposed objectives

Please comment on **Proposal 1-1** in the table below.

Feedback Form 4:

1 – Qualcomm Korea Ok with the proposal
2 – Apple (UK) Limited

We are fine with Proposal 1-1 though we still think there is no need to include FR2-1 BWs as all the BWs have already been introduced in the existing FR2-1 bands.
3 – Ericsson Limited A revision of this basket WI considering proposal 1-1 is available in the [97e-08-R18-RAN4-OtherSpectrumRelated] folder (Revised RP-222012 Rel-18 New WID Additional CBW in NR bands.docx).
4 – ZTE Wistron Telecom AB The proposal is fine to us.

2.3.2 Summary

Moderator summarizes discussion status for this round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

2.4 Final round

2.4.1 Comments & responses

Based on the status of the final round, recommendations will be provided.

Companies are invited to provide comments and responses in the following table.

2.4.2 Summary

Moderator summarizes discussion status and provide the recommendation.

3 Topic #2: Basket for simultaneous Rx/Tx band combinations

3.1 Companies' contributions summary

Table 3:

T-doc number	Title
RP-222514	New WID: Simultaneous Rx/Tx band combinations for NR CA/DC, NR SUL and LTE/NR DC in Rel-1

3.2 Initial round

3.2.1 Comments & responses

Sub-topic 2-1: Any question or comment on the justification or any other general comment for WI?

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 5:

1 – Guangdong OPPO Mobile Telecom. For clarification, current RAN4 spec seems doesn't support Non-synchronized TDD-TDD band combinations, so with the basket WI here to introduce Non-Sync TDD-TDD band combinations together with general requirements?
2 – Huawei Technologies France We support the WI proposal. To OPPO, the current spec also has non-synchronized TDD-TDD band combinations, e.g. CA_n41-n79, CA_n40-n77. For the TDD combinations proposed by operators in the WID, some analysis would be needed to check if non-sync operation is feasible or whether MSD should be considered for the simultaneous Rx/Tx operation.
3 – CATT We support the requested band combination in 4.1.3 and the bracket can be removed.
4 – SoftBank Corp. We are supportive of this WI proposal.
5 – China Mobile Com. Corporation We support this WI. We observe the throughput gap between DL and UL in 5G network is reduced compared to 4G. Mandating synchronization between TDD bands will bring restriction on network side. Hence, we would like to further disucss on the non-synchronized TDD-TDD band combinations.
6 – QUALCOMM JAPAN LLC. Is the right understanding that we do not have any MSD threshold for which the combination will have mandatory simultaneous Rx-Tx and this will be discussed case by case in this WI?
7 – Samsung Electronics Co. We support to investigate the possible architectures of CA_n7-n40 in this WI, and accordingly further discuss whether simultaneous RxTx capability could be supported or not based on the evaluation of the MSD performance.

8 – ZTE Wistron Telecom AB

A minor change to Objective #1 since the target is not all band combinations in the spec:

1. Identify feasibility for each **requested** FDD-TDD and TDD-TDD band combinations for CA, SUL, MR-DC supporting simultaneous Rx/Tx capability/operation based on technical analysis, especially for those with large MSD values.

Note: Band combinations considered in this WI have to be introduced first via basket WIs (see 2.3) or completed in previous releases if necessary.

9 – China Unicom

We support the WID proposal.

10 – Huawei Technologies France

To QC's comments: Yes. As discussed in Rel-17, it is very difficult to reach consensus on the MSD threshold, thus analysis should be carried out case by case for the specific band combination.

To ZTE's comments: We are fine with the minor change. Thanks.

Sub-topic 2-2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

——————————————————— Core part ———————————————————-

1. Identify feasibility for each FDD-TDD and TDD-TDD band combinations for CA, SUL, MR-DC supporting simultaneous Rx/Tx capability/operation based on technical analysis, especially for those with large MSD values.

   Note: Band combinations considered in this WI have to be introduced first via basket WIs (see 2.3) or completed in previous releases if necessary.

2. Align the specification treatment of simultaneous Rx/Tx capability for CA, SUL, MR-DC and NR-DC band combinations.

——————————————————- Way of working
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The new request adding CA, SUL, MR-DC and NR-DC band combinations for evaluation of supporting simultaneous Rx/Tx capability should be submitted on RAN4 reflector before tdoc submission deadline to the next RAN4 meeting (1 week before the meeting). The basket WI will then be updated with the new requests (section 4.1.3) and submitted to next RAN4 meeting for endorsement, before submission to RAN meeting for approval.

