

3GPP TSG-RAN WG1 Meeting #113
Incheon, Korea, May 22nd – May 26th, 2023

R1-2305769



Agenda Item: 9.17
Source: Moderator (Ericsson)
Document for: Information

Title: Recommendations for RAN1 RRC Parameter Preparation

Revision of R1-2202913

Abstract



- This document is a revision of R1-2202913 to capture the RAN2 review at RAN2#121bis-e and the following endorsement by RAN2 Chair.

Comments to [R1-2202913/R2-2303634](#):

Slide 7, To what extent the columns E/F are used/populated in the end, may be decided case-by-case in RAN2.

Slide 9, The text in Column J should be such that RAN2 could copy it into the specification as a starting point for the RRC field description.

Slide 10, Column L: Default values are in practice less important and may cause some work. RAN1 should not spend time to specify default values for the purpose of signaling overhead optimization.

Slide 11, Column M: One company pointed out that RAN1 suggested parent IE provides a lot of information to RAN2 on the RAN1 intention, is thus important, and could be put in a separate column.

Slide 12, To avoid ambiguity, it is suggested to rename column N to “Required for initial access or IDLE/INACTIVE”

Slide 13, on Lists, it would be helpful to RAN2 that RAN1 provides explanations how a list is used, e.g. how / how often it is expected to be modified, rather than just suggesting ASN1 implementation, which RAN2 likely anyway would re-analyze (e.g. using AddMod-List or similar).

⇒ **[000] With comments for consideration, RAN2 acknowledges the use “Recommendations for RAN1 RRC Parameter Preparation” ([R1-2202913/R2-2303634](#)) in the RAN1 work on Rel-18 RAN1 Parameter lists.**

- The guidelines are **updated** accordingly based on the above review.

Outline



- Background
- Motivation
- Q&A
- Suggested guidelines
- Recommendations

Background



- Similar to previous releases, RAN1 has started discussions to prepare a list of RRC parameters for Rel-17 PHY layer functionalities that are dependent on higher layers.
- The list is intended to provide necessary information to RAN2 such that RAN2 can accomplish necessary RRC implementations to support Rel-17 PHY layer functionalities.
- For this purpose, an ExcelSheet with Columns labeled as below has been used in RAN1 since Rel-15 to facilitate communication between RAN1 and RAN2.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	WI code	Sub-feature group	RAN1 specification	Section	RAN2 Parent IE	RAN2 ASN.1 name	Parameter name in the spec	New or existing?	Parameter name in the text	Description	Value range	Default value aspect	Per (UE, cell, TRP, ...)	UE-specific or Cell-specific	Specification	Comment

- Observing different approaches used in RAN1 for preparing the RRC parameter list and in RAN2 for using the list, it may be beneficial to discuss the WHY/HOW/WHAT aspects of the task at hand:
 - WHY: Good understanding of primary goal of the task
 - HOW: Embrace constructive, consistent and effective practices to achieve the goal
 - WHAT: Use the Excelsheet appropriately by understanding the intention of the entries of different columns
- This document discusses the aspects above and suggests a set of recommendations and guidelines that hopefully would benefit RAN1 for the task at hand.

Motivation



- **RAN1 primary goal** is to provide information to RAN2 such that RAN2 would achieve a clear understanding on what RRC parameters are needed and how they should be configured to support a feature. **As long as RAN2 reaches the proper understanding based on the information provided by RAN1, the goal is achieved.**
- The Excelsheet is a structured tool intended to help RAN1 to send the information that is needed from RAN2 point of view for the purpose of implementing RRC.
- Proper input in the Excelsheet by RAN1 prevents unnecessary work at RAN1 and RAN2.
- In the past, some columns in the Excelsheet have been observed to be understood differently in RAN1 than was originally intended by RAN2.
 - This document provides explanations in the form of Q&A based on discussions with the TS 38.331 rapporteur to clarify the intention of these columns.

Motivation



- Based on past experience, RAN2 may start running CRs to process the input from RAN1 as soon as it receives the first LS on RRC parameters.
 - A good quality LS from RAN1 prevents unnecessary work in RAN2, and consequently in RAN1.
- In the past, it was occasionally observed that RAN2 was hesitant to make any changes on the input received from RAN1, although it is up to RAN2 to implement the RRC parameters in the way that is most suitable.
 - If RAN1 addresses this issue e.g., via LS to RAN2, it would help to ensure that RAN2 applies their expertise to achieve a good RRC implementation.

Q&A: Column E & F

Reserved for RAN2!



