3GPP TSG-RAN WG1 Meeting #114e Tdoc R2-2106534

May 19th - 23rd 2021

Agenda: 8.10.3.3

Source: Ericsson

Title: [AT114-e][104][NTN] CHO aspects and service continuity (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This is continuation of the offline 104 with below instructions

* [AT114-e][104][NTN] CHO aspects and service continuity (Ericsson)

Initial scope: Discuss the proposals from [R2-2106489](file:///C:\Data\3GPP\Extracts\R2-2106489%20%20%5bPre114-e%5d%5b104%5d%5bNTN%5d%20Summary%208.10.3.3%20-%20CHO%20and%20service%20continuity%20(Ericsson).docx)

Initial intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Friday 2021-05-21 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106526](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106526.zip)): Friday 2021-05-21 14:00 UTC

Final scope: Continue the discussion on p5 (to see whether the proposal to consider a time range can be agreed), p9, p10 and p12

Final intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2106534): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in R2-2106534 not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

[R2-2106526](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106526.zip) [Offline 104] CHO aspects and service continuity Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

# 2 List of agreements and proposals

Agreements made in RAN2#114 so far

Agreements via email (from offline 104):

1. Support CHO location trigger as the distance between UE and a reference location which may be configured as the serving cell reference location or the candidate target cell reference location. FFS if combination can be allowed.
2. The reference location for the event description is defined as cell center.

Agreements online:

1. For CHO, joint configuration of location and RSRP as well as time and RSRP triggers are supported.
2. For idle mode reselection, based on configuration NTN UE can prioritise TN over NTN. Configuration details FFS

Proposal Conc5 The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available and when candidate target cell stops serving the area (FFS time range, two timers)

- Oppo suggests to reword as: "The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available."

- Nokia thinks this does not move us forward, but instead we take several steps backwards, compared to what was already agreed at RAN2#113bis. With this Proposal we again have all options on the table (or even all options already supported and the time-based trigger becomes super complex, requiring at least three timers?). Why can’t we try to keep it simple?

- LGE thinks we should say it is "FFS whether the CHO configuration includes timing information when the candidate cell stops serving the area"

* Continue online

Note: R2#113bis-e agreement: "Timing information in CHO execution triggering for NTN describes the time after which the UE is allowed to execute CHO to the candidate target cell"

- VC wonders if we can extend the R2#113bis-e agreement saying that the "Timing information in CHO execution triggering for NTN describes the time range ~~after~~ during which the UE is allowed to execute CHO to the candidate target cell".

- Apple/Nokia support the time range proposal and we can link this to entry or leave conditions

- Ericsson thinks the end time in this case would have two meanings.

* Continue offline to see whether the proposal to consider a time range can be agreed

Proposal Conc10 RAN2 does not discuss further support of joint time and location trigger

- CATT disagrees as location based would be applicable for UE-moving switch and time based for satellite moving switch.

- Samsung disagrees

* Continue online
* Continue the discussion offline

Proposal Conc12 No limitations are specified for NTN-TN mobility thus same trigger conditions can be used within NTN and NTN-TN mobility. FFS for enhancements.

- Xiaomi thinks it is not clear whether “NTN-TN” means “from NTN to TN (hand-in)”or “from NTN to TN (hand-in) and from TN to NTN (hand-out)”.

* Continue offline

Proposal Conc9 RAN2 to discuss whether RAN2 declines the options that the network configures location or time CHO trigger without measurement trigger

* Continue offline

### 2.1 CHO time trigger definition

Related agreement from RAN2#113bis:

Agreements:

1. Timing information in CHO execution triggering for NTN describes the time after which the UE is allowed to execute CHO to the candidate target cell.

2. Working assumption: the timing information for CHO execution triggering in NTN is defined in the form of a timer/timers. This can be revised and a solution based on UTC/system frame number can be considered if problems are found (e.g. if the timer lacks accuracy due to RTT in NTN).

Discussion from RAN2#114

Proposal Conc5 The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available and when candidate target cell stops serving the area (FFS time range, two timers)

- Oppo suggests to reword as: "The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available."

- Nokia thinks this does not move us forward, but instead we take several steps backwards, compared to what was already agreed at RAN2#113bis. With this Proposal we again have all options on the table (or even all options already supported and the time-based trigger becomes super complex, requiring at least three timers?). Why can’t we try to keep it simple?

- LGE thinks we should say it is "FFS whether the CHO configuration includes timing information when the candidate cell stops serving the area"

* Continue online

Note: R2#113bis-e agreement: "Timing information in CHO execution triggering for NTN describes the time after which the UE is allowed to execute CHO to the candidate target cell"

- VC wonders if we can extend the R2#113bis-e agreement saying that the "Timing information in CHO execution triggering for NTN describes the time range ~~after~~ during which the UE is allowed to execute CHO to the candidate target cell".

- Apple/Nokia support the time range proposal and we can link this to entry or leave conditions

- Ericsson thinks the end time in this case would have two meanings.

* Continue offline to see whether the proposal to consider a time range can be agreed

Discussion in the online was about the definition of the second end of the “range”. It is possible to define it as the time when UE latest needs to perform the handover. As use case this means that the time is then related to time left to be served in serving cell in a feeder link switch scenario. Another possible definition is that it marks the time after which the CHO command for that candidate target cell is no longer valid. That is, it would be the time when the candidate target cell remains available. As this offline is one shot attempt to make an email agreement and there was last round more support to have this time related to the end time of serving cell, this definition is attempted to be agreed.

