**3GPP TSG RAN WG2#127 R2-240xxxx**

**Maastricht, Netherlands, Aug 19th – 23rd, 2024**

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

**Release: Rel-19**

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

**Source: Intel Corporation (to be TSG RAN WG2)**

**To:** **TSG RAN WG1**

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**Attachments: None**

1 Overall description

For functionality based LCM for UE-sided model for beam management use case, RAN2 has studied and worked on the signalling procedure of applicable functionality reporting.

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RAN2 further has made following agreements and signalling procedure (see the attached figure) on applicable functionality reporting for beam management UE-sided model:



* **Step 1**: Network sends *UECapabilityEnqiry* message to initiate the procedure to a UE reporting its AI/ML supported functionalities.
* **Step 2**: UE sends *UECapablityInformation* message to network, containing supported functionalities at the UE side.
* “**Step 3**”: Following configurations are provided from NW to UE:

1) UE is allowed to do UAI reporting via OtherConfig.

2) Network may provide NW-side additional condition. FFS on the RRC signalling and whether it is mandatory or optional.

3) FFS on configuration (e.g. inference configuration) of supported functionalities. FFS on the content of configuration.

* (**between “Step 3” and “Step 4”**) UE decides the applicable functionalities based on NW-side additional conditions (if provided), UE-side additional conditions (internally known by UE) and model availability in device. FFS whether other configuration can considered by UE (e.g. inference configuration). FFS how the applicable functionality is decided if NW-side additional condition is not provided in step 3.
* “**Step 4**”: UE reports applicable functionality in the following scenarios:

1) Upon being configured to provide applicable functionality and upon change of applicable functionality via UAI

2) As response to NW-side additional condition requesting applicable functionality reporting in step 3, FFS other network configuration (e.g. inference configuration).

* **Step 5**:

1) Network configures inference configuration to UE after applicable functionality reporting, if inference configuration based on supported functionality is not provided in Step 3 (i.e. inference configuration is provided in Step 5).

2) If inference configuration based on supported functionality is provided in Step 3, it is up to network implementation whether to provide an updated configuration or not.

RAN2 also agreed the applicable functionality may be activated by receiving its inference configuration when it is provided in Step 5. FFS the initial activation state. FFS on initial state of applicable functionality if inference configuration of supported functionality is provided in Step 3. FFS on additional L1/L2 signaling for activation/deactivation. FFS if multiple applicable functionalities can be activated at the same time. FFS what is the granularity of functionality.

The above agreements were made based on the following assumptions:



NW-side additional condition is assumed as associated ID in RAN2 (which is assumed by majority of companies).

To further progress life cycle management for beam management UE-sided model, RAN2 has following questions for which RAN2 would like to check RAN1’s understanding:

On General

* 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?

On NW-side additional condition and configuration

* Q3: 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?
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* Q5: RAN2 wonder 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 (Q5-1 to Q5-4).
* Q5-1: 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? If yes, could RAN1 explain how consistency between training and inference can be achieved without NW-side additional condition in Step 3?
* Q5-2: In RAN2, it is FFS whether inference 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 for gNB to provide configuration (e.g. inference configuration) other than NW-side additional condition in Step 3 to for UE to determine applicable functionalities?
* Q4: For UE evaluating applicable functionality reporting, if the answer to Q5-2 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?
* Q5-3: the answer to Q5-2 is Yes , what is the content of configuration (e.g. inference configuration) for UE to determine applicable functionalities?
* Q5-4: the answer to Q5-2 is No , what is the content of inference configuration in Step 5?
* Q4-6: What is the content of applicability functionality reporting in Step 4?

On Functionality Activation

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

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

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

Q10: Is L1/L2 signalling for functionality activation/deactivation needed?

2 Actions

**To RAN1**

**ACTION:** RAN2 kindly requests RAN1 to take the above RAN2 agreements into consideration and inform RAN2 in case issues are identified, and kindly reply with RAN1 understanding to enable RAN2 further progress in functionality based LCM for UE-sided model for Beam Management use case.