- **Should there be any input in Column E, Column F from RAN1?**
- In Rel-16, E&F were empty, and RAN2 filled them out after ASN.1 code review.
- If there is information that from RAN1 point of view is suitable for these columns (e.g., the IE that RAN1 think is the most appropriate for an RRC parameter is pucch-Config) **RAN1 can provide this information in column M (see next Q&A) and leave E&F columns empty.**
 - This allows RAN2 to learn about RAN1's intention on where the parameter should end up (e.g., in pucch-Config) and can implement accordingly if appropriate in terms of ASN.1.
- **To what extent the columns E/F are used/populated in the end, may be decided case-by-case in RAN2.**

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Q&A: Column I

Parameter name in the (L1) text



- **What is Column I for?**

- It is intended for current name in RAN1 spec or the temporary name that RAN1 uses.
- Probably in Rel-17, similarly to previous releases there will be an activity to ensure alignment with RRC parameter names adopted by RAN2 across specifications.

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Q&A: Column J

Description



- **What is the recommendation for this column?**
- The text in Column J should be such that RAN2 could copy it into the specification as **a starting point for the RRC field description**. Field description should be short and precise and describe how the UE shall use the given values. The unit for a parameter should be given, when applicable, e.g., ms, slot, symbol, dB, etc.
- This column is important. Think carefully what RAN1 would like to achieve with the RRC parameter. Ask yourself the question: "**What does the UE do when the NW sets the field? What does the UE do if it is absent?**"
- How the feature works, and how different parameters are used, is described in other specs, e.g. RAN1 specs. References can be made to clauses in other spec for the expected behavior when applicable. TBD place holders can be used if corresponding clauses are not available yet. These place holders can be updated in later revisions.
- Column J is **not** for explanations, discussions, background, agreements, reasons, etc. to comment
 - Provide background information in Column P if you think it could help RAN2 in designing the ASN.1.

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Q&A: Column L

Default Value



- **What is the Recommendation for Default values?**

- Default values are **primarily important for cases where the NW has not yet provided a (UE-specific) configuration**,
 - in IDLE/INACTIVE mode and
 - during initial access (until network knows the UE Capabilities and sent the first RRCReconfiguration)
- In all other cases default values are less important, **but...**
 - It should be clear what a UE does when a parameter or feature is not configured
 - Sometimes a default parameter value helps to reduce signaling in "typical cases" (e.g. if the value range is large but most often the default value is used)
 - RAN2 uses this information also to decide whether and how to apply delta signaling
- In RAN2 we separate between
 - "if the field is not configured, the UE shall..."
 - This means the field is not present in this message and has not been configured before, the UE shall <use the default value>
 - "if the field is absent, the UE shall ..."
 - This means irrespective of whether the field is previously configured, the UE shall <use the default value>
 - Here it would be preferred if the default value is a fixed constant, because this translates to the ASN.1 DEFAULT, and we need not "set" the value in procedure text/field description.

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Q&A: Column M

Per UE, serving cell, BWP, TRP, ...



- **What is the purpose of column M?**
- Column M: RAN1 can provide information that gives clarity to RAN2 on the level that configuration of an RRC parameter changes, e.g., per cell, per BWP, per TRP... . This information is important!
 - Some background: In Rel-15, by introduction of BWP in RAN1, a UE specific parameter, can be configured differently in different BWPs of the UE. Therefore, RRC parameters had to be revisited to clarify whether a parameter (that previously e.g., was tagged as per cell) was the same, or different for the all the BWPs configured in the cell to the UE.
- Based on the same logic, if RAN1 has an opinion on which parent information element (IE) is suitable for an RRC parameter (e.g., pucch-Config), **RAN1 may provide that information (“in pucch-Config”) in Column M.**
 - By this, RAN1 also informs RAN2 that this parameter is per UE and per BWP as in pucch-Config, and hence it would be redundant (but not conflicting) to mention per UE, or per BWP etc. in addition to “in pucch-Config”, in column M.
- **RAN1 suggested parent IE provides a lot of information to RAN2 on the RAN1 intention, is thus important, and could be put in a separate column.**

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Q&A: Column N



"Cell-Specific" vs. Common IEs

• How are Cell-specific and Common IE applied?

