**3GPP TSG RAN#90e RP-20xxxx**

**e-Meeting, December 7th – 11th, 2020**

**Agenda item:**

**Source:** 3GPP TSG RAN1 Chairman

**Title:** Email Summary on RAN4 Requirements Handling

**Document for:** Discussion/Decision

# Introduction

In this document, we will provide a summary on RAN4 reuqirements handling based on the following contribution:

* RP-202801 On the Optionality of RAN4 Requirements Qualcomm Incorporated, Nokia, Verizon, Deutsche Telekom, Vodafone, T-Mobile USA, KDDI, Softbank, China Telecom, AT&T

# Discussion

There are two observations and one proposal made in RP-202623, as copied below:

* Observation 1. A capability implying the optionality of meeting the RAN4 requirements for a certain feature will implicitly make the feature optional by making it impossible to test.
* Observation 2: Allowing optionality of 3GPP requirements will devalue the 3GPP specifications and could raise serious issues for the entire eco-system.
* Proposal: RAN4 should not consider any proposals that make RAN4 requirements optional for a feature/functionality.

## Initial Email Discussion

Questions:

* Do you agree with the proposal in RP-202633? Why/why not?
  + Please elaborate detailed thoughts
* Any other thoughts?

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| **Company** | **Views** |
| vivo | We agree with the proposal in RP-202633. For the features defined as mandatory by other WGs are discussed in depth and market need is well analysed. RAN4 requirements for specific technique is defined basded on their feasibility and implementation aspects are fully understood, which is based on consensus in RAN4. Agreed RAN4 requirements being optional just doesn’t make sense. |
| Verizon | The contribution RP-202633 well discussed the current RAN4 work status and possible technical problems. We agree and support the proposal in RP-202633. |
| CMCC | We agree with the proposal in RP-202633. RAN4 had spent several meetings discussed whether to capture some RAN4 requirements as “optional features” in the UE feature list. This kind of discussion should be avoided in the future. Requirements are not features and cannot be optionally supported. Even for optional features, if UE support this optional feature, it needs to meet corresponding RAN4 requirements. |
| T-Mobile USA | We support the proposal in RP-202623 for the reasons explained in observations. |
| China Telecom | We support the obsevations and proposal, which seems the common understanding according to the discussion in Nov RAN4 meeting.  If something cannot be mandatory supported by all the UEs, separate UE feuature/capability(s) need to be introduced by the corresponding WG. The support of a feature and the requirements is always indicated by the same capability. |
| Apple | The term of “make RAN4 requirements optional” is a bit vague. RAN4 does specify requirements for optional features. UE can obviously opt for not supporting an optional feature. That means the related are optional to be supported by that UE.  If the intention of RP-202623 is if UE capability can be defined based on different requirements. I think the answer is YES. RAN4 has precedence to specify two sets of requirements. Depending on which set of requirements UE chooses to comply with, different UE capability can be indicated.  Overall, we think RAN4 has had established principle to deal with feature optionality and the related requirements. No further agreements seem necessary. |
| Samsung | We also support the observations as well as the proposals in RP-202633. It is better to get clear guideline from RAN that UE requirements shall NOT be included in the feature list discussion even for future release.  For different sets of requirements as commented by Apple, we think it is about the applicability rules of certain requirements which can be discussed in RAN4. Given RAN4 is supposed to define the minimum requirements in general, we shall be also careful about defining different set of requirements.  As similar as our understanding that mandaotry/optional cannot be applied for RAN4 requirements, we think release independent concept cannot be applied for RAN4 requirements either. RAN4 requirements defined in current release cannot be applied for early release even though the feature maybe introduced in early release. For any exceptions for applying requirements in early release, RAN4 shall discuss in case by case manner. |
| LGE | In RP-202801, QC proposed that RAN4 should not consider any proposals that make RAN4 requirements optional for a feature/functionality. It is quite confused to us. Probablely, the intention is that follow the same principle with other WGs if they define the specific feature as mandatory, then RAN4 should define the related RAN4 requirements as mandatory for the feature.  Then, could give a example case which RAN4 requirements do not follow the principle? In my understanding, RAN4 generally follow the genral principle.  Specially, it is open to define different sets of requirements based on RAN4 consensus. |
| Telecom Italia | We support RP-202633 for the reasons mentioned by several companies. Moreover, specification works is not simply limited to RAN1 and RAN2 specifications, but to be possible to exploit a feature, RAN4 requirements and RAN5 testing must be specified |
| Intel | The proposal is somewhat ambiguous and we prefer not to define a general rule. There are specific use cases, which may require definition of optional RAN4 requirements. There are some examples when RAN4 requirements and respective features are defined as Optional (e.g. enhanced R-ML receivers). Also, there are cases when the feature is defined in Rel-15, while the requirement is introduced in Rel-16 or later. In this case Rel-15 UEs may not be required to meet the requirements. In theory such requirements can be potentially defined as optional for Rel-15 UE to allow early implementations. Therefore, we prefer to discuss each feature/requirement on a case by case basis. |
