3GPP RAN WG2 Meeting #130 R2-25xxxxx

Malta, Malta May 19th – 23rd, 2025

Agenda Item: X.X.X

Source: Ericsson

Title: Remaining RRC open issues in feature AIML PHY

Document for: Discussion, Decision

# Introduction

The following document includes a list of open issues according to the following email discussion:

**[POST129bis][016][AI PHY] 38.331 Running CR (Ericsson)**

 Intended outcome:

1. Update CR based on agreements from RAN2#129bis
2. List of remaining open issues

 Deadline: Long

Companies are invited to provide feedback on open issue list by: **2 May 2025**

# Remaining open issues for specification TS 38.331

## LCM for UE-sided model for Beam Management use case

**Open issue RRC-1: Cause of inapplicability**

**Issue description:** It isFFS how to define the simple cause value of inapplicability related to model availability and how to capture it in the spec.

This issue refers to the RAN2#129bis agreement:

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| Together with inapplicability reporting, UE further indicates a simple cause value of inapplicability FFS how to define this simple cause related to model availability and how we capture it in the spec |

The issue is captured as an editor’s note in the running CR, clause 5.3.5.3.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-2: Content of *otherConfig* for enabling applicability reports in UAI**

**Issue description:** It is not yet clarified what the content (if any) of the UAI configuration should be, to enable the UE to report applicability in UAI, e.g. applicability updates/changes as agreed for option A. For instance, this configuration could be just a flag or could contain further information.

The issue is captured as an editor’s note in the running CR, clause 6.3.4.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-3: UE data collection request**

**Issue description:** For UE-side data collection**,** the details of UAI signaling for the UE start/stop request and especially the following aspects are not yet clarified:

* how to refer in UAI to a preferred radio resource candidate configuration from a list of candidate configurations provided by NW
* where/what the NW provides as candidate configurations
* what the content of *otherConfig* for enabling UE data collection requests in UAI should be (e.g. just a flag, the list of candidate UE data collection configurations, etc.).

This issue refers to the RAN2#129bis agreements:

The UE can request measurement configuration for data collection of AI/ML based beam management. The request can contain one or more of the following:

• An indication on start/stop of data collection

• Preferred configuration from a list of candidate configurations provided by NW. Details of signaling are FFS. It is up to network what it configures at the end.

Introduce UAI message for UE request of data collection measurement configuration. And it is up to UE implementation when to send the request.

The issue is captured as an editor’s notes in the running CR, clause 5.7.4.3, 6.2.2, and 6.3.4.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

### Open issues requiring further RAN1 progress

**Open issue RRC-4: Definition of ‘applicable AI/ML functionality’**

**Issue description:** How to update the definition of ‘applicable AI/ML functionality’ in clause 3.1, e.g. replace 'functionality', and align it with RAN1 specs and with TS 38.300.

The issue is captured as an editor’s note in the running CR, in clause 3.1. The running CR also contains an example initial definition.

**Proposed resolution:** Suggest to wait for RAN1 progress.

**Open issue RRC-5: Applicability reporting for option B in *RRCReconfigurationComplete***

**Issue description:** It isFFS whether the applicability report for option B (sets of inference related parameters) can be included in *RRCReconfigurationComplete* (or if it can only be included in UAI).

This issue refers to the following RAN2#129bis agreement, based on which the overall design for option B requires further input from RAN1:

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| **Agreements on option B**1 RAN2 assumes UE receives RRCReconfiguration message including one set or multiple sets of inference related parameters via OtherConfig for option B. This assumption can be confirmed (i.e., whether to reconsider CSI-ReportConfig) after receiving Option B inference related parameters (e.g., in RAN1 RRC parameters list). Potential aspects to consider if RAN2 revisit:- To reconsider CSI-ReportConfig for option B, for example, if the list of inference related parameters is fully contained within existing CSI-ReportConfig.- to take into accounts UE behaviour when confirming the assumption e.g., whether option A and option B result in different UE behavior |

The issue is captured as an editor’s note in the running CR, clause 5.3.5.3.

