**3GPP TSG-RAN Meeting #89-e RP-20XXXX**

**Electronic, Sept 14-18, 2020**

**Agenda item:** x.x

**Source:** Moderator (R2 Chairman)

**Title:** Email discussion [89E][06][SIB24]

**Document for:** Information

# Introduction

An introduction can be found in RP-201966.

The following aspects of the R2 endorsed CR were discussed on-line. We attempt to make some clarity in this email discussion, before Wednesday Come-back.

- Intention of CR: Which UEs need to be upgraded, which networks need to be upgraded.

- Risks of CR: What can reasonably go wrong, what need to be further verified?

- Urgency of CR: To what extent do the CR need to be approved at current RP vs postpone one quarter?

In addition, the following aspect is discussed:

- Proposal to capture the limitation in the TS, that SIB19+ SIBs cannot be multiplexed in a SI message with SIB18- SIBs (by Samsung). Moderator: There seems to be consensus that this can be done also without Standards impact, so the urgency seems less than the previous topics. Can discuss what would be the reasons to capture such limitation.

# Discussion

## Intention of CR: Which UEs need to be upgraded

MODERATOR UNDERSTANDING:

- In principle, all UEs that need SIB19+ will need to be upgraded, No exceptions, as UEs may roam.

- All Rel-15 UEs that need SIB 24+ will need to be upgraded.

- As this problem hasn’t surfaced until introducing Rel-15, it is assumed that SIB19, 20, 21 features of Rel-12 - Rel-14 hasn’t been deployed yet, so it is assumed that in practice no legacy UEs Rel-12 - Rel-14 need to be upgraded.

*In case companies has opinions, please provide below:*

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| **Company** | **Comments** |
| Vodafone | The Moderator’s understanding aligns with ours on this point.  Without the CR, it is believed that transmission of SIB 24 can cause problems to faulty release 8 (and later) devices. |
| Qualcomm | Our views align with moderator’s understanding. |
| NTT DOCOMO | It is also our understanding. That is why this problem is discovered when the trial testing was conducted for preparation of NR standalone commercialization. Amongst SIB19 and onwards, SIB24 is the first SIB to be broadcast in the live network. |
| CMCC | Align with moderator. Considering the exact number of UEs need to be upgraded, in our network, there are about 50 million UEs. In fact most of the UEs also support NR and we believe the users of the these “fashion” UEs have more motivation to upgrade their UEs. Thus we don’t think upgrade is a big issue. |
| CATT | Align with moderator’s understanding. |
| Turkcell | Our views align with moderator’s understanding. |
| Verizon | Align with moderator’s understanding. |
| Apple | Align with moderator’s understanding. And Rel-12 ~ Rel-14 UEs that do not need SIB19+ should not be required to be upgraded. |
| Spreadtrum | We agree with moderator’s understanding. |
| OPPO | It depends on whether Rel12~Rel14 UEs have problem to receive a SI multiplexed with both SIB18- and SIB19+. If they do, these legacy UEs should be also upgraded to fix decoding problem unless network choose to broadcast SIB19+ in concatenated SIs which will be ignored by those legacy UEs assuming moderator’s assumption is correct.  But in case network broadcast SIB19+ in concatenated SIs, then it will cause problem for Rel15 UE supporting scheduling of positioning SIBs as indicated in coversheet of endorsed CRs. So those UEs should be also upgraded even they don’t support SIB24. |
| Nokia | We agree with moderator’s assessment. We understand the imminent case is to have LTE Rel-15 UEs capable of NR SA to receive SIB24 to be able to reselect to NR and receive 5G services. Indeed, as UEs are globally mobile it is important that all the UEs will have to be upgraded. Based on RAN2 discussions, it is also clear that SIB24 is the first SIB to be used among from the available SIB19+ list and hence it is more important that only Rel-15 UEs may need to be upgraded. |
| LG Uplus | Same views with moderator’s understanding |
| Telecom Italia | We have the same understanding of the moderator. We also have the same understanding of Vodafone regarding the impacted legacy LTE UE population, that is, if the CRs are not approved then also Rel-8 (and later) being wrongly implemented might not be able to properly decode SIB1 when it schedules SIB19+, especially SIBs introduced in Rel-15/16, which seem to be the only ones of interest for most of the operators |
| vivo | Our views align with moderator’s understanding. |
| KT | Our views align with moderator’s understanding. |
| KDDI | We have the same understanding as Moderator |
| Intel | Our view is aligned with the moderator's understanding. It is also worth to note that any UEs that support the posSIBs will also need to be upgraded to support this CR (as also mentioned by OPPO). We assume that there will be very few, if any, deployed UEs that support these positioning SIBs. |
| Telstra | We have the same understanding as the moderator. |
| BT | We partially align with moderator’s understanding. We understand that UEs supporting positioning should be updated. |
| Samsung | We have the same understanding. All the legacy UEs including Release 8 are not affected from this CR. Practically only part of Rel-15 UEs are required to be upgraded. |

