**3GPP TSG RAN WG2 Meeting #130 R2-250xxxx**

St. Julian’s, Malta, May 19th – 23rd, 2025

Agenda Item: 8.1.x

Source: Xiaomi, Ericsson

Title: Report of [POST129][037][AI PHY] UE candidate data collection (Xiaomi/Ericsson)

Document for: Discussion and Decision

# Introduction

This report provides a summary for the following post-meeting email discussion:

* [POST130][037][AI PHY] UE candidate data collection (Xiaomi/Ericsson)

 Intended outcome: Discuss how to capture ‘The UE doesn’t need to measure the candidate data collection configuration(s)’ in RAN2 spec, and signalling details (including contents). Provide TP(s) for candidate UE side data collection configuration.

 Deadline:  June 20th

Deadline for providing comments is Jun 20th, 2025, 10:00UTC.

Rapporteurs will provide proposals for RAN2#131 and a draft updated TP based on the outcome of this post email discussion after the deadline.

Companies providing input to this email discussion are requested to leave contact information below.

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email Address** |
| vivo | Boubacar Kimba | kimba@vivo.com |
| Nokia | György Wolfner | gyorgy.wolfner@nokia.com |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Discussion

During RAN2 #130 meeting, RAN2 discussed how to provide candidate UE data collection configurations and reached following agreements:

|  |
| --- |
| 3 The UE doesn’t need to measure the *candidate data collection configuration(s). This will be specified in RAN2 specs.* *4* For beam management, candidate data collection configuration includes at least:- CSI-ResourceConfigId of Set A- CSI-ResourceConfigId of Set B- One/two associated IDs (up to whether Set B is equal/subset of Set A or not) according to RAN1 agreements  FFS the details of how this is signalled (e.g. CSIReport config or simplified signaling) |

In this email discussion, we further discuss the details of how to signal candidate UE data collection configuration(s) and how to capture ‘The UE doesn’t need to measure the *candidate data collection configuration(s).*’ in RAN2 specification. Three example TPs (merged in one document for easy comparison) are provided for different possible signaling solutions to facilitate the email discussion and a draft updated TP will be provided by the Rapporteurs after the conclusion of the email discussion, based on the outcome.

It is agreed that the agreement ‘The UE doesn’t need to measure the candidate data collection configuration(s)’ will be captured in RAN2 specification. Since all options listed as examples above (*CSI-ReportConfig* or simplified signaling) are intended to use RRC signaling to provide candidate UE data collection configuration(s) towards UE, it is straightforward to capture the corresponding UE behavior upon receiving candidate UE data collection configuration(s) in RRC specification (i.e., TS 38.331).

Observation 1: The agreement ‘The UE doesn’t need to measure the candidate data collection configuration(s)’ will be captured in TS 38.331.

## Container of Candidate Configuration

It is possible for the UE to support multiple configurations for UE-side data collection and it was agreed that the network can provide a list of (i.e., multiple) candidate configurations. Therefore, it is reasonable that the UE can also indicate multiple preferred configurations for network’s consideration.

##### Q1. Do you agree that multiple preferred configurations can be indicated by the UE via UAI?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Yes/No** | **Comment**  |
| vivo | Yes | Based on UE capability, multiple configurations can be sent to the UE for UE-side data collection. Therefore, the UE may indicate multiple preferred configurations, e.g., for the model training of different models. |
| Nokia | No | There will be a sufficient number UEs available to perform data collection because the total number of chipset and UE hardware is finite, so many of the same chipsets and UEs will be connected to the same cell at any given time. If a vendor needs to collect data for multiple data collection configuration candidates, the data collection preference indications can be distributed, coming from many UEs.We think that the UE should only be able to provide one preference for “start” at a time, and that indicating a new preference for “start” implies “stop” for the previous data collection candidate preference.For that, we would like to propose to change the structure of the DataCollectionPreference-r19 IE. The UE will be able to stop the current data collection preference or switch to a new one.DataCollectionPreference-r19 ::= CHOICE { dataCollectionStop-r19 NULL, dataCollectionPreferredConfiguration-r19 DataCollectionPreferredConfiguration-r19} |
|  |  |  |
|  |  |  |
|  |  |  |

##### Q2. Do you agree that certain preferred configuration can be referred by the UE via an identifier associated to a candidate configuration?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Yes/No** | **Comment**  |
| vivo | Yes |  |
| Nokia | Yes |  |
|  |  |  |
|  |  |  |
|  |  |  |

The next question is which RRC parameter is used to contain the candidate configuration.