3 Dates of next TSG RAN WG2 meetings

TSG-RAN WG2 Meeting #127bis Oct 14th – Oct 18th, 2024 Hefei, CN

TSG-RAN WG2 Meeting #128 Nov 19th – Nov 22nd, 2024 Orlando, US

4 Comment (to be deleted after RAN2 discussion)

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| **Company** | **Comment (suggestions and other questions)** |
| OPPO | * We think Q4 should be merged with Q5-2, because Q4 is based on the assumption that inference configuration is provided in step 3, otherwise, there is no relationship between NW-side additional condition and inference configuration in Step 3. More addition, Q5-3 is also based on the assumption that inference configuration is provided in step 3, better to merge with Q5-2 as well for simplicity. So we suggest to delete Q4 and Q5-3, and revise Q5-2 as the following:   + Q5-2: Is it feasible for gNB to provide inference configuration to UE in Step 3 to determine applicable functionalities at UE side? If feasible, what is the content of inference configuration in Step 3 based on supported functionality? what is the relationship between NW-side additional condition and inference configuration in Step 3? NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, etc? * For Q5-4, to make the question clear enough, we suggest to revise Q5-4 as the following:   + Q5-4: If inference configuration is not needed in Step 3, i.e. inference configuration is provided in step 5, what is the content of inference configuration in Step 5? what is the relationship between NW-side additional condition and inference configuration in Step 5? NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, etc?   [Rapp] In rapporteur’s understanding, the relationship between NW-side additional condition and inference configuration is the foundation of the discussion. Hence, rapporteur suggests to keep Q5 in the beginning.   * For Q5-5, we understand it should be merged into Q5-2 or put under Q5-2 as one additional question, it’s not relevant to Q5-4, so better not to put Q5-5 under Q5-4. * For Q7, we think the question may have logic problem as there may be no inference configuration before Step 3, so suggest to revise Q7 as the following to make it clear:   Q7-1: If inference configuration is needed in Step 3, what is the initial activation state of UE-sided model upon receiving Step 3?  Q7-2: If inference configuration is not needed in Step 3, what is the initial activation state of UE-sided model upon receiving Step 5?  [Rapp] Please see the updated questions. |
| vivo(Boubacar) | 1. We should have a question addressing:  * “FFS on the RRC signalling and whether it is mandatory or optional.” e.g. Qx-y: Whether Network providing NW-side additional condition in step 3 is mandatory or optional? * [Rapp] Rapporteur thinks this is covered by Q5-1? * “FFS on initial state of applicable functionality if inference configuration of supported functionality is provided in Step 3” * [Rapp] rapporteur further clarify the question in Q7 and Q8 for different scenarios.  1. Suggest to put these definitions on top of the discussion:   Furthermore, RAN2 also agreed the following understandings on terminologies:   |  | | --- | | **Supported functionalities** refer to functionalities that UE can indicate by using UE capability information (via RRC/LPP signalling)  **Applicable functionalities** refers to functionalities that the UE is ready to apply for inference  **Activated functionalities** refers to functionalities already enabled for performing inference |   [Rapp] Thanks. updated.   1. On Q3, we understand we are interested at knowing the content of NW-side additional condition, not the format, right?. So, we suggest:  * Q3: What is the content ~~format~~ of NW-side additional condition? * [Rapp] Thanks. updated.  1. On Q4:  * Step 3 simply uses configuration and FFS about the content, thus “inference” is not used in the current sentence and the following ones. * [Rapp] updated to align with RAN2 agreement.   On “NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, etc?” we think we should also consider that “inference configuration is part of NW-side additional condition”  [Rapp] Added for completeness.   1. Q5-2, Is “applicable functionalities” referring to “supported functionalities”?   [Rapp] further update in Q5-2 to avoid misleading. Since RAN2 agreement already captured this configuration is of supported functionalities, we will not emphasize here, but instead, we indicate some RAN2 companies’ understanding (proponent) how to use it. |