When the work is completed, all draft CRs related to one request will be submitted in the same RAN4 meeting to check consistency. If they are endorsed, the basket WI Rapporteur will merge all draft CRs from all requests in big CRs (one per TS specification). After the RAN4 meeting preceding a RAN meeting, those big CRs will be sent on RAN4 reflector for email approval (1 week) and, if agreed, they will be submitted to following RAN meeting.

——————————————————— Request overview
————————————————————————————-

Refer to RP-222514.

——————————————————— Performance part
————————————————————————————-

This Perf. Part WI standardizes the requirements to release independence TS 38.307 of all REL-17 CA, SUL, MR-DC and NR-DC band combinations that fall into the category supporting simultaneous Rx/Tx capability defined by the WI title.

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Companies are invited to provide comments and responses in the following table.

Feedback Form 6:

1 – vivo Communication Technology A question for clarification: Will any new further general guidelines be discussed for the cases in this WI?

Sub-topic 2-3: Comments and responses on impacted/new specifications and target completion date & time budget

Companies are invited to provide comments and responses in the following table.

Feedback Form 7:

3.2.2 Summary

Sub-topic 2-1: Any question or comment on the justification or any other general comment for WI?

Generally, companies seemed OK with the WI proposal.

OPPO commented whether non-sync TDD-TDD band combinations as well as general requirements will be introduced. CMCC and Huawei responded that the non-sync TDD-TDD band combinations of CA_n41-n79 and CA_n40-n77 have been specified. Thus the related general requirements should be in place already. In the basket WI, the band specific requirement will be discussed.

Sub-topic 2-2: Comments and responses on the proposed objectives

ZTE proposed the modification of objective which seemed OK to companies.

Qualcomm commented that there is no MSD threshold for which the combination will have mandatory simultaneous Rx-Tx and that will be discussed case by case in the WI. Huawei confirm Qualcomm understanding. VIVO questioned if any new further general guidelines be discussed in this WI.

Based on the comments, the moderator proposes

- **Proposal 2-1:** for objectives of Basket for simultaneous Rx/Tx band combinations
  - Modify objecive 1 as follows
    - 1. Identify feasibility for each **requested** FDD-TDD and TDD-TDD band combinations for CA, SUL, MR-DC supporting simultaneous Rx/Tx capability/operation based on technical analysis, especially for those with large MSD values.
  - Add one note under the objective 1 to clarify that there is no MSD threashold for which have mandatory simultaneous Rx-Tx and the simulatenous Rx-Tx capability will be discussed case by case in the WI
    - Note X: whether the simultaneous Rx-Tx capability could be supported or not depends on the evaluation of MSD for the requested band combinations case by case.

3.3 Intermediate round

3.3.1 Comments & responses

Sub-topic 2-2: Comments and responses on the proposed objectives

Please comment on **Proposal 2-1** in the table below**.** Hope the proposed Note X can also address VIVO comments related to general guidelines.

Feedback Form 8:

1 – Huawei Technologies France Agree with the proposal 2-1 by moderator and we will update the WID accordingly.
2 – QUALCOMM JAPAN LLC. We are fine with the proposal from the moderator
3 – Guangdong OPPO Mobile Telecom. ok with proposal.
4 – ZTE Wistron Telecom AB Fine with the proposal.

3.3.2 Summary

Moderator summarizes discussion status for this round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

3.4 Final round

3.4.1 Comments & responses

Based on the status of the final round, recommendations will be provided.

Companies are invited to provide comments and responses in the following table.

3.4.2 Summary

Moderator summarizes discussion status and provide the recommendation.

4 Topic #3: Basket for 4Rx support

4.1 Companies' contributions summary

Table 4:

T-doc number	Title	Sourcing compa
RP-222451	Proposed new WID: 4Rx support for NR FR1 bands (<2.6GHz) in Rel-18	ZTE, Sanechips
RP-222452	Motivation on basket WID on 4Rx support for NR FR1 bands (<2.6GHz) in Rel-18	ZTE, Sanechips

4.2 Initial round

4.2.1 Comments & responses

Sub-topic 3-1: Any question or comment on the justification or any other general comment for WI?