- RRC ASN.1 has information elements and fields where the name ends with “Common”. They were meant to contain the information that a cell broadcasts in SIB1 (and during mobility to a target cell). I.e., the basic parameters that a UE needs for initial access. Hence, those parameters are always cell-specific (i.e., common for all UEs in a cell). **RAN2 usually added new L1 parameters to the xxxCommon IEs when column N of the table said “Cell-Specific”,**
- However, when we introduced support for bandwidth parts late in Rel-15 we instantiated some of those xxxCommon IEs also in the dedicated configuration. E.g. one can configure pdccch-ConfigCommon inside a dedicated BWP. This made some sense since those parameters usually require alignment among different UEs in the same cell. However, it causes now also some problems when we add new fields to those information elements which are only meant to be used in dedicated BWPs for UEs that support the feature. From the ASN.1 structure it appears as if the field could also be configured in SIB1.
- **Observation:** But not all parameters which require alignment among UEs in a cell are also needed for initial access. RAN2 should only put those parameters into the xxxCommon that the UE needs for initial access. All other parameters should go into other IEs (without xxxCommon).
- **Request: Set column N to "cell-specific" only if the parameter is already required during initial access or in IDLE/INACTIVE.** Preferably mention this also in column J (Description) or in P (Comment). RAN2 will put only those in the xxxCommon IEs.
 - **To avoid ambiguity, it is suggested to rename column N to “Required for initial access or IDLE/INACTIVE”**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	WI code	Sub-feature group	RAN1 specification	Section	RAN2 Parent IE	RAN2 ASN.1 name	Parameter name in the spec	New or existing?	Parameter name in the text	Description	Value range	Default value aspect	Per (UE, cell, TRP, ...)	UE-specific or Cell-specific	Specification	Comment

Q&A: List



- **What is your view on RAN1 describing entries using AddModList, etc.?**
- ToAddMod list, is a special flavor of the list which makes it more efficient to add, remove or change elements in a list. Whether that is necessary or not, it is better to be left to RAN2 to judge.
 - **It is sufficient if RAN1 clarifies that it should be a list up to e.g., 10 elements.**
- Also, RAN1 can suggest to RAN2 if RAN1 thinks using ToAddModList is a better way. However, the implementation of the list is up to RAN2.
- **It would be helpful to RAN2 that RAN1 provides explanations how a list is used, e.g. how / how often it is expected to be modified, rather than just suggesting ASN1 implementation, which RAN2 likely anyway would re-analyze (e.g. using AddMod-List or similar).**

Q&A: RRC and Feature IEs



- What is the recommendation for RRC and UE Feature IEs?
- UE capabilities have to be in the Feature List.
- In RAN2, RRC Parameter List and Feature List are handled separately and (of course) impact completely different parts of the signalling.
- When RAN1 uses the parameters for UE capability they should clearly appear in the Feature List.

Suggested guidelines (1/2)



- Suggested guidelines for preparation of RRC parameter list (based on details in Q&A):
 - Column J (description): Should be suitable as “field description” for the RRC specification. i.e. it should clarify what the UE does when the NW sets the field. Should e.g., contain the unit of the numerical values. Short and concrete descriptions are preferred.
 - Column P (Comments): Should contain background information from RAN1 to RAN2 that helps RAN2 to understand the context and the feature.
 - Column M (per UE, cell, ...): May also contain the name of a parent IE that RAN1 considers appropriate.
 - Column E (RAN2 Parent IE): Should be left empty. Provide information on Parent IE in Column M, if needed.
 - Column F (RAN2 ASN.1 name): Should be left empty.
 - Using ToAddModList and ToReleaseList structures: Suggest to leave it to RAN2 whether to use these structures or other methods for proper implementation of signalling.

Suggested guidelines (2/2)



- **Column N (UE-specific, Cell-specific):** Set column N to "cell-specific" only if the parameter is required during initial access or in IDLE/INACTIVE. Preferably mention this also in column J (Description) or in P (Comment). RAN2 will put only those in the xxxCommon IEs.
- **Column L (Default value):** Default values are primarily important for cases where the NW has not yet provided a (UE-specific) configuration. In other cases, it can help clarify what the UE does when a parameter or feature is not configured
- RRC Parameter List and Feature List are handled separately. If RAN1 for some reason includes a UE feature parameter in the Parameter list, it should comment that: **This is a UE capability parameter and is listed here for information. It appears also in the Feature List.**

Recommendations



- Based on the discussion, the following practices are recommended:
- Recommendation 1: RAN1 is encouraged to include RRC parameter lists in LS to RAN2 that are stable (not necessarily complete) and achieve the primary goal.
- Recommendation 2: RAN1 is encouraged to consider the suggested guidelines in this document for preparation of RRC parameter list.
- Recommendation 3: RAN1 is encouraged to emphasize in the LS to RAN2 that RAN1 understands that RAN2 can modify the RAN1 input RRC parameter lists for the purpose of proper implementation of the functionalities as needed.



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