During online discussion, three main solutions were proposed to contain/signal candidate UE data collection configurations:

**Solution 1**: *OtherConfig* contains a list of candidate configurations as a list with a new IE, where the new IE (i.e., each candidate configuration) contains at least the following set of parameters as agreed in RAN2#130, i.e., identifier of the candidate configuration, *CSI-ResourceConfigId* for Set A, *CSI-ResourceConfigId* for Set B, and related associated IDs [4]. An example of *DataCollectionPreferenceConfig-r19* is shown as below:

|  |
| --- |
| DataCollectionPreferenceConfig-r19 :: = SEQUENCE { -- Solution 1dataCollectionCandidateConfigList-r19 SEQUENCE (SIZE (1..maxCandidateConfig-r19)) OF DataCollectionCandidateConfig-r19 OPTIONAL, -- Need N} |

**Solution 2**: *OtherConfig* contains a list of candidate configurations as a list of *CSI-ReportConfigId*, where the candidate configurations are provided by the gNB within *csi-ReportConfigToAddModList* under *CSI-ReportConfig* [5]. An example of *DataCollectionPreferenceConfig-r19* is shown as below:

|  |
| --- |
| DataCollectionPreferenceConfig-r19 :: = SEQUENCE { -- Solution 2 dataCollectionCandidateConfigList-r19 SEQUENCE (SIZE (1.. maxCandidateConfig-r19)) OF CSI-ReportConfigId OPTIONAL, -- Need R} |

**Solution 3**: *OtherConfig* contains a list of candidate configurations as a new list of *CSI-ReportConfig*, i.e., creating a list of *CSI-ReportConfig* in *otherConfig*, which is independent from *CSI-ReportConfig* under *CSI-MeasConfig.* An example of *DataCollectionPreferenceConfig-r19* is shown as below:

|  |
| --- |
| DataCollectionPreferenceConfig-r19 :: = SEQUENCE { -- Solution 3 dataCollectionCandidateConfigToAddModList SEQUENCE (SIZE (1..maxCandidateConfig -r19)) OF CSI-ReportConfig OPTIONAL, -- Need N} |

Following agreements were further reached in RAN1 for the measured UE data collection configuration:

|  |
| --- |
| RAN1#120 AgreementFor 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 RSRAN1 #121 AgreementFor data collection for UE-sided model, in CSI-report configuration, *reportQuantity* is set to “*none-BM-r19*”RAN1 #121 AgreementFor UE-sided model, regarding a *CSI-ReportConfig* for data collection, * Reuse the existing CPU occupation time for a CSI report with *CSI-ReportConfig* with *reportQuantity* set to 'none' and TRS-info not configured
 |

It is observed that RAN1 has agreed, for UE measured UE-side data collection configuration provided in *CSI-ReportConfig*, considering **UE needs to measure configurations but does not need to report**, *reportQuantity* of such *CSI-ReportConfig* is set to ‘*none-BM-r19*’ and CPU occupation is 1.

Observation 2: RAN1 agreed a new *reportQuantity* ‘*none-BM-r19*’ for UE-side data collection that UE needs to measure but not need to report. CPU occupation for such measured UE-side data collection is 1.

As RAN2 agreed a new UE behaviour, i.e., ‘**UE doesn’t need to measure** the *candidate data collection configuration(s)*’, and that this needs to be captured in RAN2, the solution for signaling candidate data collection configuration(s) needs to fulfil these requirements and avoid RAN1 impact.