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 9:

1 – Nokia Japan Necessity and motivation are understandable. We wonder why we need to limit the scope to bands < 2.6 GHz? What if some want 4Rx requirements for bands > 2.6GHz which do not have 4 Rx requirements?
2 – T-Mobile USA Inc. We requested that ZTE add n25 and n85 to the WID, with n85 for FWA. T-Mobile USA would also like to be added as a supporting company.
3 – Qualcomm Korea Is it the correct understanding that 4Rx for bands <2.6 GHz would be optional?

4 – Guangdong OPPO Mobile Telecom.

We understand this is for FWA device feature, just for clarification, how NW can distinguish FWA device and Smartphone, or just from requirement definition perspective?

5 – Huawei Technologies France

In general, we are fine with the WI proposal. To make it clear, the WI is for 4Rx only, but we see the title of motivation paper also includes 8Rx. We think it's not an appropriate time to consider 8Rx as general requirements are not available.

6 – E-surfing Digital

We support the WID which captures our request.

Regarding Nokia's comment,

we think the description of "< 2.6 GHz" is based on the comment in RAN #96 that 4Rx should be mandatory for frequency band >= 2.6 GHz.

Regarding QC's comment,

We agree it is optional.

Regarding OPPO's comment,

We also think it is from requirement definition perspective.

7 – China Mobile Com. Corporation

For "<2.6GHz", it is better to clarify since >2.6GH also has 4Rx requirements. Our understanding is that if there is new bands introduced for >2.6GHz, it should also be discussed in this WI.

8 – ZTE Wistron Telecom AB

To Nokia: It is the compromise from the last RAN plenary meeting since company commented it should be restricted the bands<2.6GHz.

To Qualcomm: We think 4Rx for bands <2.6 GHz would be optional.

9 – Samsung Electronics Co.

Generally we are fine with the WI proposal. However, it would be much better if the WID captures the process or objective in detail in term of UE type, optionality, etc.

10 – China Unicom

We support the WID proposal.

11 – vivo Communication Technology

Currently, the intended UE type FWA is in the additional information column. Since there is still difficulty to differentiate different types in the final spec, optional is preferred.

Sub-topic 3-2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

——————————————————— Core part ———————————————————-

Specify the 4Rx REFSENS requirement for NR FR1 bands

Table 4.1.2-1: Requests tracking for 4Rx

Table 5:

Band	Contact name, company	Contact email	Other supporting companies	Additional informatio
n5	Lei GAO, China Telecom	gaol8@chinatelecom.cn	ZTE, Sanechips, vivo	4 Rx operation is targete

——————————————————- Performance Part
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This Perf. Part WI has to standardize the Perf. Part requirements:

- Required changes to be added to release independence TS 38.307 if any.

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Companies are invited to provide comments and responses in the following table.

Feedback Form 10:

1 – T-Mobile USA Inc.

Sorry that I commented above in the wrong form. Repeating here, we requested that ZTE add n25 and n85 to the WID, with n85 for FWA. T-Mobile USA would also like to be added as a supporting company. Ericsson, Nokia and Deutsche Telekom are supporting companies.

2 – ZTE Wistron Telecom AB

To T-mobile USA: We can revise the WID to include n25 and n85

Sub-topic 3-3: Comments and responses on impacted/new specifications and target completion date & time budget

Companies are invited to provide comments and responses in the following table.

Feedback Form 11:

4.2.2 Summary

Sub-topic 3-1: Any question or comment on the justification or any other general comment for WI?

The first comments are whether the request for bands > 2.6GHz should be included in the basket WI. The proponent clarified that 4Rx is mandatory for bands > 2.6GHz already.

The second comment is that support of 4Rx for band < 2.6Ghz should be optional.

The third comment is that the proposal is for FWA device and how the network distinguish FWA and smartphone. The response is that RAN4 can distinguish them by defining the proper requirements.

The forth comment is that 8Rx should not be considered at the current stage.

Sub-topic 3-2: Comments and responses on the proposed objectives

T-Moible request adding n25 and n85.

Based on the comments, the moderator proposes

- **Proposal 3-1**: for objectives of Basket for 4Rx support, the following modfication is proposed
  - Specify the 4Rx REFSENS requirement for NR FR1 bands
    - **Support of 4Rx for the bands added in this WI is optional**
    - **Note: it is not required for network to distinguish UE types. Define the proper requirements for different UE types.**
  - Add n25 and n85 together with contatct person, supporting companies and other necessary information.

