3GPP TSG-RAN WG2 Meeting#113-e Draft\_R2-201xxxx

Online, 25th Jan. - 5th Feb. 2021

Agenda Item: x.x.x.x

Source: Huawei

Title: [Draft] Summary of email discussion [351] (N)RSRP reference for TA validation for PUR

Document for: Discussion and Decision

# Introduction

In RAN2#112-e, the following CR on the (N)RSRP reference for the first TA validation for PUR was discussed in offline [AT112-e][304].

[R2-2009730](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009730.zip) Clarification on the reference (N)RSRP for the first TA validation for PUR Huawei, HiSilicon CR Rel-16 36.331 16.2.1 4480 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

- QC thinks the added description is clear from the procedure text. Huawei and Ericsson think the clarification is useful for the first TA validation. Ericsson thinks the wording could be improved.

* Postponed
* [AT112-e][304][NBIOT/eMTC R16] Clarification on the reference (N)RSRP for the first TA validation for PUR (Huawei)

Scope: Improve the wording of the change.

Intended outcome: Agreed CR in R2-2010909

Deadline: Tuesday 10th 1200 UTC

* Rapporteur reports there are different understandings and suggests an email discussion.
* QC agrees with this summary and think we should ensure a common understanding.

During the offline discussion, 4 cases were raised for the potential (N)RSRP reference update but there was no consensus on whether (N)RSRP reference should be updated in all the 4 cases. The following email discussion was assigned to further discuss the 4 cases and try to reach a common understanding:

* [Post112-e][351][NBIOT/eMTC R16] (N)RSRP reference for the TA validation for PUR (Huawei)

Scope: To come to common understanding of the different cases

Intended outcome: Report and possibly CR to the next meeting

Deadline: Tuesday Jan 12 1100 UTC

# Discussion

For (N)RSRP based TA validation in PUR, whether TA should be considered as (re-)validated and the (N)RSRP reference should be updated in the following cases was discussed but there was no consensus:

* Case 1: Upon reception of RRC release message including pur-Config(-NB) in RRC\_CONNECTED mode;
* Case 2: Upon reception of RRC release message in response to uplink transmission using PUR;
* Case 3: Upon reception of Timing Advance Command MAC CE;
* Case 4: Upon reception of (N)PDCCH indicates timing advance adjustment as specified in TS 36.212.

For each case, companies are invited to provide comments on whether TA should be considered as (re-)validated and the (N)RSRP reference should be updated. Based on the reply, companies are further invited to comment if anything needs to be clarified in the specification.

**Case 1: Upon reception of RRC release message including pur-Config(-NB) in RRC\_CONNECTED mode**

**Question 1a.** For case 1, do you think TA should be considered as (re-)validated and the (N)RSRP reference updated? If yes, please also indicate whether it depends on the following cases raised in the offline discussion:

* whether it depends on pur-Config explicitly included (need ON)
* whether it depends on what is included in pur-Config. e,g, pur-RSRP-ChangeThreshold-r16 (Need ON) and/or pur-TimeAlignmentTimer-r16 (Need OR)