In order to clarify that no measurements need to be performed by the UE for the candidate configurations, Rapporteurs included the following note in Section 5.3.5.9 in all the TPs (we used the endorsed RRC running CR R2-2504349, except the NOTE highlighted in yellow):

|  |
| --- |
| **Subclause 5.3.5.9**The UE shall:1> if the received *OtherConfig* includes the *DataCollectionPreferenceConfig*:2> if *DataCollectionPreferenceConfig* is set to setup:3> consider itself to be configured to provide its preference on being configured with radio measurement resources for UE data collection configuration in accordance with 5.7.4; 2> else: 3> consider itself not to be configured to provide its preference on being configured with radio measurement resources for UE data collection configuration.NOTE: UE does not need to measure radio measurement resources provided in *DataCollectionPreferenceConfig*. |

In solution 1/3, proponent companies understand that, since all candidate CSI-RS resource configurations are provided in *OtherConfig*, according to the NOTE, it is clear that UE does not need to perform measurement towards CSI-RS resources configured in *DataCollectionPreferenceConfig*.

In solution 2, proponent companies understand that, if the inference configurations provided in *CSI-ReportConfig* (Option A) is not applicable (for periodic, semi-persistent or aperiodic) or not activated (for semi-persistent or aperiodic) and network has not released the corresponding inference configuration (included in *csi-ReportConfigToAddModList*), UE also does not need to perform measurement towards such *CSI-ReportConfig*.

##### Q3. Do you agree that the above NOTE in subclause 5.3.5.9 in TS 38.331 is sufficient to avoid RAN1 impacts for Solution 1/2/3? If the answer to the above question is No for certain solution, please explain what other impacts or RAN1 impacts foreseen.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Company**  | **Solution 1 Yes/No** | **Solution 2 Yes/No** | **Solution 3 Yes/No** | **Comment** |
| vivo | Yes | No (Up to RAN1) | Yes | For solution 2, both legacy *CSI-resourceResourceConfig* and *CSI-ReportConfig* are configured. In the existing 38.214, there are some descriptions on the UE behaviour (e.g., active duration for measurement) upon activation of the resources. Therefore, in addition to the clarification in the RRC spec, RAN1 may further check and decide whether there are additional specification impacts from the RAN1 perspective. |
| Nokia | No | No | No | We do not see the need for the note. Instead, we could add to the field description of the eventual solution that the UE need not measure anything based solely on the data collection preference configuration (See our answer to Q4). We think that according to the 3GPP drafting rules a NOTE shall not be used to specify normative UE behaviour.The intention of the note is to say that when the UE is provided a data collection candidate configuration that the candidate configuration is not to be interpreted as instructions for the UE to perform measurements. The context of the note is related to **Solution 2** in case a periodic reporting configuration is provided as a candidate. A periodic report configuration is enabled immediately and cannot be disabled or enabled, in legacy. The consequence is that Solution 2 isn’t feasible unless we were to restrict it to semipersistent and/or aperiodic, but there has been no such desire.However, we see that **Solution 1** has no RAN1 impact because the UE isn’t being provided anything which instructs the UE to measure, but rather a subset of an eventual configuration. Nothing in the specification requires the UE to measure these. And **Solution 3** has no RAN1 impact because the CSI-ReportConfigs are provided in otherConfig, unrelated to CSI-MeasConfig, so nothing in the specification requires the UE to measure based on the candidate configurations. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Finally, if you agree with the intention of the NOTE, Rapporteurs would like to ask if companies see the need to capture in the procedural text the NOTE highlighted above or somewhere else (e.g. field description), please comment on that.

##### Q4. Do you agree to capture the above NOTE in subclause 5.3.5.9 in TS 38.331? If no, please comment in case you agree with the intention of the NOTE, but you prefer to include this information somewhere else (e.g. in the field description).

|  |  |  |
| --- | --- | --- |
| **Company**  | **Yes/No** | **Comment (where and subclause to capture)** |
| vivo | No | Prefer to add the UE behaviour in the field description.In addition, the content should be refined as the UE can measure the resources if they are associated with other *CSI-ReportConfig* or after the gNB feedback requested resources are activated:UE does not need to measure radio measurement resources provided in *DataCollectionPreferenceConfig* if they are not associated with other *CSI-ReportConfig* or before the *CSI-ReportConfig* for data collection purpose is configured and activated. |
| Nokia | No | We prefer to include in the field description for *dataCollectionCandidateConfig*, “The UE is not expected to perform measurements solely based on the configurations provided by this IE.” |
|  |  |  |
|  |  |  |
|  |  |  |