**Proposed resolution:** Suggest to wait for RAN1 to provide the list of inference related parameters for option B.

**Open issue RRC-6: Terminology throughout RRC specs**

**Issue description:** It isFFS how to consistently update the AIML related terminology throughout the document (e.g. whether to adopt the terms 'measurement prediction', 'prediction configuration', etc.).

The issue is captured as an editor’s note in the running CR, clause 5.3.5.3.

**Proposed resolution:** Suggest to wait for RAN1 to provide the list of parameters for AI/ML beam management.

## NW side data collection

**Open issue RRC-7: NW control on retaining logged data at HO**

**Issue description:** Thesignaling details of the network control on how data should be retained at handover are FFS, based on the RAN2#129 bis agreement:

Introduce 1-bit indication on whether to release or retain un-retrieved data in RRCReconfiguration during/before HO. Source gNB decides whether the data should be kept. The indication is provided in RRCReconfiguration (i.e. not in RRC Reconfiguration from target cell). FFS signaling details.

The issue is captured as an editor’s note in the running CR, in clause 5.3.5.3 and 6.2.2.

It the rapporteur’s view, it should be clarified Whether/how the 1-bit indication can be sent during or before HO, taking into account that the source gNB decides whether the data should be kept. From the rapporteur perspective, it is not possible for the source gNB to add the 1-bit indication during HO, in the same RRCReconfiguration that encapsulates the RRCReconfiguration from the target gNB. Thus, the rapporteur sees the following two possible solutions for this issue:

* The source gNB sends the 1-bit indication to the UE before HO.
* The source gNB decides if the 1-bit indication is needed and, if so, sends it to the target gNB, which includes it in the RRCReconfiguration sent to the UE during HO. No RAN3 impact is expected if the transmission of the 1-bit indication is limited to the case in which the target gNB is from the same vendor as the source gNB.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-8: Reporting assistance information related to logged measurements**

**Issue description:** It is not yet clearwhat the *otherConfig* should contain to enable the UE to report assistance information via UAI, related to logging of radio measurements. For instance, should the low power, buffer full, and buffer threshold reached indications be all configured with a single bit, or should the configurations be separated?

This issue is related to the RAN2#129bis agreement:

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| **Agreements on availability indication*** Availability indication can be triggered due to:
	+ Full buffer being reached (if configured)
	+ Buffer threshold being reached (if configured).
	+ Low power (if configured)
* The UE send a UAI that indicates:
	+ Data is available
	+ Reason for trigger (full buffer, threshold)
	+ Low power indication
* The encoding of the data is available/UAI and the cause value is FFS

NOTE: it is up to UE Implementation how buffer threshold reached and low power is determined |

The issue is captured as an editor’s notes in the running CR, in clause 5.3.5.9, 5.7.4.3, 6.2.2, and 6.3.4.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-9: Further procedures for UE assistance information related to logging**

**Issue description:** It has not yet been discussed whether further procedures for UE reporting assistance information related to logging is need. Such further procedures may be, e.g. prohibit timers, indication that battery state is not low any longer, indication that the memory is not full any longer, etc.

The issue is captured as an editor’s note in the running CR, in clause 5.7.4.2 and 5.7.4.3.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-10: Time related content of logged data**

**Issue description:** It has not yet been clarified whatinformation needs to be included with the logged data, to indicate a time gap between the logged data entries (i.e. a gap that is longer than the logging data periodicity).

This issue refers to the RAN2#129bis agreement:

1. For temporal domain, the network is made aware whether there is a gap between two consecutive samples. FFS amount of gap and whether this is implicit or explicit

The issue is captured as an editor’s note in the running CR, in clause 5.7.10.3 and 6.2.2.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-11: RAN1 involvement for logged data for NW-side and UE-side data collection**

**Issue description:** Procedures for performing the L1 measurement results are captured in RAN1 specification, i.e. TS 38.214. Rapporteur assumes that the same should be applied for the case of radio measurements logging for the NW-side data collection and UE-side data collection. Hence RAN1 involvement is expected to capture procedures related to the radio measurements logging, e.g. in the UE variable *VarCSI-LogMeasReport* for the case of NW-side data collection.

