3GPP TSG-RAN WG2 #122 R2-23xxxxx

Incheon, South Korea, May 22nd – 26th 2023

Agenda Item: 7.13.5

Source: Ericsson

Title: Summary of AI 7.13.5 SON for NR-U (Ericsson)

Document for: Discussion, Decision

#  Introduction

This document provides the summary of all the contributions submitted to 7.13.5 agenda item (SON for NR-U) of RAN2#122 meeting:

* [R2-2305424](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305424.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305424.zip), Nokia, Nokia Shanghai Bell
* [R2-2305485](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305485.zip), [SON Enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305485.zip), CATT
* [R2-2305658](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305658.zip), [SON/MDT enhancements for NR-U](https://ericsson.sharepoint.com/R2-2305658.zip), Samsung R&D Institute India
* [R2-2305706](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305706.zip), [Discussion on MRO for NR-U](https://ericsson.sharepoint.com/R2-2305706.zip), Lenovo
* [R2-2305728](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305728.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305728.zip), Xiaomi
* [R2-2305777](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305777.zip), [SONMDT enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305777.zip), CMCC
* [R2-2306043](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306043.zip), [Discussion on NR-U Related Enhancements](https://ericsson.sharepoint.com/R2-2306043.zip), Qualcomm Incorporated
* [R2-2306101](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306101.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2306101.zip), Huawei, HiSilicon
* [R2-2306247](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306247.zip), [Consideration on NR-U related SON](https://ericsson.sharepoint.com/R2-2306247.zip), ZTE Corporation, Sanechips
* [R2-2306450](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306450.zip), [Enhancements of SON reports for NR-U](https://ericsson.sharepoint.com/R2-2306450.zip), Ericsson

Rapporteur notes that many of the issues addressed in the above contributions were already discussed and captured in the RAN2#121-bis email discussion (R2-2306452).

Hence, in this summary, for each of the above contributions, Rapporteur analyses whether there is any new proposal/issue not discussed in R2-2306452. The new proposal/issues will be captured in a revised R2-2306452.

#  Discussion

## 2.1 [R2-2305424](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305424.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305424.zip), Nokia, Nokia Shanghai Bell

**Proposal 1.1: A RA should be considered as attempted only if the PHY layer actually transmitted the preamble.**

**Proposal 1.2: LBT failure information is not needed in the RA-report.**

**Proposal 1.3: RAN2 should not focus RA optimization issues when the NR-U related objective of this work item is discussed.**

**Rapporteur analysis**: The above proposals P1.1, P1.2, P1.3 are already captured under the issue in R2-2306452.

**Proposal 2.1: LBT is not impacting PRACH power setting and therefore no further information is needed to be reported for this purpose.**

**Rapporteur analysis**: The above proposals P2.1 is under discussion in the issue#2 in R2-2306452. Rapporteur also would like to highlight that the scenario for the UE power ramping depicted in Figure 1 in this contribution does not create any problem, i.e. the problematic scenario is the one captured in the email discussion R2-2306452 above Q2.

**Proposal 3: Extend RLF-report with waiting/deferral time due to LBT of signalling and access messages involved in the handover process.**

**Rapporteur analysis**: The above proposals P3 is already captured for discussion in R2-2306452 Q10.

**Proposal 4.1: Introduce a new configuration index parameter that is provided by the network with the configuration. The UE stores the configuration index and provides it within the RLF reports.**

**Proposal 4.2: Add an optional, 32-bit configuration index in the *RRCReconfiguration* message and in the RLF Report. The UE shall store only the most recently received configuration index for the RLF Report.**

**Proposal 4.3: RAN2 sends a reply LS to RAN3 to inform them about the introduction of the configuration index. (See draft LS proposal in Annex.)**

**Rapporteur analysis**: The above proposals P4.1, P4.2, P4.3 are already captured as part of issue of issue#13 in R2-2306452, and can be discussed as part of P19 discussion.
As highlighted in R2-2306452, Rapporteur would like to emphasize again that in the RAN3 LS, it is claimed that when the UE context or the configuration is still available in the network, then “there is an existing network-based mechanism that can be reused for the NR-U case, based on the information provided from the UE (last serving PCell ID and C-RNTI), that enables the RAN to retrieve the UE context or the configuration used for the UE….”.
Then, as per the RAN3 LS, there is no problem for the network to retrieve the UE context when that is still available on the network. The proposals above instead just provide a new method for the network for fetching the UE context, but RAN3 clearly states that existing methods (e.g. based on the C-RNTI or PCell ID) can be reused. RAN3 shows problems only for the case in which the UE context is not available anymore in the network, e.g. long time after RLF, but the proposals above does not solve this issue.