## Content

Following candidate configuration contents were agreed in RAN2 #130 meeting:

|  |
| --- |
| For beam management, candidate data collection configuration includes at least:- CSI-ResourceConfigId of Set A- CSI-ResourceConfigId of Set B- One/two associated IDs (up to whether Set B is equal/subset of Set A or not) according to RAN1 agreements  |

In the following, we discuss how to represent the above agreed content for each of the Solutions 1/2/3, and whether additional parameters are needed.

##### Q5-1. For Solution 1, besides the above parameters agreed in RAN2#130 (which are already captured in the proposed TP), which other parameters, if any, need to be included in candidate UE data collection configuration? Please explain your reasons.

|  |  |  |
| --- | --- | --- |
| **Company**  | **Additional RRC parameters as candidate configuration in Solution 1? (Yes/No)** | **Comment (please list the RRC parameter and explain why this is needed as part of candidate data collection configuration)** |
| vivo | No |  |
| Nokia | Yes | We think that at least the **full list of parameters selected for sets of inference parameters** for inference should be part of the data collection candidate configurations such that the UE can determine the purpose of the data collection candidate configuration and decide to signal one as a preference based on training a model for a specific use case. That is, the UE will collect data such that in the future, it can report “applicable” for an AI/ML configuration. Therefore, it should be clear, e.g., that a data collection candidate configuration is associated with beam management case 1 vs. beam management case 2 based on the nature of the configuration without naming use cases. |
|  |  |  |
|  |  |  |
|  |  |  |

##### Q5-2. For Solution 2 and 3, do you agree that the above parameters agreed in RAN2#130 would be already included as part of the *CSI-ReportConfig* (i.e., the above parameters would be already introduced in the ASN.1 in the *CSI-ReportConfig* to support the UE side data collection configuration)?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Yes/No** | **Comment** |
| vivo | Yes |  |
| Nokia | Yes |  |
|  |  |  |
|  |  |  |
|  |  |  |

##### Q5-3. For Solution 2 and 3, besides the above parameters agreed in RAN2#130, which other parameters, if any, need to be included within the *CSI-ReportConfig* as candidate UE data collection configuration? Please explain your reasons.

|  |  |  |
| --- | --- | --- |
| **Company**  | **Additional RRC parameters as candidate configuration in Solution 2/3? (Yes/No)** | **Comment (please list the RRC parameter and please explain why this is needed as part of candidate data collection configuration)** |
| Nokia | No | We just have one caveat to note for the eventual configuration.The CSI-ReportConfig will include *resourcesForChannelMeasurement* and *resourcesForChannelPrediction*, which will be interpreted to mean Set B and Set A, respectively. In an inference configuration, the UE is not expected to measure Set A, but in a data collection configuration, the UE should measure Set A and Set B. So, in the eventual configuration for data collection, it must be made clear everything which is to be measured.We think it would be useful to send an LS to RAN1 asking them whether a UE can measure both *resourcesForChannelMeasurement* and *resourcesForChannelPrediction* when the *reportQuantity-r19* is set to *none-r19*. In case *resourcesForChannelMeasurement* is a subset of *resourcesForChannelPrediction*, the UE is only required to make and store a measurement once per common resource.For example, if Set A is 64 beams, and Set B is 8 beams and entirely a subset of Set A, then the UE would only be required to measure the Set A beams since the Set B beams would be inherently captured by Set A. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

As discussed in Q1, network may provide an ID for each candidate configuration (either the new *DataCollectionCandidateConfigId* for Solution 1 or a *CSI-ReportConfigId* for Solutions 2 and 3). UE can directly report these ID(s)representing its preferred configuration(s). Besides the preferred candidate configuration ID(s), is there any other information needed that the UE should include in UAI along with the preferred configuration(s)?