From the rapporteur’s perspective, an LS should be sent to RAN1.

The issue is captured as an editor’s note in the running CR, in clause 5.7.10.3.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-12: Cell ID stored with logged data for NW-side data collection**

**Issue description:** It has not been clarified what type of cell ID the UE needs to log along with the logged data, in order to unambiguously identify the cell in which the UE performed the data logging, e.g. CGI, PCI-ARFCN etc.

The issue is captured as an editor’s note in the running CR, in clause 6.2.2.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-13: Where to include the logging configuration from NW to UE**

**Issue description:** It isFFS whether the logging configuration is included in the CSI framework (whether in *CSI-ReportConfig* or directly under *CSI-MeasConfig*) or at L3.

This issue was discussed in RAN2#129bis and the following outcome was captured:

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| * Next meeting proponents should work together and bring complete proposals to show specification impact and consider future use cases.
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The issue is captured as an editor’s note in the running CR, in clause 6.3.2.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

**Open issue RRC-14: Multiplexing legacy logged data and AIML logged data in new SRB**

**Issue description:** RAN2#129bis agreed that

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| 2. New SRB can be configured for NW-side data collection (with lower priority) |

Given the agreement on the new SRB for the transmission of the *UEInformationResponse*, Rapporteur’s understanding is that the new SRB may be used also for the transmission of the legacy SON/MDT reports (e.g. logged MDT measurements, RLF-Report, RA-reports, successful HO reports, etc.), whenever the *UEInformationResponse* carries both a legacy SON/MDT report and AIML logged data. However, this would impact how legacy SON/MDT reporting is performed which can only be at the moment on SRB1 or SRB2.

From the specification perspective, this affects primarily RRC clause 5.7.10.3 and it would impact also other specifications, e.g. TS 37.320.

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.

# Other identified open issues

Companies are invited to describe any other identified open issues not currently included within this document

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| **Company** | **Other identified open issues? (please describe)** |
| LGE | **LCM for UE-sided model for BM****Issue: When the UE reports updated applicability via UAI, the activation timing of the corresponding functionality is unclear.**RAN2 agreed that for periodic CSI reporting, the UE autonomously activates the applicable functionality upon sending the applicability report via **RRCReconfigurationComplete** in Step 4.However, when the applicability report is sent via **UAI**, the activation timing is ambiguous.Unlike **RRCReconfigurationComplete**, the network may not be aware whether the UAI message was delivered, so a different mechanism needs to be considered.For example, the UE could autonomously activate the functionality only if the UAI was successfully sent.Agreement:RAN2#129* Upon receiving a full inference configuration, the UE sends the initial applicability report in RRCReconfigurationComplete. UAI can be sent to update applicability.
* If option A is configured in Step 3, for periodic CSI reporting, the UE autonomously activate the applicable functionalities upon reporting applicable functionalities via RRCReconfigurationComplete in step 4 (i.e. without need to wait RRCReconfiguration in Step 5).
* Semi-persistent and aperiodic CSI reporting of applicable functionality is activated following legacy CSI framework:
	+ Semi-persistent reporting, activated by MAC CE/DCI
	+ Aperiodic CSI reporting, activated by DCI

RAN2#128* When a functionality configured by the network to be reported via UAI, becomes from non-applicable to applicable, the UE can reports it to the network. FFS detailed design