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | Thanks for the CR and all the discussion during offline in last meeting. Now we agree with QC’s comments mentioned in last meeting, e.g., if RSRP-based TA validation is configured (*pur-RSRP-ChangeThreshold* is set to “setup”), the RSRP reference should be updated by the UE after every TA validation.  According to the current specification, the straightforward understanding (#1) could be that TA validation only means the actions in 5.3.3.19 which is only invoked when UE initiates transmission using PUR. But during the offline discussion, we can see other understanding (#2) that TA validation also means (re)acquiring valid TA or guaranteeing the validity of TA, e.g., TA value validation.  With the following reason, we prefer the #2 understanding:   * If the TA value is (re-)validated but RSRP reference is not updated, we can see the risk of inaccurate TA validation during the future PUR initiation. This may cause incorrect judgement on whether PUR can be initiated. In other words, when the UE performs the actions in 5.3.3.19 when it later initiates transmission using PUR, the stored RSRP reference doesn't correspond to the latest TA value. This would cause the calculated RSRP change cannot reflect the actual change of TA value.   Therefore, we think a high level rule should be that, the RSRP reference value should be updated accordingly when the first time and every subsequent TA value validation (e.g., every time the TA timer (re)starts or the TA value is updated).  Moreover, although *pur-Config* and *pur-RSRP-ChangeThreshold* are “need ON” type IE, because they use the definition of SetupRelease{}, they can still be set to release, which is equivalent to the case that the IE is absent for the IE type of “need OR”.  With the above comments, the explicit description for our thinking on such high level rule can be as following:   * If the *pur-TimeAlignmentTimer* IE is included in *pur-Config(-NB)* and the *pur-TimeAlignmentTimer* is not running and/or if the *pur-RSRP-ChangeThreshold* IE is set to “setup” in *pur-Config(-NB)* and there has no stored (N)RSRP reference, this can be seen as the first time TA value validation and the current serving cell RSRP value should be stored as RSRP reference. * If *pur-TimeAlignmentTimer* is already running, reception of TAC MAC CE (this triggers restart of *pur-TimeAlignmentTimer*) can be seen as another TA value validation and RSRP reference should also be updated. * If the *pur-TimeAlignmentTimer* is already runningand the *pur-TimeAlignmentTimer* IE is included in *pur-Config(-NB),* as this triggers restart of *pur-TimeAlignmentTimer*, this also can be seen as another TA value validation and RSRP reference should also be updated. * If there already has stored (N)RSRP reference and only the *pur-RSRP-ChangeThreshold* IE is set to “setup” in *pur-Config*(-NB), we think this is not TA value validation. Therefore, the stored (N)RSRP reference should be maintained, e.g., not updated. (With reference to relaxed monitoring, the *SrxlevRef* would not be updated when *s-SearchDeltaP* is (re)provided in SIB). * If there already has stored (N)RSRP reference, and the *pur-RSRP-ChangeThreshold* IE is set to “release” in *pur-Config(-NB)*, it can be seen as RSRP-based TA validation is not configured and the RSRP reference can be released, if stored. |
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**Question 1b.** According to your reply to Question 1a, for case 1, is there anything to be clarified in current specification?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | Based on the above comments for Q1a, we think the issue “*it is not specified what is the reference value for the first TA validation*” mentioned in CR [R2-2009730] exists and therefore clarification is needed.  Based on the proposed change in CR[R2-2009730], we have the following example change (highlight yellow texts):   |  | | --- | | ***pur-RSRP-ChangeThreshold***  Indicates the threshold(s) of change in serving cell RSRP in dB for TA validation. Value dB4 corresponds to 4 dB, value dB6 corresponds to 6 dB and so on. When *pur-RSRP-ChangeThreshold* is set to *setup*, if *decreaseThresh* is absent the value of *increaseThresh* is also used for *decreaseThresh*.  If there is no stored RSRP reference, t~~T~~he RSRP of the serving cell at the time the field is received is used as the reference for the first TA validation, see clause 5.3.3.19. | |
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**Case 2: Upon reception of RRC release message in response to uplink transmission using PUR**

**Question 2a.** For case 2, do you think TA should be considered as (re-)validated and the (N)RSRP reference updated?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | - | In this case, if PUR TA timer is not restarted, RSRP reference also doesn’t need to be updated.  But if PUR TA timer is restarted due to some conditions, RSRP reference needs to be updated. |
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**Question 2b.** According to your reply to Question 2a, for case 2, is there anything to be clarified in current specification?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | No |  |
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**Case 3: Upon reception of Timing Advance Command MAC CE**

**Question 3a.** For case 3, do you think TA should be considered as (re-)validated and the (N)RSRP reference updated?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | According to our high level comments for Q1a, upon reception of TAC MAC CE, the TA value can be considered revalidated and therefore the RSRP reference should also be updated to the current serving cell RSRP value (if the *pur-RSRP-ChangeThreshold* is previously set to “setup”).  We think this needs some clarification in MAC spec. |
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**Question 3b.** According to your reply to Question 3a, for case 3, is there anything to be clarified in current specification?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | According to our comments for Q1a and Q3a, we have the following example change:   |  | | --- | | TS 36.3215.4.7.2 Maintenance of PUR Uplink Time Alignment ……  - when a Timing Advance Command MAC control element is received or PDCCH indicates timing advance adjustment as specified in TS 36.212 [5]:  - apply the Timing Advance Command or the timing advance adjustment;  - start or restart the *pur-TimeAlignmentTimer*, if configured.  - MAC entity indicates to upper layers the UE shall set the stored RSRP reference value to the current RSRP value of the serving cell. | |
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**Case 4: Upon reception of (N)PDCCH indicates timing advance adjustment as specified in TS 36.212**

**Question 4a.** For case 4, do you think TA should be considered as (re-)validated and the (N)RSRP reference be updated?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | This case is similar as case 3 in which TA value also can be considered revalidated and therefore the RSRP reference should also be updated. |
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**Question 4b.** According to your reply to Question 4a, for case 4, is there anything to be clarified in current specification?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | Yes | See our comments for Q3b. |
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**Other clarification needed in the specification**

**Question 5** Regarding TA validation and (N)RSRP reference update, apart from the changes commented in above questions for the 4 cases, is there any other change needed in current specification?

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| ***Company name*** | ***Opinion*** | ***Comments*** |
| ZTE | No |  |
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# Conclusion

This offline discussion focused on (N)RSRP based TA validation and (N)RSRP reference update for PUR:

**TBD**

# References

# Contact delegates

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| --- | --- | --- |
| **Delegate** | **Company name** | **Email** |
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