## 2.2 [R2-2305485](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305485.zip), [SON Enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305485.zip), CATT

Proposal 1: The number of LBT failure in RA report includes the number of failed RA preamble transmission due to LBT failure.

**Proposal 2: The threshold based method is applied to define the number of LBT failure in RA report, the details could be discussed in stage 3.**

**Rapporteur analysis**: The above proposals P1, P2 are dependent on the outcome of issue#1 and issue#2 in R2-2306452.

Proposal 3: RAN2 to discuss whether to consider the number of LBT failure in RA report for PUSCH transmission in MSGA.

**Rapporteur analysis**: The above proposals P3 is already captured under issue#5 in R2-2306452.

Proposal 4: Log the number of LBT failures per RA procedure.

**Proposal 5: For RA report, UE could give an indication on whether an unsuccessful RA attempt due to LBT is happened before SSB switching in order to make network understand the power ramping procedure.**

**Rapporteur analysis**: The above proposals P4 and P5 are already captured under issue#2 (P2) in R2-2306452.

Proposal 6: Report BWP information where consistent LBT failure happens in RA report.

**Rapporteur analysis**: The above proposals P6 is already captured under issue#4 (P4) in R2-2306452.

Proposal 7: RAN2 study what/how to report for detected energy and EDT to reduce signalling overhead.

**Rapporteur analysis**: The above proposals P6 is already captured under issue#11 and issue#12 in R2-2306452. According to rapporteur´s understanding the intention of the following text “That means the UE will compare the detected power and EDT to check whether the detected power is less that EDT.” is to enable the UE to indicate whether the detected power was higher than the configured EDT. Since this would be a mean to reduce the signalling overhead a new proposal for discussion is included in the revised R2-2306452 (see the new P18).

**Proposal 8: Triggering condition for SHR reporting consistent LBT failure information can be: the number of LBT failure in RA procedure is larger than a threshold during a duration when UE receives the HO command to the time of HO is successful.**

**Proposal 9: The content in SHR for LBT failure can follow the content in RA-InformationCommon for LBT failure.**

**Rapporteur analysis**: The above proposals P8/P9 is already captured under issue#14 and issue#15 in R2-2306452.

**Proposal 10: RAN2 to further study what to be included in RLF report to reflect the RLF which is caused by consistent LBT failure indirectly.**

**Rapporteur analysis**: The above proposals P10 is already captured under issue#7 (P11.a) in R2-2306452, i.e. the UE logs LBT-related information in the RA-Information if at the moment of RLF, there were consistent UL LBT failures triggered.

## 2.3 [R2-2305658](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305658.zip), [SON/MDT enhancements for NR-U](https://ericsson.sharepoint.com/R2-2305658.zip), Samsung R&D Institute India

**Proposal 1: For the multiple successive RA procedures failed due to LBT issue UE logs the following information in RA report.**

1. **Either BWP id or absoluteFrequencyPointA-r16/locationAndBandwidth.**
2. **Whether the LBT failures are for PRACH resources or PUSCH resources of MSG-A for 2 step RACH.**
3. **Whether the LBT failures are for MSG1 or MSG3 of 4 step RACH.**

**Rapporteur analysis**: The above proposals P8/P9 is already captured under issue#14 and issue#15 in R2-2306452.

**Proposal 2: UE includes LBT\_RAInformationCommon containing information of the multiple successive RA procedures failed due to LBT issue in the RA Report for the successful RA procedure in the BWP.**

**Proposal 3: UE logs the total number of LBT failures during RA procedure.**

**Proposal 4: UE counts the RA attempt when it actually transmits the preamble.**

**Rapporteur analysis**: The above proposals P2/P3/P4 are already captured under issue#1 and issue#2 in R2-2306452.

**Proposal 5: RAN2 to discuss additional info in RLF report when the reported RLF cause is not consistent UL LBT failurs, but UL LBT failures have an impact on RLF.**