4.3 Intermediate round

4.3.1 Comments & responses

Sub-topic 3-2: Comments and responses on the proposed objectives

Please comment on **Proposal 3-1** in the table below.

Feedback Form 12:

1 – Qualcomm Korea

Although there is little chance for misunderstanding among the companies here, the note ”it is not required for network to distinguish UE types” might be too general for others who might read the WID. Would it be better to write ”it is not required for the network to distinguish between smartphone and FWA UE types”?

2 – Apple (UK) Limited

We have concern on proponent’s comment that 4Rx is mandatory for bands > 2.6GHz already. We do not think this the reason that only < 2.6GHz is included in this basket WID. The reason should be 4Rx requirements have already been introduced for all existing bands > 2.6GHz, not because 4Rx is mandatory for all bands > 2.6GHz.

3 – TELECOM ITALIA S.p.A.

to Apple: it is interesting your interpretation of 3GPP specs...

We support the moderator’s recommendation

4 – TELECOM ITALIA S.p.A.

to Apple: it is interesting your interpretation of 3GPP specs...

We support the moderator’s recommendation

5 – China Telecommunications

We are ok with Proposal 3-1 with the additional modification by QC.

With the following sub-bullet added in the WID, we believe it is important to restrict the frequency range of < 2.6GHz.

- **Support of 4Rx for the bands added in this WI is optional**

6 – China Telecommunications

We are ok with Proposal 3-1 with the additional modification by QC.

With the following sub-bullet added in the WID, we believe it is important to restrict the frequency range of < 2.6GHz.

- **Support of 4Rx for the bands added in this WI is optional**

7 – Nokia Japan

As far as 4Rx is concerned, we don’t expect there is something meaningful to distinguish if a UE is smartphone or CPE. Network just handles them based on received signal level and quality.

We don’t see the necessity of the NOTE but if it’s included, the first part is not necessary.

Note: ~~it is not required for network to distinguish UE types.~~ Define the proper requirements for different UE types.

8 – China Mobile Com. Corporation We are OK with the proposal. Mandatory support of 4Rx for > 2.6GHz was agreed in the past. Regarding the note, we are OK with either the wording in proposal or Qualcomm's comments.
9 – Guangdong OPPO Mobile Telecom. Ok with the proposal.
10 – Huawei Technologies France We are ok with moderator's proposal. Modified wording by QC is also fine for us.
11 – ZTE Wistron Telecom AB We are fine with both Moderator's proposal and QC's wording. We will update the WID according to the consensus.
12 – ZTE Wistron Telecom AB Regarding the UE types, Nokia's proposal is also fine with us.
13 – ZTE Wistron Telecom AB Regarding the UE types, Nokia's proposal is also fine with us.
14 – vivo Communication Technology We are ok with proposal. The modified wording from QC is also fine.

4.3.2 Summary

Moderator summarizes discussion status for this round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

4.4 Final round

4.4.1 Comments & responses

Based on the status of the final round, recommendations will be provided.

Companies are invited to provide comments and responses in the following table.

4.4.2 Summary

Moderator summarizes discussion status and provide the recommendation.

5 Topic #4: MPR requirements for LTE intra-band non-contiguous CA with >35MHz CC gap

5.1 Companies' contributions summary

Table 6:

T-doc number	Title	Sourcing company
RP-222307	MPR requirements for LTE itrabCA with >35 MHz CC gap	Vodafone Ireland Plc
RP-222370	Motivation for MPR requirements for LTE itrabCA with >35 MHz CC gap	Vodafone Ireland Plc

5.2 Initial round

5.2.1 Comments & responses

Sub-topic 4-1: Any question or comment on the justification or any other general comment for WI?

In RP-222370, the proposals are as follows:

Observation 1: To support non-contiguous intra-band CA with a sub-band gap greater than 35 MHz, new MPR requirements need to be specified.

Proposal 1: Approve the new WI proposed in RP-222307 to establish MPR requirements for non-contiguous intra-band CA with a sub-band gap of greater than 35 MHz.