1. RAN2 to agree that CHO includes timing information when UE latest needs to perform CHO. Note this is in addition to already agreed information on when a candidate target cell becomes available.

**Question 1 Please comment here only if Proposal 1 cannot be agreed in your view.**

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| --- | --- | --- |
| **Company** | **Operation** | **UE information** |
| Huawei, HiSilicon | P1 is not exactly the same as Proposal Conc5. Do we need to discuss Proposal Conc5 instead?  We think the time when candidate target cell stops serving the area is not equal to the time when UE latest needs to perform CHO. It is just the end time of candidate cell, i.e. it provides the time information when the candidate target cell remains available. In our view, when multiple candidate cells fulfil the CHO trigger, UE may select the candidate target cell with the longest remaining serving time. | For Proposal Conc5, it’s not reasonable to provide all these time information in CHO configuration, as it needs network to know UE location. And considering the moving cell case, there is also transmission delay for UE location report. We think all these time information should be calculated in UE side, and network only provide assistance information. So we suggest to modify the wording of P5 as “~~The CHO configuration includes~~ time left to be served in serving cell as well as information when candidate target cell becomes available and when candidate target cell stops serving the area (FFS time range, two timers) are considered as CHO triggers” |
| Nokia | We do not think it needs to be debated whether the timer(s) are related to source cell coverage, etc. CHO is a connected mode procedure, where the UE may be given by the NW (source cell) a time window [t1, t2]. t1 (already agreed last meeting) denotes the time after which the candidate target becomes available (provided other conditions – RSRP/RSRQ – are met or should be met during that window. This can remain FFS). t2 denotes the end of the window, within which the UE should execute the CHO to that candidate cell. The UE shall not assume anything about the source cell’s coverage, e.g. whether it could be available after the expiry of t2. The UE can be given multiple CHO configurations for different CHO candidates, each equipped with such [t1, t2] window. |  |
| Thales | Such timing information probably corresponds to the time when the source cell will no longer be available | What about the following wording “**RAN2 to agree that CHO includes timing information when at latest UE ~~latest~~ needs to perform CHO.** ” |
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### 2.2 Joint configurations

Proposal Conc10 RAN2 does not discuss further support of joint time and location trigger

- CATT disagrees as location based would be applicable for UE-moving switch and time based for satellite moving switch.

- Samsung disagrees

* Continue online
* Continue the discussion offline

Proposal Conc9 RAN2 to discuss whether RAN2 declines the options that the network configures location or time CHO trigger without measurement trigger

* Continue offline

Both of the above are basically about whether there is a specified network restriction to not allow certain events to be configured for same candidate target cell, or to specify a network restriction to mandate certain combination to be configured. Thus far the discussion has been about whether companies see a certain combination or induvial operation as useful or not. As it is quite hard to predict how the real deployment works and what will be feasible in certain situations, it is better to allow flexibility unless it comes with disadvantageous tradeoff like specification complexity, UE implementation issue etc. Here neither of these seem to be the case and allowing an option in the specification does not seem cause issues for deployments where only certain combinations are predicted to be used. Thus, it is proposed that RAN2 does not specify network restrictions on joint of individual configuration of CHO events.

1. RAN2 does not specify network restrictions on joint of individual configuration of CHO events.

**Question 2 Please comment here only if Proposal 2 cannot be agreed in your view.**

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| --- | --- | --- |
| **Company** | **Operation** | **UE information** |
| Nokia | The full configuration flexibility is not always a desired outcome. Please beware that each of such combinations would have to be tested and corresponding requirements would have to be developed by RAN4/RAN5 colleagues. Thus, unless there is a good use case and credible justification, we should limit the number of supported combinations. We do not think a combination of time and location is needed, as whether the UE has moved significantly can be also derived from RSRP/RSRQ measurements, used in combination with either time or location. |  |
| Thales | Probably no need to support all combination of triggers simultaneously.  So 2 options should be sufficient for Rel-17: RSRP & time based or RSRP & location based |  |
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Proposal Conc12 No limitations are specified for NTN-TN mobility thus same trigger conditions can be used within NTN and NTN-TN mobility. FFS for enhancements.

- Xiaomi thinks it is not clear whether “NTN-TN” means “from NTN to TN (hand-in)”or “from NTN to TN (hand-in) and from TN to NTN (hand-out)”.

* Continue offline

Here, the confusion was possibly only on the meaning of NTN-TN. Thus, clarified proposal is attempted to be agreed.

1. Same CHO trigger conditions and RRM events can be used within NTN and NTN-TN mobility provided these are supported by the UE. NTN-TN means both “from NTN to TN (hand-in)”or “from NTN to TN (hand-in) and from TN to NTN (hand-out). FFS for enhancements.

**Question 3 Please comment here only if Proposal 3 cannot be agreed in your view.**

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| --- | --- | --- |
| **Company** | **option** | **comment** |
| Nokia | We just want to underline that with P3 we decide that e.g. location- or timing-based events will be used for the NTN->TN mobility and as a consequence e.g. the TN cell would have to also provide a reference location, etc.  It may be OK to agree P3, with the FFS in the end which indicates the details of each HO scenario would have to be studied (hopefully the time in Rel-17 allows) before making any related specification changes. |  |
| Thales | Agree provided that the following trigger combinations are possible:  RSRP  RSRP & time  RSRP & location | Hand-out: Trigger is probably TN serving cell’s RSRP below threshold and no available TN’s neighbouring cells corresponding to TN not available anymore  Hand-in: It can benefit from a combined Trigger based on RSRP & location |
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