| Google | 1. For Q3 and Q6, they are related to the information of NW-side additional condition and should be merged or put together. Besides, the wording “format” is a bit ambiguous and may be wrongly considered as the ASN.1 format in RRC or other format in L1/L2 signalling. We prefer to revise Q3 and Q6 as the following part:   * Q3: What is the form/content of NW-side additional condition? Whether NW-side additional condition is functionality specific?   [Rapp] rapporteur update it as “content” and further check if RAN2 assumption is correct.  2. For Q4, we should focus on the relationship discussion between NW-side additional condition and inference configuration. The description of Q4 should be general without considering the detailed cases or steps. Besides, as vivo suggested, we also need to consider the third option for the relationship. Thus, Q4 can be revised as showed below:   * Q4: what is the relationship between NW-side additional condition and inference configuration? NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, or inference configuration is part of NW-side additional condition etc?   [Rapp] See updates.  3. For Q5, we want to know whether NW-side additional condition and/or inference configuration are needed before step 4. Moreover, RAN1 is also expected to provide the answer to the content of the inference configuration. For Q5-2, as indicated above, the wording is unclear and need to be updated. For Q5-3 and Q5-5, they are for the same case and should be put under the same branch. In a summary, the Q5 can be revised below:   * Q5: What is needed from NW side by UE to decide applicable functionality before Step 4 (e.g. NW-side additional condition and/or inference configuration from network)?   + Q5-1: Is it feasible for UE to decide the applicable functionalities without NW-side additional condition? If yes, what information does UE use to decide applicable functionality?   + Q5-2: Is it feasible for gNB to provide inference configuration in Step 3 for UE to determine applicable functionalities?   + Q5-3: If inference configuration is needed in Step 3:     - Q5-3-1: what is the content of inference configuration in step 3 based on supported functionality?     - Q5-3-2: If inference configuration is updated in step5, what is the delta between configuration in Step 3 and Step 5?   + Q5-4: If inference configuration is not needed in Step 3, what is the content of inference configuration in Step 5?   4. For Q7, the “initial activation state” may mislead that the initial state is activation. So, we prefer to reword it as “the initial state”. Besides, we agree with OPPO on the updates of Q7. Consequently, the Q7 can be updated below:  Q7-1: If inference configuration is needed in Step 3, what is the initial state of UE-sided model upon receiving Step 3?  Q7-2: If inference configuration is not needed in Step 3, what is the initial state of UE-sided model upon receiving Step 5? |
| NEC | Basically, we think it is good to instruct RAN2 questions based on FFS (highlighted in yellow).  Comments for “General Questions”   1. Suggest removing “For examples,” part as below. Since the question is straight forward, RAN1 can understand easily. Q1: What is the granularity of supported functionality? ~~For example, per use case (e.g. beam management), per sub-use case (e.g. beam management Case 1), or others?~~   [Rapp] Examples may help RAN1 understands better on what we are asking about. Rapporteur suggests to keep it unless there’s strong concern.   1. Wording suggestion: change “the same use case” to “ the same conditions” as below. Since applicable functionalities is assumed to be decided based on NW-side additional conditions (if provided), UE-side additional conditions (internally known by UE) and model availability in device.   Q2: Whether multiple applicable functionalities under the same ~~use cases~~ conditions are supported or not?  [Rapp] this is further merged in Q8.  Comments on NW-side additional condition and configuration   1. Before Q2, we think it is also good to check RAN1 view on “associated ID”, so we suggest adding following question to Q3. Q3: What is the definition and format of NW-side additional condition? Is RAN2 assumption (NW-side additional condition is assumed as associated ID) correct? If yes, how UE to know/understand NW-side additional condition via associated ID? 2. Question on “what is the relationship between NW-side additional condition and inference configuration in Step 3?” in Q4. How does this question come from? I guess this is from the below agreement:   2) As response to NW-side additional condition requesting applicable functionality reporting in step 3, FFS other network configuration (e.g. inference configuration).  Suggest changing to:  Whether UE needs to report applicable functionality with regard to other network configuration in step 3 (e.g. inference configuration)?  [Rapp] This question is mainly motivated from post email discussion with companies different understanding. Since most companies are ok with it, rapporteur suggests to keep it as it is.   1. “NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, etc? ” in Q4 will mislead RAN1, suggest removing this part. 2. Q5-2, Q5-3, Q5-4 and Q6 should be asked before Q4.   [Rapp] Q6 is moved after Q3. However, for Q5-2 to Q5-4, rapporteur thinks it would be good to ask after understanding of the relationship between NW-side additional condition and inference configuration. Otherwise, companies’ assumptions might be different.   1. Suggest changing “applicable” in Q5-2 to “supported” since in Step 3, NW only knows the supported functionalities reported by UE in Step 2. 2. Suggest adding “supported” as below in Q6.   - Q6: Whether NW-side additional condition is supported functionality specific? |
| Samsung | Q1: we are not sure to limit to “supported” functionality. Rather we first need to ask the general functionality. We prefer to remove “supported” and naturally don’t need to add “UE capability”.  [Rapp] Agree don’t need to add UE capability. To make it clear, rapporteur add the step in the beginning and remove “supported”.  Q3: RAN2 understand that associated ID can be configured to indicate NW-side additional conditions. Is this question to ask what additional information is included for NW-side additional conditions? The more detailed content would be good but we feel that it might not be so urgent for now. If companies want to ask, we would be ok.  [Rapp] The question is mainly to confirm RAN2 assumption, which is provided further in the example. Q4: for the first sentence, this question is a bit confusing. Is it to confirm RAN2 agreement “UE decides the applicable functionalities based on NW-side additional conditions (if provided), UE-side additional conditions (internally known by UE) and model availability in device.” ? Otherwise, we prefer to remove it.  Q4: for the second sentence, is it to ask what kind of additional condition is needed in Step 3 in addition to NW-side additional conditions? If yes, it might be overlapped with Q5-1 and Q5-2?  [Rapp] The question is mainly motivated based on post email discussion we had during last meeting, to better understand the overlap between NW-side additional condition and configuration. Q5-1 and Q5-2 are different questions for mandatory or optional signaling.  Q5: Is this question related to Q5-1-4?   * Q5. What information can be provided to UE in Step 3, in order for UE to decide applicable functionality before Step 4? The following are more specific questions.   Q5-1: we would suggest the following update.   * “Q5-1: 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. If yes, what information does UE use to decide applicable functionality? * [Rapp] Is it necessary to repeat the RAN2 assumptions again in the question? This might also be applicable to other questions (which majority of them are based on FFS). Rapporteur thinks it might be good to avoid duplication?   Q5-2: we would suggest to clarify Q5-2 more as follows.   * Q5-2: In RAN2, it is FFS whether inference configuration (e.g. inference configuration) other than NW-side additional condition can be included in Step 3. Is it feasible for gNB to provide inference configuration UE in Step 3 in order to configure applicable functionalities?   Q5-3 & 4: we feel that it is not so urgent. If it is preferred to ask, we could just merge them by asking what is the content of inference configuration to enable applicable functionality at UE side? Inference configuration would not change in Step 3 and Step 5.  [Rapp] The question is related to the full inference configuration and partial configuration provided in Step 3 or not. Rapporteur tends to think separate question will be clear for different scenarios.  Q7: the question can be clarified as follows.   * If inference configuration is provided in Step 3, what is the initial state (activated or deactivated) of the configured functionality?   Q8: the question can be clarified as follows.   * If more than one applicable functionalities are configured in Step 5, whether all the functionality can be activated?   Rapp] Thanks. Please see the updated questions. |