**Rapporteur analysis**: The above proposals P5 is already captured under issue#7 (P11) in R2-2306452.

**Proposal 6: Introduce RSSI measurements in the RLF report.**

**Rapporteur analysis**: The above proposals P6 is already captured under issue#9/10 in R2-2306452.

**Proposal 7: Existing SHR configuration and threhsolds are reused for NR-U.**

**Rapporteur analysis**: The above proposals P7 is already captured under issue#14 in R2-2306452.

**Proposal 8: UE logs LBT related information of the cell (source/target) which provided the configuration of the satisfied condition in SHR.**

**Rapporteur analysis**: The above proposals P8 should be included as part of the issue#15 discussion. In particular, Rapporteur believes that it should be clarified what are the information that should be included related to the target cell, and related to the source cell (if any). To this end, Rapporteur has clarified that the existing P21 proposal (for which there was large consensus) just applies to the target cell. Whereas, for the source cell, Rapporteur believes that first RAN2 should discuss if there are any LBT information related to the source cell that should be capture in the SHR. For this, a new P23 is included for further discussion.

## 2.4 [R2-2305706](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305706.zip), [Discussion on MRO for NR-U](https://ericsson.sharepoint.com/R2-2305706.zip), Lenovo

Proposal 1: Include measured RSSI and an explicit indication concerning handover failure due to consistent LBT failure in the RLF report.

**Rapporteur analysis**: The above proposals P1 is already captured under issue#9/10 in R2-2306452. Related to the second part of this proposal, Rapporteur highlights that today the HO failure can only be due to T304 expiry, i.e. consistent LBT failure during the HO cannot trigger HOF. See below:

2> upon consistent uplink LBT failure indication from MCG MAC while T304 is not running:

…….

4> consider radio link failure to be detected for the MCG, i.e. MCG RLF;

…..

**Proposal 2: The number of preamble transmissions blocked due to LBT failure per RACH attempt for the last BWP of the last RA procedure can be included in the RLF report.**

**Rapporteur analysis**: The above proposals P2 is already captured under issue#6 (P8) in R2-2306452.

**Proposal 3: The number of LBT failures per other BWPs (i.e. except the last BWP) in which consistent LBT failure happens of the last RA procedure can be included in the RLF report.**

**Rapporteur analysis**: The above proposals P3 is already captured under issue#6 (P9) in R2-2306452.

**Proposal 4: Time information during handover procedure, e.g. time duration for UL LBT before per RACH attempt and the time elapsed since the last HO execution until successful LBT, can be included in the RLF report.**

**Rapporteur analysis**: The above proposals P4 is already captured under issue#8 (P12) in R2-2306452.

**Proposal 5: The number of preamble transmissions blocked due to LBT failure per RACH attempt for the last BWP of the last RA procedure can be included in the RA report.**

**Proposal 6: The number of LBT failures per other BWPs (i.e. except the last BWP) in which consistent LBT failure happens of the last RA procedure can be included in the RA report.**

**Rapporteur analysis**: The above proposals P5/P6 is already captured under issue#1/2 in R2-2306452.

**Proposal 7: Time duration for UL LBT before per RACH attempt can be included in the RA report.**

**Rapporteur analysis**: The above proposals P7 is already captured under issue#8 (P12) in R2-2306452.

**Proposal 8: Consistent LBT failures in at least one UL BWP on the source cell and/or target cell can be considered as a triggering condition for generating a SHR in NR-U.**

**Rapporteur analysis**: The above proposals P8 is already captured under issue#14 (P20) in R2-2306452.

**Proposal 9: The identifier of the UL BWP where consistent LBT failure occurs can be included in the SHR.**

**Proposal 10: Number of LBT failures, and time information during handover procedure e.g. time duration for UL LBT before per RACH attempt and the time elapsed since the last HO execution until successful LBT can be included in the SHR.**

**Rapporteur analysis**: The above proposals P8 is already captured under issue#15 (P20/P22) in R2-2306452.

## 2.5 [R2-2305728](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305728.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305728.zip), Xiaomi

1. Only preamble transmission with LBT success is considered as a RA attempt.
2. numberOfPreamblesSentOnSSB and numberOfPreamblesSentOnCSI-RS includes all the preamble attempts regardless whether the LBT is successful or not.
3. The number of LBT failures can be implicitly known by the size of the PerRAAttemptInfoList and number of preambles sent on SSB/CSI-RS.