| MTK | At least for a feature designed by other WGs, if RAN4 only specifies a single requirement for that feature, then the requirement should be mandatory. Of course, if RAN4 agreed to have 2 different UE requirements (like BWP switch delay), it is fine to introduce capability.  As to RAN4-led WIs, it is up to RAN4 discussion to decide mandatory or optional. |
| Qualcomm | We fully agree with the proposals in the paper. There is the technical aspect, which means that if a UE supports a feature(either optional or mandatory), it shall meet the requirements defined for that feature. RAN4 requirements are always mandatory for any feature/functionality supported by the UE. How would it be possible to test if a UE supports a feature if it claims it supports it but it says it does not meet the requirements?  To LGE: during the Rel.16 RAN4 features/capabilities discussion there were proposals to define a feature with the description: “UE meets requirements for feature X” where feature X was defined by another workin group. This means that the requirements defined by RAN4 for that feature become optional.  To Apple and Intel, it would be good if you could clarify what is ambiguous about this proposal.  The example given by Intel is not about making requirements optional, is about the feature being optional. In the example given, if the UE claims it supports the advanced receiver, it has to meet the RAN4 requirement. It cannot claim it supports the feature but also say it does not meet the RAN4 requirement. For requirements defined in a later release, they become implicitly optional.  To Apple: if different requirements are defined for a feature(for example different delays for BWP switching), it is still mandatory for the UE to support one of them. This does not mean they are optional. What we mean here are cases in which the UE is allowed to choose not to meet any requirement. |
| OPPO | Generally agree with the proposal, however, from the above feedbacks it can be seen that different understanding are shown on the definition of “Optional feature” and “Optional requirements”.  RAN4 sometimes define several requirements for one feature like beam correspondence in FR2 that bit 1 and bit 0. Even beam correspondence is a mandatory feature, the requirements are divided into two sets depending on UE capability. If we call one set of requirements is optional, then yes, RAN4 can define optional requirement.  Another example is that sometimes RAN4 define requirements according to the UE architecture, e.g. one PA, two PA. And different requirements are defined for each architecture. Then, can we call one PA requirement is optional for UE with two PA?  Above are some examples on the concept of optional and mandatory confusions. In our understanding, when we discuss optional/mandatory, actually it means the feature. If UE supports one optional feature, then it has to meet the corresponding requirements. That’s it.  Whether there is value to agree on some highlevel rules but with different interpretations is up to the group. |
| ZTE | We fully agree the proposal in 2633.  For a feature/functionality, RAN4 makes the associated requirements under the assumption that the feature/functionality is supported. If the feature/functionality is claimed to be supported, then the corresponding RAN4 requirements should be fulfilled. There are only two choices: either supporting the feature/functionality and fulfilling the corresponding requirements, or not supporting the feature/functionality while not fulfilling the corresponding requirements. No other choice.  Making some of these requirements optional could undermine the foundation of RAN4 works thus may lead to unpredicable and uncontrollable consequences |
| Vodafone | We support the proposals in the paper. If we make requirements optional for features that a UE supports, then it will be totally unclear for operators how they are supposed to plan their network deployments as performance will not be guaranteed within some limits. This will generate issues with the wider ecosystem of 3GPP stakeholders in terms of their reliance on 3GPP technology and be detrimental to the value of IMT licensed spectrum in terms of providing a consistent service.  However, we do see that RAN4 UE requirements specifications could be written more from the perspective of what the UE is required to support in the case where a feature is only defined within RAN4 specs and nowhere else. As neutral text could lead to a lack of clarity for conformance verification. |
| Nokia | We fully support the proposal and reasons in RP-202633 and it is also aligned with the recent RAN4 agreements. |
| AT&T | We agree with the proposal in RP-202633. RAN4 can always consider if relaxations are required with the introduction of a new feature on a case-by-case basis based on technical analysis but should not consider making core requirements optional. |
| DISH Network | We support RP-202633 |
| CHTTL | in general agree. |

## Intermediate Round

It seems that the proposal is agreeable in principle, although there are questions/concerns with respect to some ambiguity, interaction with being optional/mandatory of a feature/functionality, potential issue of multiple requirements of a feature/functionality, potential issue of a requirement introduced in a later release, etc.