##### Q6. What information does UE include in its preferred configuration via UAI (except configuration ID in Q2 if agreed)?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Parameter (besides configuration ID if agreed in Q2) in Solution 1, 2, 3** | **Comment (please explain why this is needed as part of preferred data collection configuration)** |
| vivo | None (start/stop indication and ID are sufficient)  |  |
| Nokia | None | The candidate data collection configurations are self-sufficient |
|  |  |  |
|  |  |  |
|  |  |  |

##### Q7. Do you think prohibit timer should be considered for UE indicating its preferred data collection configuration?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Yes/No** | **Comment** |
| vivo | No | The preference for UE data collection is not expected to change frequently. Thus, the prohibit timer is not needed. |
| Nokia | No, but | The prohibit should prohibit the UE from requesting to start a data collection candidate for a configurable amount of time since the UE requested to start or stop any data candidate. A request to stop is not subject to the prohibit timer. This is necessary since the UE is mandated to make measurements based on the configured UE-side data collection configurations. The prohibit timer starts when the UE requests to start any data collection preference.For example, we could start with the following procedure:1> if configured to provide its preference to be configured with radio measurement resources for UE data collection: 2> if the UE did not transmit a *UEAssistanceInformation* message with *dataCollectionPreference* since it was configured to provide its preference to be configured with radio measurement resources for UE data collection; or 2> if the data collection preference is different from the last transmission of the *UEAssistanceInformation* message including *dataCollectionPreference*: 3> if the data collection preference includes *dataCollectionStartStop* set to *stop*: 4> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to report the UE preference to be configured with radio measurement resources for UE data collection; 3> else if timer Txx is not running: 4> start or restart timer <Txx> with the timer value set to the *dataCollectionPreferenceProhibitTimer;* 4> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to report the UE preference to be configured with radio measurement resources for UE data collection;The above procedure could be modified to match our answer to Q1, which is to support only a single active data collection preference at a time and modifying the preference configuration IE as follows:DataCollectionPreference-r19 ::= CHOICE { dataCollectionStop-r19 NULL, dataCollectionPreferredConfiguration-r19 DataCollectionPreferredConfiguration-r19} 3> if the data collection preference includes *dataCollection~~Start~~Stop* ~~set to~~ *~~stop~~*: |
|  |  |  |
|  |  |  |
|  |  |  |

##### Q8. Among Solution 1/2/3, which solution is acceptable/not acceptable?

|  |  |  |
| --- | --- | --- |
| **Company**  | **Acceptable (Solution 1/2/3)** | **Not acceptable (Solution 1/2/3)** |
| vivo | From our understanding, the selection of the solutions depends on backward compatibility and signaling overhead of configuration/feedback:- For **Solution 1**, the *DataCollectionCandidateConfig* is decoupled with the existing CSI report. Thus, no BC issue. The gNB needs to reconfigure the *CSI-ReportConfig* to activate the resource for measurements. In this case, the Set A/B and associated ID are duplicated in the configuration and feedback. - For **Solution 2**, the NW may provide the candidates *CSI-ReportConfig* along with the legacy *CSI-ReportConfig*, which will impact the maximum number of legacy *CSI-ReportConfig*. - For Solution 3, the gNB needs to reconfigure the *CSI-ReportConfig* to activate the resource for measurements. In this case, all the fields in *CSI-ReportConfig* are duplicated in the configuration and feedback.In general, **Solution 1** is acceptable.  | Solution 2, 3  |
| Nokia | Solution 3 | Solution 1 and 2 |
|  |  |  |
|  |  |  |
|  |  |  |

# Conclusion

# Reference

[1] R2-2504309 Remaining open issues: LCM for UE-sided model for BM use case InterDigital

[2] R2-2504353 Open Issues on LCM for UE-sided Models for Beam Management and CSI Prediction Qualcomm Incorporated

[3] R2-2503775 Further Discussion on LCM of UE-sided Model for AI BM MediaTek Inc.

[4] R2-2503449 Discussion on open issues of AI/ML air LCM Xiaomi

[5] R2-2504414 On Enhancements for NW Involvement in UE-side DC for BM Nokia, T-Mobile USA Inc., Ericsson, BT plc, Verizon, Deutsche Telekom AG