| Nokia | We suggest the following changes and have a few comments.   * Change the LS title to “LS on LCM for beam management UE-sided model” * [Rapp] I change the title to applicable functionality reporting for BM UE-side model to be clear that we mainly focus on this aspect. * In the call flow, there is a typo in the word “enquiry”. * [Rapp] updated. * **Step 1**: Network sends *UECapabilityEnquiry* message to initiate the procedure ~~to a~~ for UE reporting of its AI/ML supported functionalities. * “**Step 3**”: Following configurations are provided from NW to UE:   1) Whether UE is allowed to do UAI reporting via OtherConfig.  2) ~~Network may provide~~ NW-side additional condition(s). FFS on the RRC signalling and whether it is mandatory or optional.  3) FFS on configuration (e.g. inference configuration) of supported functionalities. FFS on the content of configuration.   * (**between “Step 3” and “Step 4”**) UE decides the applicable functionalities based on NW-side additional conditions (if provided), UE-side additional conditions (internally known by UE) and model availability in device. FFS whether other configuration can be considered by UE (e.g. inference configuration). FFS how the applicable functionality is decided if NW-side additional condition is not provided in step 3. * “**Step 4**”: UE reports applicable functionality in the following scenarios:  1. Upon being configured to provide applicable functionality report   2) ~~and u~~Upon change of applicable functionality(ies)~~via UAI~~  ~~2)~~3) As response to NW ~~side additional condition~~ requesting applicable functionality reporting in step 3, FFS other network configuration (e.g. inference configuration).   **We propose splitting 1) into two bullets and either rewording or removing the last bullet since it is captured by “upon change of applicable functionality’.**   * **Step 5**:  1. Network ~~configures~~provides inference configuration to UE after applicable functionality reporting, if inference configuration based on supported functionality is not provided in Step 3 (i.e. inference configuration is provided in Step 5).   [Rapp] As replied to HW’s comment, rapporteur tends to use the original context from RAN2 agreement to avoid any misleading to RAN1.   * NW-side additional condition is assumed to be identified by an ~~as~~ associated ID (which is ~~used~~ assumed by majority of companies). Other inference configuration (e.g. CSI-RS resource configuration, etc) is considered as separate~~ly~~ from NW-side additional condition, i.e. it is not considered as part of NW-side additional condition in below proposals. It is up to RAN1 about the details of NW-side additional condition. * For Q1, could we also add “per configuration”, and could we also ask about the positioning use case? We also agree with Samsung’s comment that we don’t need to limit this to “supported” functionalities. We need a firm definition for “functionality”, anyway. * [Rapp] To make it clear, rapporteur add the step in the beginning and remove “supported”. For positioning, since we mainly focus on BM use case in this LS, which was also agreed during online meeting. For “per configuration”, at least this is not clear to rapporteur how to associate this with functionality granularity. Rapporteur thinks the questions with “others” listed in the end, still give RAN1 flexibility to discuss their understanding on different options. * For Q3, could we also ask about “content” in addition to format? Perhaps this definition could be one we could use in the normative phase already. * [Rapp] changed to “content”. * Q4: For UE evaluating and reporting applicable functionalit~~y reporting~~ies, what is the relationship between NW-side additional condition(s) and inference configuration in Step 3? Are NW-side additional conditions ~~is~~ part of inference configuration, or are NW-side additional conditions ~~is~~ separate from inference configuration, etc? * Q5: What is needed by UE to decide applicable functionality before reporting applicable functionality in Step 4 (e.g. NW-side additional condition and/or inference configuration from network)? * Q5-3: If inference configuration is ~~needed~~ provided in Step 3, what is the content of inference configuration based on supported functionality? * Q5-4: If inference configuration is not ~~needed~~ provided in Step 3, what is the content of inference configuration in Step 5? * Q6: ~~Whether~~ Are NW-side additional condition(s) ~~is~~ functionality specific? * Q7: What is the initial ~~activation~~ state of UE-sided ~~model~~ applicable functionality ~~before~~ after Step 3? * Q8: Is L1/L2 signalling for functionality activation/deactivation ~~needed~~supported?   **ACTION:** RAN2 kindly requests RAN1 to take the above RAN2 agreements into consideration, and kindly reply with RAN1 understanding to enable RAN2 further progress in LCM for beam management UE-side~~d~~ model~~LCM~~. |