**Rapporteur analysis:** The above proposals P1/P2/P3 are already captured under issue#1/2 in R2-2306452.

1. RAN2 agrees to record the RA procedure where the first consistant LBT failure occurs, as well as the follow up RA procedures triggered by consistant LBT failure.

**Rapporteur analysis:** The above proposals P4 is already captured under issue#4 (P6) in R2-2306452.

1. RAN2 agrees to record at least the BWP information (e.g. pointA, location and bandwidth) of the RA procedures related to consistant LBT failures.

**Rapporteur analysis:** The above proposals P5 is already captured under issue#4 (P4) in R2-2306452.

1. RAN2 agrees to not report the EDT set by UE, but only the RSSI.

**Rapporteur analysis:** The above proposals P6 is already captured under issue#11/12 in R2-2306452.

1. UE indicates whether MsgA payload transmission is failed due to LBT or not if fallback to 4-step RA occur.

**Rapporteur analysis:** The above proposals P7 is already captured under issue#5 in R2-2306452.

## 2.6 [R2-2305777](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305777.zip), [SONMDT enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305777.zip), CMCC

**Proposal 1: An RA attempt is only logged in “per RA attempt info list” when the PHY layer actually transmitted the preamble.**

**Rapporteur analysis:** The above proposals P1 is already captured under issue#1 in R2-2306452.

**Proposal 2: At least include absoluteFrequencyPointA-r16 and locationAndBandwidth-r16 to log the BWP information for multiple RA procedures related to consistence LBT failure.**

**Rapporteur analysis:** The above proposals P2 is already captured under issue#4 in R2-2306452.

**Proposal 3: Log latest measured RSSI and applied EDT in RLF report.**

**Rapporteur analysis:** The above proposals P3 is already captured under issue#9/10/12 in R2-2306452.

**Proposal 4: Introduce a new counter to log the number of LBT failure regardless whether *lbt\_FailureRecoveryConfig* is configured or not.**

**Proposal 5: Log the total number of LBT failures per RA procedure.**

**Rapporteur analysis:** The above proposals P4/P5 is already captured under issue#2 in R2-2306452.

**Proposal 6: Study the LBT failure have impacts on the RA failure or RLF case.**

**Rapporteur analysis:** The above proposals P6 is already captured under various issues in R2-2306452, e.g. issue#7.

## 2.7 [R2-2306043](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306043.zip), [Discussion on NR-U Related Enhancements](https://ericsson.sharepoint.com/R2-2306043.zip), Qualcomm Incorporated

**Proposal 1: UE provides the BWP information (I.e., locationAndBandwidth and subcarrierSpacing information) for previously failed RA procedures (when multiple consistent LBT failures happen).**

**Proposal 2: RAN2 should discuss Proposal 2 and Proposal 5 in the email summary TDOC** [**R2-2304200**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_121bis-e/Inbox/R2-2304200.zip) **together.**

**Proposal 3: RAN2 should first discuss whether the LBT failure-related counter should only be reported for the last BWP or all previous BWPs.**

**Rapporteur analysis:** The above proposals P1/3 are already captured under issue#4 in R2-2306452.

**Proposal 4: If the number of LBT failures experienced in each BWP during RA is reported, then to represent the preamble transmission attempts blocked by LBT, introduce a field that counts the number of preamble transmissions blocked by LBT per RA procedure.**

**Proposal 5: RAN2 should further discuss the objective of reporting a flag indicating transmission failures experienced right before beam switching.**

**Rapporteur analysis:** The above proposals P4/5 are already captured under issue#2 in R2-2306452.

**Proposal 6: The RSSI and EDT are not reported in the RA report.**

**Proposal 7: For SON/MDT reports, UE should not retrieve measurement information from the physical layer.**

**Rapporteur analysis:** The above proposals P6/7 are already captured under issue#9/10/11/12 in R2-2306452.

## 2.8 [R2-2306101](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306101.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2306101.zip), Huawei, HiSilicon

**Proposal 1: In the RA report, the UE should indicate that whether there are preamble transmission failures right before beam switching.**