Based on the inputs, the proposal is updated to:

Proposal:

* For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponnding requirement specified by RAN4 are mandatory
  + Note: if there two or more requirements specified by RAN4 for a feature/fucntionality, it is understood that a UE is mandatory to support one of the two or more requirements.
  + Note: For a feature/functionality specified in Release *N,* if the requirement is introduced in a later release, whether the requirement should be optional or mandatory for release *N* UEs should be discussed on a case by case basis

Please express any further comments to the updated propsoal in the table below

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| **Company** | **Views** |
| China Telecom | In general, the updated proposal looks good.  Two minor comments:  1. As commented by LGE in the intial round, actually RAN4 did follow this principle in the past. It is good to have clear guidance for future work by this proposal, meanwhile we need to a little careful to avoid misunderstanding from people outside the group that RAN4 did not follow this principle in the past.  2. Minor wording suggestion on the 1st sub-bullet:  o Note: if there two or more sets of requirements specified by RAN4 for a feature/fucntionality, it is understood that a UE is mandatory to support one of the two or more sets of requirements. |
| Apple | Even though the intention is good and understandable, it is however not very clear how this proposal can make difference from what has been implemented in RAN4.  Also, RAN4 has specified many applicability rules. Unless those rules are met, the UE/NW behaviour otherwise is unpredictable. In other words, if the applicability rule is not followed, the corresponding requirements are optional to comply with.  Can proponent company please provide an example how this agreement can help to fix existing issues or improve RAN4 work?  In general, we propose not to pursue this agreements and leave it for RAN4 to handle. |
| Intel | Thank you for updating the proposal and it becomes way more clear now.  1) We overall support the approach that “*For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponnding requirement specified by RAN4 are mandatory*”. Basically these are the principles which RAN4 follows. We are not sure if we should explicitly repeat this.  Also we should pay attention to different exceptions which inevitably can happen from time to time and it is not clear if we can predict every situation now.  2) The 2nd note is also acceptable and we suggest a minor update to address possible requirements defined in Rel-17 “*For a feature/functionality specified in Release N, if the requirement is introduced in a later release N + X, whether the requirement should be optional or mandatory for release N, …, N+X-1 UEs should be discussed on a case by case basis*”.  3) One controversial question is how the network knows that UE supports newly defined requirements in Release N + X for the features, which were defined as mandatory in the previous release and whether it is helpful to define additional UE capabilities signalling in Release N + X (e.g. mandatory with capability signalling). This was discussed in the last RAN4 meeting. Based on approved RAN4 LS to RAN2 R4-2017803 it is RAN4 understanding that the network will know the release of the UE and such capability signalling is not needed. The agreement is fine for us, but we prefer to wait for RAN2 confirmation that this principle is aligned with RAN2 principles. We suggest to add a note that “*It is not precluded to introduce new UE capabilities for Release N+X in case it is identified necessary*”  4) Another relevant question is that there are also situations when RAN4 introduces new requirements without any clear linkage to the new or existing UE features (e.g. Rel-16 HST single tap demodulation requirements). Such requirements become implicitly mandatory for all Rel-16 UEs, but the functionality/feature is not well visible from the specification perspective. In our view such situations should be avoided and UE features shall be clearly defined for the newly defined requirements (even if the functionality is agreed to be mandatory). |
| Qualcomm | We support the proposal from the moderator. This should be business as usual in RAN4, however, it seems this was not the case recently. Hence, the proposals in this paper were brought up.  To Apple, the improvement in RAN4 work is that we will not spend valuable time discussing proposals to make requirements optional(see the CA fallback discussion which in the end is making or at least trying to make some RAN4 requirements optional) or proposals to introduce capabilities such as “UE meets requirement for feature X”. In the last few meetings(including plenary), a lot of time was wasted discussing such proposals. This should not happen anymore. |
| Nokia | We support the proposal from the moderator. Also the slightly updated wording for the note text from China Telecom is ok. |
| OPPO | The general rule as suggested by moderator is aligned with our understanding and can be followed as general guideline and no need to be specified in RAN4 spec in our view since there are already applicability rules for the requirements in RAN4 specs. |
| Vodafone | Looks ok, but the point I raised in initial round should be reflected:  *Where a feature is only defined within RAN4 specifications, and in particular if used in idle mode, the specifications should be more clear on whether that feature is mandatory for the UE.* |
| MTK | We support the proposal from Moderator. |
| Samsung | We also support Moderator proposal which can be used as guideline in RAN4 for future discussions |
| InterDigital | We support the moderator proposal and the China telecom updated wording, still needs a little improvement . The note should start  if there are two or more sets…. |

## Intermediate Round – Cont’d

It seems the proposal is generally stable. Regarding China Telecom’s suggested changes and Intel’s suggested changes about release numbering, they are incorporated in the update below. Regarding Intel’s suggestions for release N+X UEs, it is not clear whether it is necessary or not, since it seems to be an exception case and as usual, can be discussed as an exception. Regarding Vodofane’s suggested text, since the action is “the specifications should be more clear”, it is not clear whether we should capture it as an explicit note, although it should be understand that a clear specification is always the goal for any working group.