| Apple | First, we don’t agree to make change on agreed description of step 1-5 (as RAN2#127 agreement). If company have concern on the wording, they should raise online.  Secondly, we think the agreement on 3 definitions can also be included.  Then, we provide comments for each question:   * Q1: I tend to agree with Rapporteur original version. We understand the intention of this question is related to Step 1 and 2 on UE capability contents (i.e. supported functionality). If we extend to “functionality”, we think RAN1 may misunderstand it is general question of definition which is usually hard to converge in RAN1. Meanwhile, step 1 and 2 have clearly mentioned “supported functionality in capability signalling”. So, it seems to be redundant to add “expressed in capability”. * [Rapp] To make it clear, rapporteur add the step in the beginning and remove “supported”. * Q2: we agree with Samsung’s suggestion that it is more readable if it is moved to questions on “On Functionality Activation”. For example:   Q9 If more than one applicable functionalities are configured in Step 5, whether all the functionality can be activated?   * Q3: we suggest to remove this question. If the intention is to confirm associated ID, I think the NOTE has clearly explained all the RAN2 agreements are based on associated ID. If RAN1 have concern, they can raise it in response. * [Rapp] The question is mainly to confirm RAN2 assumption, which is provided further in the example. Since most companies are ok, rapporteur thinks there’s no harm to check directly in the question. * Q4: we agree with other company to remove the first sentence. To make it more readable, we suggest to rephase it as follows:   Q4: ~~For UE evaluating applicable functionality reporting~~, In RAN2, it is FFS whether inference configuration (e.g. inference configuration) other than NW-side additional condition can be included in Step 3. In order to discuss further, RAN2 would like to understand, if inference configuration is provided in step 3, what is the relationship between NW-side additional condition and inference configuration in Step 3? NW-side additional condition is part of inference configuration, or NW-side additional condition is separate from inference configuration, etc?  [Rapp] Rapporteur thinks the current background in the question is general and RAN1 can refer RAN2 agreements for the details.   * Q5/5-1/5-2: we basically agree with Samsung’s suggestion. In detail, we prefer below change (some rephasing in Q5-2): * Q5. What information can be provided to UE in Step 3, in order for UE to decide applicable functionality before Step 4? The following are more specific questions.   + Q5-1: 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. If yes, what information does UE use to decide applicable functionality?   + Q5-2: In RAN2, it is FFS whether inference configuration (e.g. inference configuration) other than NW-side additional condition can be included in Step 3. Is it feasible for gNB to provide inference configuration ~~UE~~ in Step 3 for the UE to determine applicable functionalities?   [Rapp] See updates.   * Q5-5: we suggest not to put Q5-5 under Q5-4. It can be independent with Q5-4. * Q7: We agree with the formulation suggested by OPPO, but we think “initial activation status” should be changed to “initial status (activation or deactivation)”. And “needed” should be replaced with “provided”. So, we suggest below change:   Q7-1: If inference configuration is provided in Step 3, what is the initial state (activation or deactivation) of UE-sided model upon receiving Step 3?  Q7-2: If inference configuration is not provided in Step 3, what is the initial state (activation or deactivation) of UE-sided model upon receiving Step 5?  [Rapp] Please see the updated questions. |
| Xiaomi | Since we agreed the LCM shall be under NW control, the key point is how NW can be aware of the applicable functionality. In case NW additional condition is not provided to UE, our understanding is UE first report the functionality, which fulfils the UE side additional condition and model availability. Note the reported functionality can be a super set of the ‘applicable’ functionality. NW can further determine the applicable functionality based on the reported functionality. In current question, RAN1 may be confused how UE can decide applicable functionality without NW side additional condition. With above assumption, we suggest to further clarify how the procedure works in this case.  The key question is whether it’s feasible to determine the applicable functionality in a joint way, i.e. UE reports the functionality which fulfils the UE side additional condition and model availability, then NW decides the applicable functionality based on the report.   * + Q5-1: 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’s feasible to determine the applicable functionality in a joint way, i.e. UE reports the functionality which fulfils the UE side additional condition and model availability, then NW decides the applicable functionality based on the report.   + [Rapp] For Q5-1, if it’s feasible UE’s decision on applicable functionality doesn’t need NW-side additional condition, then it is the “joint way” as you mentioned? For clarification, rapporteur further add example of RAN2 discussion for RAN1 information. |