**Rapporteur analysis:** The above proposals P1 is already captured under issue#2 in R2-2306452.

**Proposal 2: The UE should log the number of LBT failures experienced in each BWP during RA procedure.**

**Rapporteur analysis:** The above proposals P1 is already captured under issue#2/4 in R2-2306452.

**Proposal 3: In the RA report, there is no need to log the BWP information of the BWP in which the UE was operating when the first consistent UL LBT failure is detected.**

**Rapporteur analysis:** The above proposals P3 is already captured under issue#4 in R2-2306452.

**Proposal 4: RAN2 not to introduce extra a~d information in the RA report.**

**Rapporteur analysis:** The above proposals P4 is already captured under issue#5 in R2-2306452.

**Proposal 5: In the RLF report, the UE shall log the BWP information of the BWP in which the UE was operating when the first consistent UL LBT failure is detected.**

**Rapporteur analysis:** The above proposals P5 is already captured under issue#6 (P9) in R2-2306452.

**Proposal 6: RAN2 to include the average sensing time due to LBT during the HO before the HOF and time elapsed since the last HO execution until successful LBT into RLF report.**

**Rapporteur analysis:** The above proposals P6 is already captured under issue#8 (P12) in R2-2306452. However in P12.b, it was not clear what was the “Waiting/deferral time due to LBT”. It is now clarified in the revised R2-2306452, that this is the “average Waiting/deferral time due to LBT”.

 **Proposal 7: The UE should log the RSSI measurement results in the RLF report when the RLF cause is set to lbt-failure.**

**Proposal 8: The UE should log the average detected power in the RLF report.**

**Proposal 9: The UE should log the average applied EDT value in the RLF report.**

**Rapporteur analysis:** The above proposals P7/P8/P9/ are already captured under issue#9/10/11/12 in R2-2306452.

 **Proposal 10: The UE should log the lbt-FailureRecoveryConfig in the RLF report.**

**Rapporteur analysis:** The above proposals P10 are already captured under issue#13 in R2-2306452.

**Proposal 11: Whether the number of UL LBT failures during HO exceeds a certain threshold should be regarded as an SHR trigger.**

**Proposal 12: The SHR should be triggered if consistent LBT failure happens in either the target cell or the source cell.**

**Rapporteur analysis:** The above proposals P11/12 are already captured under issue#14 in R2-2306452.

 **Proposal 13: The SHR should include the number of LBT failures, the average sensing time due to LBT during the HO and time elapsed since the last HO execution until successful LBT**

**Rapporteur analysis:** The above proposals P13 is already captured under issue#15 (P22) in R2-2306452. However in P22, this option was not explicitly included, hence that is now included in the revised R2-2306452.

## 2.9 [R2-2306247](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306247.zip), [Consideration on NR-U related SON](https://ericsson.sharepoint.com/R2-2306247.zip) ZTE Corporation, Sanechips

**Proposal 1: For RLF triggered due to consistent LBT failure, UE includes in RLF-report the last failed RA procedure related information and selective information for multiple successive RA procedures failed due to LBT issues.**

**Proposal 2: For multiple successive RA procedures failed due to LBT issue, UE includes the attempted RA resource configuration together with corresponding BWP information in RA report (for successful LBT failure recovery) or in RLF report (when RLF triggered due to consistent LBT failure)**

**Proposal 3: RAN2 further studies how to save signalling overhead used to store the attempted RA resource configuration and corresponding BWP information of multiple successive RA procedures due to LBT issues.**

**Proposal 4: UE includes perRAAttemptInfo only when preamble is actually transmitted in lower layer.**

**Proposal 5: Include the the number of LBT failures received per consecutive attempts in the same beam in RA report.**

**Rapporteur analysis:** The above proposals P1/P2/P3/P4/P5 is already captured under issue#1/2/4 in R2-2306452. Related to P2, it is not clear from the proposal which are the “attempted RA resource configuration” that should be included. Rapporteur suggests further discussing it during the online session.

 **Proposal 6: Include in RLF-report the latest RSSI measurements if available when RLF happens and rlf-cause is set to lbt-failure or when HOF happens and at least one consistent lbt-failure is detected.**

**Rapporteur analysis:** The above proposals P6 is already captured under issue#9/10 in R2-2306452.

**Proposal 7: No need to introduce explicit indication in RLF-report that the indication that handover failure occurred due to consistent LBT failures.**

**Rapporteur analysis:** Rapporteur highlights that today the HO failure can only be due to T304 expiry, i.e. consistent LBT failure during the HO cannot trigger HOF. See below:

2> upon consistent uplink LBT failure indication from MCG MAC while T304 is not running:

…….

