**3GPP TSG RAN WG1 #119 R1-2410xxxx**

**Orlando, US, November 18th – 22nd, 2024**

**Title: [DRAFT]** Reply LS on applicable functionality reporting for beam management UE-sided model

**Response to:** R1-2407829(R2-2407848)

**Release:** Release 19

**Work Item:** NR\_AIML\_air-Core

**Source:** [TSG RAN WG1]

**To:** TSG RAN WG2

**Contact person:**

**Send any reply LS to: 3GPP Liaisons Coordinator,** [**mailto:3GPPLiaison@etsi.org**](mailto:3GPPLiaison@etsi.org)

**Attachments: None**

1 Overall description

RAN1 thanks RAN2 for the LS on applicable functionality reporting for beam management UE-sided model.

In RAN1’s discussion of RAN 2 terminologies on beam management,

* The concept/terminology “functionality” of **Supported functionalities** may refer to UE-capability information/parameters i.e., Rel-19 AI/ML-specific FGs
* The concept/terminology “ functionality” of **Applicable functionalities** may refer to *CSI-ReportConfig* for inference configuration or a set of inference related parameters ~~or information/parameters indicated by UE~~
* The **Activated functionalities** may be enabled based on CSI framework.

Therefore, the meaning and the granularity of “functionality” for **Applicable functionalities, Activated functionalities and Supported functionalities** may or may not be the same. ~~, depends on certain option in RAN1, and the discussion is still ongoing.~~

RAN1 would like to provide replies on the following questions from RAN2 in R2-2407848:

**Q1: In Step 2, what is the granularity of functionality? For example, whether it is a use case (e.g. beam management), whether it is a sub-use case (e.g. beam management Case 1), or others?**

**Answer to Q1:** In Step 2, RAN1 expects that UE reports its UE-capability information/parameters, i.e., Rel-19 AI/ML-specific FGs (including components and corresponding value ranges). These AI/ML-specific UE capability information/parameters will depend on how FGs are defined including the granularity, that will be discussed in RAN1 later in the WI.

**Q2: What is the content of NW-side additional condition, i.e. is it correct the RAN2 assumption of a NW-side additional condition assumed as associated ID?**

**Answer to Q2:** RAN 1 did not have agreement on the content of NW-side additional condition. RAN1 agreed to support associated ID and it can be used to ensure the consistency of NW-side additional condition across training and inference for UE-sided model for BM-Case 1 and BM Case 2. UE may assume the similar properties of a DL Tx beam or beam set/list associated with the same associated ID, while FFS whether/how to define similar properties of a DL Tx beam or beam set/list.

**Q3: Is NW-side additional condition functionality specific?**

**Answer to Q3:** Please also refer to the answer to Q2 to understand the ongoing discussion about the associated ID for NW-side additional condition.RAN 1 agreed that the associated ID can be configured within CSI framework ~~as working assumption~~ and can be configured as one of the parameters in the set of inference related parameters for applicability report.

**Q4: RAN2 wonders what information is needed in Step 3 for UE to decide whether a functionality is applicable before Step 4. More specifically, RAN2 would like to ask the following questions (Q4-1 to Q4-5):**

**Answer to Q4:** RAN 1 agreed that following configurations are provided from NW to UE:

* + UE is allowed to do UAI reporting via OtherConfig,
  + The applicability report is based on A) and/or B)
    - It is up to RAN 2 to design the container
    - A) one or more of *CSI-ReportConfig* for inference configuration (wherein the associated ID may be configured in CSI framework ~~as working assumption applied~~)
    - B) One set or multiple sets of inference related parameters for applicability report only (not for inference)
      * It is up to RAN 2 to design the container
      * the set of inference related parameters selected from the IEs in/or the IEs referred by*CSI-ReportConfig* as a starting point

**Q4-1: In RAN2, it is FFS whether NW-side additional condition is mandatory or optional. In order to discuss further, RAN2 would like to understand whether it is feasible for UE to decide the applicable functionalities without NW-side additional condition?**

**Answer to Q4-1:** There is no consistency yet on whether it is feasible or not for UE to decide the applicability without NW-side additional condition.