| Ericsson | Q3: Please see our comment in the bubble  Q5-1: Please see our comment in the bubble  Q5-2: Please see our comment in the bubble  Q5-3: Please see our comment in the bubble. Currently this sentence reads strange. If inference configuration is provided in step-3, obviously the configuration contains the inference configuration. The objective of this question should be instead to ask RAN1 about the content of the inference configuration if that is provided in step-3. Suggest following change:  “If inference configuration is provided in Step 3, what is the content of configuration (e.g. ~~inference configuration~~ set A and/or set B configuration, associated ID, etc)"  ”  Q5-4: Please see our comment in the bubble. We noticed that we do not have any question about the content of the step-4. That is important, especially for the case in which the inference configuration is not provided in step-3. And also for the case in which the inference configuration can be provided in step-3, so that gNB can decide the need or not for a delta configuration in step-5.  So RAN2 needs to know what is the content of the applicability reporting that RAN1 expects. We should ask RAN1 inputs on this, in order to facilitate progress in RAN2. Suggest adding the following question to Q5-4:  “Depending on whether the inference configuration is provided or not by the gNB in step-3, what is the expected content of the applicability functionality reporting in step-4?”  Q9: Please see our comment in the bubble |
| Samsung [09/04] | Regarding Q5-2, we would prefer to keep this question because the key question is whether it is feasible for gNB to provide inference configuration before gNB receives UE reporting of applicable functionalities.  If we don’t want duplicated response, we could remove Q5.  We were thinking that Q5 is a bit high level questions and Q5-2 is more specific question. That is why numbering is related.  We wonder if Q5 can be reworded as follows.   * Q5: RAN2 wonder what information is needed in Step 3 for UE to decide whether a functionality is applicable before Step 4 (e.g. NW-side additional condition and/or inference configuration from network in Step 3). More specifically RAN2 would like to ask the following questions (Q5-1 to Q5-4).   We have some minor comments for clarification.   1. Minor clarification on Q5-2 and Q5-3  * Q5-2: In RAN2, it is FFS whether ~~inference~~ configuration (e.g. inference configuration) other than NW-side additional condition can be included in Step 3. Is it feasible for gNB to provide configuration (e.g. inference configuration) **other than NW-side additional condition** in Step 3 for UE to determine applicable functionalities? * Q5-3: If **the answer for Q5-2 is Yes**~~inference configuration is provided in Step 3~~, what is the content of configuration (e.g. inference configuration) for UE to determine applicable functionalities? * Q5-4: If **the answer for Q5-2 is No** ~~inference configuration is not provided in Step 3~~, what is the content of inference configuration in Step 5?      1. Minor clarification on Action   **ACTION:** RAN2 kindly requests RAN1 to take the above RAN2 agreements into consideration and inform RAN2 in case issues are identified, and kindly reply with RAN1 understanding to enable RAN2 further progress in functionality based LCM for UE-sided model for Beam Management use **case**. |
| Sharp | We would like to clarify the following:  Q-4: If the NW-side additional conditions are provided to the UE, are they provided separately or as a part of inference configuration? NW side additional conditions and inference configuration maybe jointly or individually provided (if the NW side additional conditions are optional).  Clarify if there is any correlation between NW side additional conditions and inference configuration in step 3.  Somewhere in between step 3 and 4:  The UE determines the applicable functionalities based on the following factors: network-side additional conditions (if provided), UE-side additional conditions (internally known by the UE), and the availability of models on the device. FFS is needed to assess whether other configurations (e.g., inference configuration) can be considered by the UE. Additionally, FFS is needed on how the applicable functionality is determined if network-side additional conditions are not provided in Step 3. For example, can the UE determine applicability functionality based on model availability, UE side conditions and inference configuration?  Regarding Q-9:  If multiple functionalities are defined per use case or sub-use case, whether all or **multiple** functionalities can be applicable concurrently for a sub-use case, across sub-use case of a use case, and across different use cases? Whether multiple applicable functionalities can be (de)activated. |