**LCM for UE-sided model for BM****Issue: (RAN1 involvement for UE data collection) How to configure RS configuration for UE sided data collection within *CSI-ReportConfig*** According to the RAN1 agreement, a CSI-ReportConfig without an actual CSI report can be configured for UE data collection purposes.Since the ***reportConfigType*** field is mandatory in *CSI-ReportConfig*, further discussion is needed on how to handle this situation.For example, introducing a new IE to instruct the UE to ignore the legacy ***reportConfigType*** could be considered.AgreementRAN1#120For UE-sided model, for configuring the resource for data collection purpose, support* *CSI-ReportConfig* can used for configuring the resources for data collection purpose without CSI report.
	+ One *CSI-ResourceConfigId* is configured for Set A.
	+ One *CSI-ResourceConfigId* is configured for Set B.
	+ Note: UE performs measurement on all resources
	+ One or two associated IDs can be configured in *CSI-ReportConfig*
		- When Set B is equal or a subset of set A (i.e., *NZP-CSI-RS-ResourceId*/*SSB-Index* in the resource setfor Set B is within the *NZP-CSI-RS-ResourceId*/*SSB-Index* in the resource setfor Set A), one associated ID is configured,
		- Otherwise, one associated ID is configured for Set A and another one associated ID is configured for Set B
* FFS: whether/how to support 'aperiodic' CSI RS

**NW side data collection****Issue: (Further discussion on Open issue RRC-13) How to set logging periodicity**Regardless of the chosen logging framework, further discussion is needed on how to set the logging periodicity for each Logging RS.To provide flexibility in the logging timing, two options could be considered for logging periodicity:(i) aligning with the RS transmission periodicity, or(ii) introducing an optional logging interval setting.**Issue: (RAN3 involvement for NW data collection) Whether to need separate user consent for gNB centric training**It needs to be discussed whether a separate user consent is required for gNB-centric training, as it may differ from the conventional MDT user consent.To address the potential impact on gNB and OAM regarding data collection, it may be necessary to send an LS to RAN3 and SA5, including agreements related to logging. |
| vivo | Whether the enhancements for NW-side data collection are per use case or common for all AI-related use cases, e.g., AS layer memory, logged data availability, low-power state indication. |
| Lenovo | **Open issue RRC-X: applicability report in CA scenario****Issue description:**It is captured in RRC running CR: FFS if applicability reporting is supported for multiple serving cells and applicabilityCellId is needed to unambiguously identify CSI report configurations for prediction.**Proposed resolution:** RAN2 confirms the support of beam prediction in CA scenario, wherein UE can be configured to perform beam prediction with Set A and Set B beams of the same cell (PCell/SCell).In the applicability report, cell information is needed to unambiguously identify CSI report configurations for prediction. The relevant FFS can be removed.  |
| Lenovo | **Open issue RRC-x: The release of logged AIML data in UE’s buffer****Issue description:**RAN2 needs to discuss and capture in the spec when the logged data for AIML in UE buffer will be released. In addition to the retain/release of logged data during HO covered in Open issue RRC-1, the following can be also considered:- Power off or deregistration- 48 hrs after the release of logged measurement configuration- Explicit indication from the serving gNB**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.  |
| Lenovo | **Open issue RRC-x: Monitoring for AI based beam management****Issue description:**RAN1 has made progress related to the monitoring framework, i.e., Type 1 Option 2 UE assisted monitoring wherein UE will report the monitoring metric to gNB. The RRC impact can be analysed upon RAN1 conclusion.**Proposed resolution:** Suggest to wait for RAN1 conclusion. |
| Lenovo | **Open issue RRC-x: CSI prediction LCM framework****Issue description:**For the CSI prediction use case, it is very likely the same framework (e.g., applicability report, inference configuration, data collection, monitoring) for AI based beam management can be used, but still it is upon RAN1/RAN2’s confirmation. **Proposed resolution:** Suggest to wait for RAN1 conclusion. |
| Huawei, HiSilicon | We think the following open issues need to be added to the list:**LCM for UE-sided model for Beam Management use case:**1. Considering that both Option A and B are to be specified, we need to discuss how the 2 options co-exist, whether there is any interaction between them etc.
2. RAN1 mentioned in their previous LS that: ‘Note: UE is not expected to be configured with a CSI-ReportConfig for inference configuration for a non-applicable set of inference parameters or a non-applicable CSI-ReportConfig ’. This might need to be captured in RRC specifications.