In RP-222307, the justifications are as follows:

Fragmented spectrum allocations in some regions of the world can make it challenging for operators to meet the bandwidth needs of their customers using a single, contiguous component carrier within a given 3GPP band. Non-contiguous intra-band carrier aggregation (CA) provides a solution for this, but the maximum power reduction (MPR) requirements are currently only specified for a sub-band gap of up to 35 MHz. As there are now spectrum allocations for some regions that require a sub-band gap greater than 35 MHz, this work item is required to establish the new MPR requirements.

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 13:

1 – Qualcomm Korea

Is UL CA deemed to be absolutely necessary for this CA configuration? If the CA can be limited to DL CA, not only would the specification work be considerably lessened (there are not too many companies contributing to new technical work for LTE anymore), but UL CA may not be very attractive from a link budget perspective. The MPR (or A-MPR if applicable) needed for intra-band UL CA is likely to be quite large unless two separate transmit chains are used.

2 – Apple (UK) Limited

The WID can use the intended CA_41A-41A as an example band altogether to define both MPR and A-MPR in the same WID without the need to introduce CA_41A-41A in a basket WID separately. The proposed WID in RP-222307 does not have any supporting company though.

3 – Huawei Technologies France

We support the WI proposal. MPR for larger than 35MHz gap is not specified in the LTE spec, which should be defined to accommodate the deployment scenario for operator with the NC spectrum in band 41.

4 – VODAFONE Group Plc

To QC: UL CA for this configuration would be useful to have as an option, so we would like it to remain included in scope. The link budget and implementation tradeoffs can be discussed as part of the specification work.

To Apple: The intent is to add supporting companies this week.

Sub-topic 4-2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

——————————————————— Core part ———————————————————-

The objective of this work item is to specify MPR requirements for intra-band non-contiguous CA with a sub-band gap larger than 35 MHz using CA_41A-41A with a 90 MHz gap as the example band.

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Moderator: the band combination specific requirements needs be covered somewhere, if needed.

Companies are invited to provide comments and responses in the following table.

Feedback Form 14:

Sub-topic 4-3: Comments and responses on impacted/new specifications and target completion date & time budget

Companies are invited to provide comments and responses in the following table.

Feedback Form 15:

5.2.2 Summary

Sub-topic 4-1: Any question or comment on the justification or any other general comment for WI?

Qualcomm questioned the necessity for this work. Vodafone responded and thought intra-band NC CA on band 41 is needed. Since this is highly related to spectrum work, the moderator wonder if company still have view to start the work with the operator's clarification.

Apple commented that both MPR and A-MPR work for CA_41A-41A could be done in this WI as the example band combination. But according to feedback from MCC, it is expected to finalize the spectrum related work in the basket WI after MPR requirement is finalized in this WI.

But according to moderator checking, DL CA_41A-41A with UL configuration of CA_41A-41A seems not be captured in the LTE basket WI yet. The proponent should contact with LTE basket rapporteur.

Sub-topic 4-2: Comments and responses on the proposed objectives

The moderator wonder if companies still have different views on this WI proposal and would like to propose

- **Proposal 4-1**: approve the revised WID proposal RP-222307 for which the supporting companies need be added.

5.3 Intermediate round

5.3.1 Comments & responses

Sub-topic 4-2: Comments and responses on the proposed objectives

Can we agree on **Proposal 4-1**?

Feedback Form 16:

1 – Apple (UK) Limited Is it still considered as a spectrum WID if only MPR is to be specified?
2 – VODAFONE Group Plc DL CA_41A-41A with UL configuration of CA_41A-41A is not yet in the LTE basket WI because it was only discussed in the last RAN4 meeting how to handle LTE intra-band requests in R18. During the process of raising this issue with the RAN4 chair and MCC to seek a means for handling the CA_41A-41A request, it was noted that the generic requirements for MPR will need to be updated to account for the larger sub-band gap, hence proposing this new "non-spectrum" WI for that purpose.

5.3.2 Summary

Moderator summarizes discussion status for this round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

5.4 Final round

5.4.1 Comments & responses

Based on the status of the final round, recommendations will be provided.

Companies are invited to provide comments and responses in the following table.

5.4.2 Summary

Moderator summarizes discussion status and provide the recommendation.