4> consider radio link failure to be detected for the MCG, i.e. MCG RLF;

Hence, Rapporteur believes that we do not need to even discuss it.

## 2.10 [R2-2306450](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306450.zip), [Enhancements of SON reports for NR-U](https://ericsson.sharepoint.com/R2-2306450.zip) Ericsson

[Proposal 1 In case the UE experiences consistent LBT failures in multiple BWPs of the PCell prior the RLF/HOF, the UE logs in the RLF the entire RA-InformationCommon associated to the random access attempts performed in the last BWP, and some limited information for the other BWPs in which the UE experienced consistent LBT failures prior the RLF/HOF.](#_Toc134778890)

[Proposal 2 For each BWP in which the UE experienced the consistent LBT failure, the UE includes in the RA-InformationCommon at least the locationAndBandwidth, and the subcarrierSpacing of the BWP.](#_Toc134778891)

**Rapporteur analysis:** The above proposals P1/P2 is already captured under issue#3/4 in R2-2306452.

[Proposal 3 The UE includes in the RA-Report the BWP information (proposed in Proposal 2) associated to the first BWP in which the UE was operating when it first experienced the consistent LBT failures.](#_Toc134778892)

**Rapporteur analysis:** The above proposals P3 is already captured under issue#4 (P6) in R2-2306452.

[Proposal 4 The various BWPs in which the UE experienced the consistent LBT failures prior the RLF/HOF/successful RA, are logged in the RA-InformationCommon in chronological order.](#_Toc134778893)

[Proposal 5 Only the preamble transmission attempts for which LBT was successful are included in the “per RA attempt info list” for a given beam of the last BWP in which the UE performed random access.](#_Toc134778894)

[Proposal 6 For the last successful random access attempt included in the “per RA attempt info list” before the beam switch, the UE includes a flag indicating whether any random access attempt was blocked by LBT after this successful preamble transmission.](#_Toc134778895)

[Proposal 7 For the logging of the number of LBT failures for the last BWP, RAN2 selects one of the two following options:](#_Toc134778896)

[a. The number of preamble transmissions blocked by LBT are represented by a parameter that counts the overall number of preamble transmissions blocked by LBT per RA procedure](#_Toc134778897)

[b. The UE indicates for each successful attempt included in the “per RA info list”, the number of subsequent LBT failures that occurred before this successful attempt](#_Toc134778898)

**Rapporteur analysis:** The above proposals P4/P5/P6 is already captured under issue#1/2 in R2-2306452.

[Proposal 8 For each BWP of the PCell, except the last BWP, in which the UE experienced consistent LBT failures, the UE logs the number of LBT failures experienced in the BWP during the RA procedure.](#_Toc134778899)

**Rapporteur analysis:** The above proposals P4/P5/P6 is already captured under issue#4(P5) in R2-2306452.

[Proposal 9 RAN2 includes some information per RA procedure to aid the network to properly configure the energy detection configuration.](#_Toc134778900)

[Proposal 10 The UE includes the following information per RA procedure:](#_Toc134778901)

[a. The UE includes the average detected power per RA procedure](#_Toc134778902)

[b. The average applied EDT value per RA procedure.](#_Toc134778903)

[Proposal 11 If Proposal 10 is not agreeable, the UE indicates whether the average detected power per RA procedure was higher than the configured maximum ED threshold (maxEnergyDetectionThreshold).](#_Toc134778904)

[Proposal 12 The UE includes in the RA procedure information on the configured maximum ED threshold (maxEnergyDetectionThreshold).](#_Toc134778905)

**Rapporteur analysis:** The above proposals P9/P10/P11 is already captured under issue#11/12 in R2-2306452. In particular P11, is captured now in P18 as a possible compromise.