| Apple | 1. On Q5-1, we have similar view as Ericsson. We don’t understand what is “Network check the NW-side additional conditions" means. It is very confusing. Meanwhile, please note that the discussion on consistency between training and inference is led by RAN1. We believe RAN2 doesn’t need to provide example to educate RAN1. Based on that, these example is not acceptable to us. We prefer to remove the part from “e.g.”. 2. On Q5-2, we prefer to keep it, and Samsung’s suggestion looks good to us. |
| Interdigital | For the UE to start using an AIML functionality, the following should be fulfilled:   1. There is at least one model for the functionality 2. The model must have been trained under current UE side additional conditions 3. The model must have been trained under current network side additional conditions 4. The UE must have been provided with the inference configuration needed by the model   The applicability determination can follow one of the following alternatives (in all these alternatives, UE first must check there is a model for the functionality):   * Alt 1: UE considers the functionality applicable if UE side additional conditions are fulfilled * Alt 2: UE checks if both UE and network side additional conditions are fulfilled * Alt 3: UE checks if both UE and network side additional conditions are fulfilled and if the required inference configurations are available     In Alt 1, UE must indicate in the applicability for which network side additional conditions the functionality is applicable, and it must get a response from the network which network side additional conditions to consider (because otherwise, how will the UE choose the right model, assuming that there were different models for the different network side additional conditions that are all trained for the same UE side additional condition?)  In Alt 2, UE may need to be configured further with inference configuration (if it doesn’t have it already)  In Alt 3, UE has everything it needs to activate the correct model for that functionality  *Could we add one high level question (before Q2) listing the 3 alternatives above and asking what is RAN1’s understanding of applicability determination?*  The questions we have now are somehow addressing these alternative ways of applicability determination, but they are delving into the details without a high-level understanding of the applicability determination.  [Rapp] Thank you for the comment. Technically, rapporteur agrees above options are possible alternatives for UE to determine applicability. However, rapporteur thinks the answer to Q4-1 and Q4-2 can help RAN2 to understand which alternative is used. The key focus of all the questions is trying to figure out the signaling impact, therefore, rapporteur thinks it would be good to ask content directly. Also, it might be a little bit late to re-structure all questions after phase 2.  Q7/8: Can they be combined? Basically, we want to know if the UE needs further signalling to activate the functionality or it can activate it immediately if the functionality is applicable?  *Q7/8: Does the UE need further indication/configuration to activate the functionality after receiving the inference configuration (in step 3 or 5) or can it activate the applicable functionality immediately?*  [Rapp] it is difficult to merge the two questions into the same one, as for the case configuration is not provided in step 3, UE will still receive certain information in step 3 (e.g. allowed to report and NW-side additional condition). Then the question is not clear whether the initial state in step 3 is for which scenario. Hence, rapporteur thinks it is better to have separate questions. But rapporteur tends to agree “can it activate the applicable functionality immediately?” could help to avoid confusion of “initial state”.  Not sure if we need Q9 or at least clarify that it is referring to the case where the answer to Q7/8 is that further activation is not required. That is, if a further activation is required, then of course the network can choose to activate which of the functionalities that the UE has indicated to be applicable and there is no ambiguity.  [Rapp] Even further activation is required, there could be still some possibility that multiple applicable functionalities to be activated – depending on the granularity of functionality. Then Q8 is a question ask in general, which should be ok? |