6 Topic #5: Reference sensitivity degradation mitigation for HPUE in NR FDD sub-1GHz bands

6.1 Companies' contributions summary

Table 7:

T-doc number	Title
RP-222340	New WID: Reference sensitivity degradation mitigation for High-Power UEs in NR FDD sub-1GHz ba

6.2 Initial round

6.2.1 Comments & responses

Sub-topic 5-1: Any question or comment on the justification or any other general comment for WI?

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 17:

1 – Nokia Japan

First of all, we don't beleive this belongs to spectrum related WI. Hence, it must not be the scope of this RAN#97-e as the other non-spectrum related WIs are not treated.

2 – Qualcomm Korea

We tend to agree with the comment from Nokia. This appears to be a more general treatment of refsens sensitivity mitigation methods rather than a spectrum work item.

3 – Apple (UK) Limited

We support this WID.

4 – Guangdong OPPO Mobile Telecom.

Similar discussion as in thread 97e-07, motivation is valuable, and probably should be a non-spectrum WI.

5 – Huawei Technologies France

In general we are fine to have some study for the MSD mitigation solutions. But the proposal is also related to the discussion for HPUE FDD bands in thread [97e-07-R18-RAN4-HPUEBaskets]. Also agree with other companies, it seems the proposal is non-spectrum related.

6 – Skyworks Solutions Inc.

We support this WID based on comments posted in 97e-07.

7 – CHTTL

Agree with Nokia

8 – Samsung Electronics Co.

We also think the new WID (RP-222340) is about non-spectrum related WI, which is not supposed to be discussed in RAN#97 meeting.

9 – Ericsson LM

We also agree with Nokia's comments. This is non-spectrum WI and requires quite a lot of work. It should not even be discussed in RAN#97e according to the chairman's guidance.

10 – China Unicom

The WID considered using n28 and n8 as the example bands, but these two bands are included in the HPUE basket for FDD bands WID, so we suggest to check what MSD values we got in these two bands first.

11 – vivo Communication Technology

Same comments as 97e-07, we think study is meaningful. However, the appropriate timing may not be in this meeting as many companies pointed out. It can be considered in a later stage.

12 – MediaTek Inc.

As proponent of this WI, we support it. Given that there is no consensus, we are fine with postponing the proposals to RAN-Plenary#98e meeting. We can provide n28 and n8 MSD evaluation results before RAN-Plenary#98e.

Sub-topic 5-2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

——————————————————— Core part ———————————————————-

For the frequency sub-1GHz bands within reference HPUE basket WID at RAN#97e the objectives of the core part are as follows,

1. Study and specify a general solution which targets at mitigating reference sensitivity degradation for providing the satisfactory UL and DL performance for HPUE FDD sub-1GHz bands considering the following potential solutions, using n28 and n8 as the example bands:
    a) Power class fallback for specific bandwidth
    b) Hybrid-duplex operation
        i) 1TX is prioritized.
    c) gNB Scheduling in time/frequency domain
2. Investigate how the network becomes aware of the presence of a solution, and whether UE needs to be configured by NW

NOTE: [The applicability of optional or mandatory for features can be further discussed.]

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Companies are invited to provide comments and responses in the following table.

Feedback Form 18:

1 – CHTTL

We think the listed solutions all need further clarifications, for (a) does it mean that the UE does not support higher power class for specific bandwidth?

for (b) as we commented before further clarification is needed on what is this operation, for (c) we are not sure what needs to be studied?

2 – MediaTek Inc.

To CHTTL:

Regarding (a) solution, higher power class is still supported. Solution (a) is about power-domain solution. When RX MSD value is too high and affects the coverage, PC fallback (or A-MPR) can be used. For UEs close to gNB, PC fallback is not needed.

Regarding (b) solution, there was legacy full-duplex and half-duplex operations in CAT-M1. When RX MSD value is too high and affects the coverage, hybrid-duplex operation can be used. For UEs close to gNB, full duplex is operated.

Regarding (c) solution, gNB scheduling RB resources in time/frequency domain can also mitigate significant MSD issues. Details about time and frequency resource allocation can be studied.

Sub-topic 5-3: Comments and responses on impacted/new specifications and target completion date & time budget

Companies are invited to provide comments and responses in the following table.

Feedback Form 19:

6.2.2 Summary

No consensus was reached for this WI proposal. The moderator suggests to stop discussion on it in this RAN plenary. If needed, the proponent can come back in future RAN meetings.

7 Summary of Recommendations