## Intention of CR: Which Networks etc need to be upgraded

MODERATOR UNDERSTANDING:

- In principle: Networks that need to support SIB19+ and that has legacy problematic UEs need to be upgraded.

- The CR support two methods of provisioning of scheduling info for SIB19+, the legacy extension (that causes problems to legacy problematic UEs), and a new extension (with which legacy problematic UEs can co-exist). The intention is that a cell uses one of these options, not both. By supporting both, operators can choose when/how to deploy this, potentially temporarily in conjunctions with one of the identified work-arounds.

*In case companies has opinions, please provide below:*

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| **Company** | **Comments** |
| Vodafone | The Moderator’s understanding aligns with ours on this point.  Vodafone believe that it is important that the CR maintains the existing R12-R15 signaling as well as adding the new method for scheduling SIB19+.  Without the CR, changes to network equipment are likely to be needed to provide the “inefficient” network workarounds. |
| Qualcomm | Our views align with moderator’s understanding. |
| NTT DOCOMO | It is also our understanding. |
| CMCC | Agree with moderator’s observation. The CR provides enough flexibility for network implementation. |
| CATT | Align with moderator’s understanding. |
| Turkcell | Our views align with moderator’s understanding. |
| Verizon | Align with moderator’s understanding. |
| Apple | Align with moderator’s understanding. |
| Spreadtrum | We agree with moderator’s understanding. |
| OPPO | Agree with moderator |
| Nokia | As stated during the online discussion the availability of two solutions is only to temporarily bridge the situation. In addition, we agree with the moderator’s assessment above. |
| LG Uplus | Same views with moderator’s understanding |
| Telecom Italia | We have the same understanding on this point. We think that different means other than the RAN2 tech endorsed CRs (i.e. the network workarounds) are not sufficient/applicable to solve this issue. |
| vivo | Our views align with moderator’s understanding. |
| KT | Our views align with moderator’s understanding. |
| KDDI | We have the same understanding as Moderator. |
| Intel | Our view is aligned with the moderator's understanding. |
| Telstra | Agree with the moderator |
| BT | We align with moderator understanding. |
| Samsung | Agree with the moderator’s understanding |

## Risks of CR: What can reasonably go wrong, what need to be further verified

MODERATOR UNDERSTANDING:

- In principle: The CR is correct and should not cause problems to correctly implemented UEs.

- However, as the legacy problematic UEs had issues with one extension in SIB, maybe it is reasonable to check whether they can actually tolerate the new extension that is implemented in the CR (maybe some operator can confirm).

*In case companies has opinions, please provide below (Moderator: please explain in detail not just a vague opinion that everything must be verified for every kind of UE)*