[Proposal 13 The UE includes in the RLF-Report, for the case of RLF, the latest measured RSSI as part of the measurement results of the NR-U channel of the last serving cell, if the UE is configured with measRSSI-ReportConfig for the associated frequency.](#_Toc134778906)

[Proposal 14 The UE includes in the RLF-Report, for the case of HOF, the latest measured RSSI of the NR-U channel of the source cell, and the latest measured RSSI of the NR-U channel of the target cell, if the UE is configured with measRSSI-ReportConfig for the associated frequency.](#_Toc134778907)

**Rapporteur analysis:** The above proposals P13/P14 is already captured under issue#9/10 in R2-2306452.

[Proposal 15 In case of HOF, the UE includes the RA-InformationCommon in the RLF-Report (as in legacy) which will include NR-U related information as proposed in previous proposals.](#_Toc134778908)

**Rapporteur analysis:** The above proposals P15 is already captured under issue#6 in R2-2306452.

[Proposal 16 At the moment of RLF, if the UE had consistent UL LBT failures triggered in one or more BWPs at MAC layer, the RLF-Report includes the RA-InformationCommon in the RLF-Report for the random-access procedures that were initiated in one or more BWPs before the RLF.](#_Toc134778909)

**Rapporteur analysis:** The above proposals P17 is already captured under issue#7 in R2-2306452.

[Proposal 17 The UE includes in the RLF-Report the locationAndBandwidth, and the subcarrierSpacing of the BWP, in which the UE experienced the first consistent UL LBT failure.](#_Toc134778910)

**Rapporteur analysis:** The above proposals P18 is already captured under issue#6 (P9) in R2-2306452.

[Proposal 18 The UE indicates in the RLF-Report whether the UE detected unavailable SMTC occasions while T304/T310/T312 was running right before the RLF/HOF.](#_Toc134778911)

[Proposal 19 If Proposal 18 cannot be agreed, RAN2 to send an LS to RAN4, asking if the UE is capable to detect unavailability of the SMTC occasions during HO to a target NR-U cell, and while connected to a NR-U cell (LS available in the Annex).](#_Toc134778912)

**Rapporteur analysis:** The above proposals P18/P19 is already captured under issue#8 (P12) in R2-2306452.

[Proposal 20 UE logs the lbt-FailureRecoveryConfig in the RLF-Report, only in case of re-establishment procedure failure (i.e., when UE performs transition to RRC\_IDLE state).](#_Toc134778913)

**Rapporteur analysis:** The above proposals P20 is already captured under issue#13 in R2-2306452.

[Proposal 21 Introduce “the number of UL LBT failure prior to successfully completion of the HO” as a new SHR triggering conditions for NR-U.](#_Toc134778914)

[Proposal 22 SHR includes information associated to the random access procedure performed at HO, similar to RA- and RLF-Report, i.e. the number of UL LBT failures during HO (depending on the outcome of Proposal 7), and the information on the multiple BWPs in which consistent UL LBT failures was triggered (as per Proposal 2) prior to successful HO completion.](#_Toc134778915)

[Proposal 23 UE includes in the SHR the number of unavailable SMTC occasions detected during the HO.](#_Toc134778916)

**Rapporteur analysis:** The above proposals P21/P22/P23 is already captured under issue#14/15 in R2-2306452.

# 3. References

1. [R2-2305424](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305424.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305424.zip), Nokia, Nokia Shanghai Bell
2. [R2-2305485](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305485.zip), [SON Enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305485.zip), CATT
3. [R2-2305658](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305658.zip), [SON/MDT enhancements for NR-U](https://ericsson.sharepoint.com/R2-2305658.zip), Samsung R&D Institute India
4. [R2-2305706](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305706.zip), [Discussion on MRO for NR-U](https://ericsson.sharepoint.com/R2-2305706.zip), Lenovo
5. [R2-2305728](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305728.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2305728.zip), Xiaomi
6. [R2-2305777](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305777.zip), [SONMDT enhancement for NR-U](https://ericsson.sharepoint.com/R2-2305777.zip), CMCC
7. [R2-2306043](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306043.zip), [Discussion on NR-U Related Enhancements](https://ericsson.sharepoint.com/R2-2306043.zip), Qualcomm Incorporated
8. [R2-2306101](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306101.zip), [Discussion on SON for NR-U](https://ericsson.sharepoint.com/R2-2306101.zip), Huawei, HiSilicon
9. [R2-2306247](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306247.zip), [Consideration on NR-U related SON](https://ericsson.sharepoint.com/R2-2306247.zip), ZTE Corporation, Sanechips
10. [R2-2306450](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306450.zip), [Enhancements of SON reports for NR-U](https://ericsson.sharepoint.com/R2-2306450.zip), Ericsson