**Q4-2: In RAN2, it is FFS whether configuration (e.g. inference configuration) other than NW-side additional condition can be included in Step 3. RAN2 would like to understand whether it is feasible and required for gNB to provide configuration (e.g. inference configuration) other than NW-side additional condition in Step 3 for UE to determine applicable functionalities?**

**Answer to Q4-2:** Please refer to the answer to Q4. In Step 3, it is feasible for gNB to provide *CSI-ReportConfig* for inference configuration (wherein the associated ID may be configured in CSI framework ~~as working assumption applied)~~ for UE to determine applicability. But it is not required to provide *CSI-ReportConfig* for inference configuration in Step 3. Instead, one set or multiple sets of inference related parameters for applicability report can be configured for UE to determine applicability in Step 3.

**Q4-3: For UE evaluating applicable functionality reporting, if the answer to Q4-2 is Yes, what is the relationship between NW-side additional condition and configuration (e.g. inference configuration)? For example, is NW-side additional condition part of inference configuration, or is inference configuration part of NW-side additional condition, or is NW-side additional condition separate from inference configuration, etc?**

**Answer to Q4-3:** Please refer to the answer to Q4. RAN 1 agreed that in Step 3, *CSI-ReportConfig* for inference configuration (wherein the associated ID may be configured in CSI framework ~~as working assumption applied~~) can be configured, or the associated ID may be configured as part of inference related parameters for applicability report.

**Q4-4: If the answer to Q4-2 is Yes, what is the content of configuration (e.g. inference configuration) for UE to determine applicable functionalities?**

**Answer to Q4-4:** Please refer to the answer to Q4.

**Q5: What is the content of applicable functionality reporting in Step 4?**

**Answer to Q5:** RAN 1 agreed that in Step 4, UE reports applicability for all the above A) one or more *CSI-ReportConfig* and/or B) set(s) of inference related parameters. And FFS on whether/what other information along with the applicability is needed.

**Q6: What is the content of inference configuration in Step 5?**

**Answer to Q6:** RAN 1 agreed that in Step 5, NW can optionally configure *CSI-ReportConfig* for inference configuration in *RRCReconfiguration*, where the associated ID may be configured in CSI framework ~~as working assumption applied~~. Note: Step 5 may be optional if UE has already been configured with *CSI-ReportConfig* in Step 3. The number of configurations is not expected to exceed the related UE capability of CSI report setting.

**Q7: If inference configuration is provided in Step 3, does it activate the functionality immediately upon receiving Step 3?**

**Answer to Q7:** RAN 1 agreed that if *CSI-ReportConfig* for inference configuration if configured in Step 3, applicable aperiodic CSI Report and semi-persistent CSI report can be activated/triggered by NW after the applicability reported, and applicable periodic CSI Report is considered as activated only if the applicability of the corresponding *CSI-ReportConfig* is reported in *RRCReconfigurationComplete*.

**Q8: If inference configuration is not provided in Step 3, does configuration in Step 5 activate the functionality immediately upon receiving Step 5?**

**Answer to Q8:** If inference configuration is not provided in Step 3, and if in Step 5, *CSI-ReportConfig* for inference configuration is configured, legacy CSI report configured/activated/triggered are reused.

**Q9: If more than one functionality are configured in Step 3 or Step 5, whether multiple/all applicable functionalities can be activated?**

**Answer to Q9:** RAN 1 agreed that for beam management, multiple CSI reports for inference for UE-side model can be configured/activated/triggered, which is up to UE capability.

2 Actions

**To RAN2:**

**ACTION:** RAN1 respectfully requests RAN2 to take the above replies into account in the future work.

3 Dates of the next TSG-RAN WG1 meetings

TSG RAN WG1 Meeting #120 17th – 21st Feb. 2025 Athens, Greece

TSG RAN WG1 Meeting #120bis 7th – 11th April. 2025 China

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| Company | Commnet |
| FL | The draft LS is based on the assumption that the proposal for applicablity report can be agreed.  And I will try to make to confirm the WA for associated ID, so that we can remove it from the LS.  With th agreed applicablity report, I cannot see any issue to confirm the WA.  Hope companies can be more flexible.  Note: the green highlight are something already been agreed. |
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