With that, the proposal is updated as following. Hopefully it can be agreeable now.

Proposal:

* For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponnding requirement specified by RAN4 are mandatory
  + Note: if there are two or more sets of requirements specified by RAN4 for a feature/fucntionality, it is understood that a UE is mandatory to support one set of the two or more sets of requirements.
  + Note: For a feature/functionality specified in Release *N,* if the requirement is introduced in a later release M (>N), whether the requirement should be optional or mandatory for release *N* and up to Release *M*-1 UEs should be discussed on a case by case basis.

Any additional comments are welcome, although it is suggested that given that the above proposal is quite stable, further improvement of wording would probably only bring marginal benefit and thus should be done only if there is a strong need.

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| **Company** | **Views** |
| vivo | In general looks fine, one clarification on second Note, in this phrase “ whether the requirement should be optional or mandatory for release *N* and up to Release *M*-1” , our understanding is “whether the feature should be optional or mandatory….”, current text implies requirement is optional or mandatory. Is it correct understanding? |
| LGE | The moderator’ latest version looks good to us. One minor collection propoas as follow   * For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponnding requirement defined within RAN4 specification are mandatory   + Note: if there are two or more sets of requirements specified by RAN4 for a feature/fucntionality, it is understood that a UE is mandatory to support one set of the two or more sets of requirements.   + Note: For a feature/functionality specified in Release *N,* if the requirement is introduced in a later release M (>N), whether the requirement should be optional or mandatory for release *N* and up to Release *M*-1 UEs should be discussed on a case by case basis. |
| Intel | 1) Regarding the UE capability question we raised before, we don’t think this is an exception case. Same time, based on current wording of the proposal it is not precluded to have discussion on this aspect. So, the proposal is agreeable.  2) As we mentioned in the previous reply “*feature/functionality supported by a UE*” can be sometimes ambiguous. There are situations when RAN4 introduces new requirements without any clear linkage to the new or existing UE features (e.g. Rel-16 HST single tap demodulation requirements). Such requirements become implicitly mandatory for all Rel-16 UEs, but the functionality/feature is not well visible from the specification perspective. In our view such situations should be avoided and UE features shall be clearly defined for the newly defined requirements (at least there should be clear applicability rules defined for the functionality). We suggest to add another note:  *Note: RAN4 requirements need to be associated with a specific feature/functionality and corresponding applicability rules shall be specified.* |
| apple | It is still not very clear of us why such agreement is needed. However, it is fine for us if others believe such clarification is helpful. Some suggested revisions are made in bold  For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponding requirement specified by RAN4 are mandatory ***for that UE, providing the corresponding applicability rules are fulfilled***  o   Note: if there are two or more sets of requirements specified by RAN4 for a feature/fucntionality, it is understood that a UE is mandatory to support one set of the two or more sets of requirements***,  providing the corresponding applicability conditions are fulfilled***  o   Note: For a feature/functionality specified in Release *N,* if the requirement is introduced in a later release M (>N**), the requirements can only apply to Release M and beyond UE**, whether the requirement should be optional or mandatory for release *N*and up to Release *M*-1 UEs should be discussed on a case by case basis. |
| Qualcomm | Can Apple please clarify what is the point of having the addition about applicability rules? Nobody is talking about making mandatory/optional rules that are not applicable.  We already commented why this agreement is needed but Apple hasn’t replied. |
| ZTE | We support Moderator’s proposal. Just a minor change on the main bullet to avoid misunderstanding:   * For a feature/functionality supported by a UE (irresepctive of whether the feature/functionality itself is optional or mandatory), the corresponnding requirement specified by RAN4 are mandatory for the feature/functionality |
| Nokia | We support the moderator’s proposal. |
| MTK | We support Moderator’s proposal and do not see the need to mention applicability rule in this principle. It should be clear that we are discussing whether UE can support a feature but not in which condition the requirement applies. |
| Samsung | We support the moderator proposal |
| Vodafone | Thanks for commenting on my comment Wanshi. However in RAN4 specs I think it is good to highlight that things need to be made more clear.  For future RAN4-contained features not requiring/applicable for network signalling, the specs should make it clear whether features are mandatory or not for the UE. |

# Conclusion

Based on the email discussion, the following are proposed:

* TBD

# References

RP-202801 On the Optionality of RAN4 Requirements Qualcomm Incorporated, Nokia, Verizon, Deutsche Telekom, Vodafone, T-Mobile USA, KDDI, Softbank, China Telecom, AT&T