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| **Company** | **Comments** |
| Vodafone | The CR seems to be based on established, already deployed extension mechanisms, so the risk of it causing problems to legacy devices should be low, but clearly non-zero.  The design of the current CR allows it to be removed in a subsequent meeting if deployment issues are shown to exist. |
| Qualcomm | Agree with moderator’s understanding that “The CR is correct and should not cause problems to correctly implemented UEs”.  Additionally, we agree with Vodafone’s comment “The design of the current CR allows it to be removed in a subsequent meeting if deployment issues are shown to exist.” |
| NTT DOCOMO | We’re honor to confirm that the new extension does not create any issues to the legacy UEs. Since Rel-8, SIB1 has been extended many times by using non-critical extension, i.e. SystemInformationBlockType1-vXYZ-IEs. To our knowledge, the following extensions have been broadcast in the live network:  - multiBandInfoList (SystemInformationBlockType1-v8h0-IEs) for MFBI;  - freqBandIndicator-v9e0, multiBandInfoList-v9e0 (SystemInformationBlockType1-v9e0-IEs) for extended frequency bands, EARFCN;  - cellSelectionInfo-v920 (SystemInformationBlockType1-v920-IEs) for RSRQ based cell reselection;  - hyperSFN-r13, eDRX-Allowed-r13, cellSelectionInfoCE-r13, bandwidthReducedAccessRelatedInfo-r13 (SystemInformationBlockType1-v1310-IEs) for eDRX and eMTC.  Every time these extensions were introduced, testing effort was made to check if all of the legacy UEs present in the live network can work correctly. We have not found any UEs not behaving correctly with these extensions.  Given that the new SIB scheduling extension is introduced by the same way as in the above legacy extensions, we’re confident that the CR does not create any further issues to all the legacy UEs present in the live network. |
| CMCC | Share the same view of Vodafone. |
| CATT | To choose the right extended solution, the CR is correct for different network scenarios and will not cause problems to correctly implemented UEs. |
| Turkcell | We agree with moderator’s understanding, ‘The CR is correct and should not cause problems to correctly implemented UEs’. We also support the comment of Vodafone, ‘The design of the current CR allows it to be removed in a subsequent meeting if deployment issues are shown to exist’ |
| Vodafone | Share the same view of Vodafone. |
| Spreadtrum | We share the same view of Vodafone. |
| OPPO | Looking into endorsed CR , there are 2 aspects are something new for legacy UE without upgrading:  1, SIB1 is updated with new scheduling information  2, new scheduling enable either concatenated SIBs or concatenated SIs  “Correctly implemented UE” refer to UEs which can decode legacy scheduling list correctly. But since endorsed CR add new scheduling list, it is not crystal clear whether they can decode SIB1 with new scheduling list correctly without any IoDT test considering this is brand new CR. The concern comes from the fact that SIB1 is essential SIB for LTE system. But still there are many problematic UEs in the field to decode scheduling list within SIB1.  As pointed before legacy UE may not be able to decode concatenated SIBs if they are SIB19+. And legacy R15 UE supporting positioning SIBs have problem with concatenated SIs. |
| Nokia | We understand the imminent case is to have LTE Rel-15 UEs received SIB24. If it can be ensured that all the Rel-15 UEs in the field that require SIB24 can be upgraded, it would be fine. In addition, RAN2 already discussed the possible impact of SIB24 scheduling to CMAS/ETWS and the possible impact has been captured on the cover page of the RAN2 technically endorsed CRs having understood that the UEs are able to handle this impact gracefully. |
| LG Uplus | Agree with the views from Vodafone and DOCOMO |
| Telecom Italia | We have the same moderator’s understanding.  We also share NTT DOCOMO’s view on the fact that the CRs do not create any further issues to all the legacy UEs in live networks since they’ve been developed following the same principle adopted for the previous SIB1 extensions |
| vivo | The CRs are technically correct in resolving the problem for problematics UEs |
| KT | We share the same views from Vodafone and NTT Docomo |
| KDDI | We consider NTT DOCOMO’s view provides confidence in our assumption on the stability of the CR. At the same time, the last part of Vodafone’s comment remains as the proper remedial procedure in case there be any issues found. |
| Ericsson | After Rel-9 was started, RAN2 has extended the Rel-8 version SIB1 using a lateNonCriticalExtensions. With this type of extension, RAN2 has added different versions of multiBandInfoList and freqBandIndicator. We are not aware that any problems have been reported to this type of extension. The RAN2 CRs discussed here, further extend SIB1 in the same manner, i.e. further down the lateNonCriticalExtensions-tree.  Given this, we have no reason to believe that this way of extending SIB1 is problematic. |
| Intel | We share DOCOMO's understanding. The extension mechanism that has been found to cause problems in SIB1 is based on the 'elipsis' style of extension. The CR is based on the 'empty sequence' style of extension that has been extensively used many times in the past, including in SIB1, without any problems and without any need to do extra checking of existing implementations before we approved those past CRs.  So we agree with the moderator that " The CR is correct and should not cause problems to correctly implemented UEs ", but we can additionally say that the CR should also not cause new problems to those (incorrectly implemented) UEs that triggered this problem in the first place. |
| Telstra | We share the moderators understanding & in particular Vodafone’s assessment that “The design of the current CR allows it to be removed in a subsequent meeting if deployment issues are shown to exist.” |
| BT | We share moderator’s view. The CR shouldn’t cause any problem but at this stage it’s not possible to confirm it. If we consider the critically of SIB1, it is worth to evaluate how these new CR impact legacy devices. We should make sure this correction doesn’t introduce new undesired behaviors if SIB24 or SIB26a is broadcasted. |
| Samsung | We agree with the moderator’s understanding. We also like to point out NTT DOCOMO’s analysis provide clear reason why the CR shall not cause any problem to the legacy UE. The problem should have occurred long before (since the first extension) if any legacy UE has problem with extension mechanism. |