**NW side data collection:**1. Whether data availability indication should be sent when the UE has data and low power state is sent and what cause should be included then. The UE may have some data when indicating low power state. Even though this data volume may be lower than full buffer/threshold, it is still useful to let the network know about that so that the data can be fetched.
2. We have agreed that target gNB can fetch data collected in the source gNB after HO. We need to decide how this data is forwarded to OAM or source gNB, e.g. via inter-node RRC message or in some other way. RAN3 involvement may be needed.
3. How can the source gNB be aware of whether the UE has data available during HO, e.g. should the UE inform source gNB about data availability before HO is executed?
4. Configuration details of events for event-based logging configuration, e.g. whether we reuse configuration in reportConfig.
5. RAN2 excluded usage of aperiodic CSI resource for data collection, but it is still unclear whether semi-persistent resources are needed for this.
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| OPPO | **Issue description:** In RAN2 Athens meeting, RAN2 confirmed to support L3 measurement event triggered data logging method. But it’s still unclear what is the UE behavior during the period that L3 measurement triggered data logging event fulfills. **Proposed resolution:** We understand MDT-like solution can be considered as the baseline, i.e. UE performs data logging periodically during the period that L3 measurement triggered data logging event fulfills. If L3 measurement triggered data logging event does not fulfill, UE just stops data logging. |
| Apple | We think Rapporteur’s clarification on open issue 5 is needed:**Open issue RRC-5: Applicability reporting for option B in *RRCReconfigurationComplete*****Issue description:** It isFFS whether the applicability report for option B (sets of inference related parameters) can be included in *RRCReconfigurationComplete* (or if it can only be included in UAI).**Proposed resolution:** Suggest to wait for RAN1 to provide the list of inference related parameters for option B.We think there are two understanding: Alt-1: RAN2 can’t discuss the UE behaviour and configuration related to option B before reception of RAN1 L1 excel on option BAlt-2: Only the details of configuration on option B waits RAN1 L1 excel. But RAN2 can discuss the UE behaviour and configuration related to option B in upcoming May meeting.We are fine with either way, but we think Rapporteur needs clarification which determine whether we need to draft proposal related to UE behavior on option B in upcoming May meeting.  |
| Apple | **Open issue RRC-x: Minimum AS layer memory size supported by the UE.****Issue description:**We made the following agreement in RAN2#127 that we will specify a minimum AS layer memory size across all use cases, similar to logged MDT. And the specific value of the memory size is FFS, but it has not been addressed yet. **Agreements**1. UE stores the logged training data at AS layer with a minimum AS layer memory size supported by the UE. FFS on the memory size. This is across all use cases

**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue.  |
| Xiaomi | **LCM for UE-side model for BM****Open issue RRC-xx: handling of inference configuration(s) when UE goes to RRC\_IDLE/INACTIVE state****Issue description:** RAN2 made following agreements in RAN2 129bis meeting:

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| * Upon receiving one or more full inference configuration(s) via RRCReconfiguration message, UE shall maintain all the full inference configuration(s) no matter the full inference configuration is applicable or inapplicable until the network releases it explicitly.
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Also, after checking RRC running CR, it is not clear whether UE releases inference configurations when UE goes to RRC\_IDLE/CONNECTED state or upon network configuration via RRCRelease, etc.**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue. **Others – LCM for UE-side model for CSI prediction****Open issue RRC-xx: Others – LCM for UE-side model for CSI prediction****Issue description:** RAN1 agreed to support CSI prediction as another use case for AI/ML air interface. All related inference /data collection configuration and reporting needs to be specified.**Proposed resolution:** It is suggested to wait for further RAN1 progress on RRC parameters, meanwhile RAN2 can progress in whether agreements for BM is applicable for CSI prediction.  |
| Nokia | **Open Issue RRC-xx: Reporting behaviour of inapplicable periodic beam prediction configuration****Issue description:** It is ambiguous what the UE should report to the NW when its periodic beam prediction configuration becomes inapplicable and whether the model would output anything at all when if, e.g., the input distribution no longer matches what is expected.**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue. We need to determine whether the configuration should cease reporting or send the input (measurements) to the NW once it becomes inapplicable.**Open Issue RRC-xx: Repeated reports of applicability for configurations which consistently perform poorly****Issue description:** UEs may repeatedly report a configuration as applicable based on the applicability determination information (UE-side and NW-side) but still perform poorly based on unforeseen factors, e.g., scenarios not captured in the dataset which trained one or more models supporting the AI/ML configuration. There is nothing we have agreed to so far to prevent a UE from repeating the same indication of applicability every time it re-enters RRC CONNECTED.**Proposed resolution:** It is suggested that companies provide contributions to the following meeting to resolve the issue. Ideally, the UE would receive feedback sufficient to adjust its applicability determination.**Open Issue RRC-xx: Use case-specific language in the procedures****Issue description:** Use case-specific language like “including a configuration for measurement prediction” is used in the running CR. We should base the inclusion in the applicability reporting procedure on specific fields in the configuration being present. We do this for other procedures, e.g., when we list events A1, A2, A3, etc., for their applicability in a procedure.**Proposed solution**: Use specific fields to indicate which configurations are included in the applicability reporting procedure.**Open Issue RRC-xx: The naming of IEs related to NW-side data collection are very specific to one use case****Issue description:** We will have more CSI-based and other use cases, each with different measurement logs. Without generic naming based on NW-side DC, we risk having to replicate the NW-side DC procedures and ASN.1 for every new use case.**Proposed resolution:** Make the naming of procedures and ASN.1 related to NW-side DC generic and enclose use case specific IEs / data logs within so that our framework can support future use cases. |
| Mediatek | **Open Issue RRC-xx: the time duration for an AI functionality to become available for inference when the UE reports applicability****Issue Description:** The UE needs to synchronize the time duration for an AI functionality to become available for inference with the network when the UE reports applicability for either a full inference configuration or a set of inference parameters.Unlike conventional non-AI features, where the algorithm size is fixed, AI algorithms can vary significantly in size depending on their generalization performance and specific use cases. These sizes can range from several kilobytes to tens of megabytes. Additionally, UE implementations may use various types of memory to balance cost and performance, and these different memory types and constraints can affect the access speed of stored models.**Proposed resolution:** The UE should indicate the time duration for the AI functionality to become available when reporting applicability to the network. This time duration refers to how long it takes for the UE to load the AI modesl into RAM or another accessible memory for inference. By providing this information, the network can better understand the timeframe within which the configured radio resources and AI model can be utilized, enabling more efficient and effective resource management, especially for periodic CSI. |
| Samsung | **LCM for BM use case** 1. Associated ID : although it is not yet shared, RAN1 would assume that the details of associated ID including value range should be decided in RAN2.
2. Operation of option A and option B: it is not clear whether both option A and option B can be configured or not. This can affect signaling design of ApplicabilityReportList.
3. Handling of non-applicable periodic CSI report: in option A, if non-applicable periodic CSI report becomes applicable, UE would send UAI. However, it is not clear how NW “re”activate this periodic CSI report. RAN2 should discuss how non-applicable periodic CSI report can be “re”activated.

**Handling of Configuration during RRCReestablishment, transition to RRC\_INACTIVE etc.**Handling of applicabilityReportConfig, LoggedDataCollectionAssistanceConfig and dataCollectionPreferenceConfig during RRCReestablishment and in transition to RRC\_INACTIVE state needs to be specified. |

# Conclusions

*<To be filled after companies have provided feedback to the proposed resolutions for simple issues only. Please include the number of supporting companies (e.g., 18/20]) in brackets within the proposal>*

The following proposals have been provided based on feedback to the above document:

[Proposals for easy agreement]

*<List all proposals with consensus and/or may be easily agreed based on Rapporteur’s opinion>*

[Proposals for discussion]

*<List all proposals which will likely require further online/offline discussion to resolve>*

# References

1. XX

# Appendix (Optional)

*<Can include past meeting agreements etc.>*