## Urgency of CR: To what extent do the CR need to be approved at current RP vs postpone one quarter

MODERATOR UNDERSTANDING:

- In principle: Proponents are explaining that R15 UEs that need SIB24+ are being deployed now, and every delay makes upgrades more cumbersome.

*In case companies has opinions, please provide below*

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| **Company** | **Comments** |
| Vodafone | If we are use this CR to change the specifications to accommodate faulty devices, then it is important to do this as soon as possible. This is because we understand that UEs are already being sold that support “5G StandAlone” functionality and therefore, the longer we delay any change, the more 5G-SA devices that will need to be OTA updated.  However, it is important to verify that the functionality added by the CR does not generate adverse behaviour with any existing LTE device. Therefore, it makes sense that CR approval at RAN#89e is conditioned on companies having until RAN#90e to perform such verification. This avoids delay in upgrading 5G-SA devices, whilst ensuring a robust outcome. |
| Qualcomm | We agree with the above comment that *if we are to use this CR to change the specifications to accommodate faulty devices, then it is important to do this as soon as possible.*  Even with 3 months delay, it will not be possible to check all the older products to check whether some corner case issues can be optimized. The current endorsed R2 CRs provide networks the flexibility to implement based on the (non)presence of the *types* of the impacted UEs.So, we think further delays in deciding should be avoided. |
| NTT DOCOMO | Not only for us, but also operators over the worlds are now preparing to launch NR Standalone services. It is absolutely timing critical for operators to implement this CR for both NW and UE to meet the schedule of commercial launch of NR SA. It is quite important that until the commercial launch, all of NR SA capable UEs to be released into the market implement this CR. Otherwise, i.e. if NR SA capable UEs w/o this CR are released and present in the network, the problem cannot be resolved. As such, it is imperative that the CRs required for NR SA are approved, right now (i.e. Rel-15 or Rel-16). The CRs for earlier releases (i.e. Rel-12, 13 and 14) are O.K to be postponed, if testing efforts are concerned. |
| CMCC | The number of the UEs needing SIB24 is increasing significantly day by day. We prefer to approve the CR ASAP. Also we sympathize with chipset vendors (e.g., MTK) who made the correct implementation and have to afford such risk for upgrade. Even we believe MTKs can success twice, it is also fine with the idea form Vodafone that “it makes sense that CR approval at RAN#89e is conditioned on companies having until RAN#90e to perform such verification”. |
| CATT | Agree with Vodafone that it is important to do this as soon as possible, since the earlier the CR is used, the fewer UEs need to be updated. |
| Turkcell | It’s clear that operators need this CR as soon as possible. If we postpone it to next plenary meeting 90e, more 5G-SA devices that will need to be OTA updated. There’re regulations that we can’t deploy OTA update without subscribers’ permission. |
| Verizon | Agree with other operators that if we are to use the CRs, do it as soon as possible. |
| Spreadtrum | Agree with the statement from Vodafone. |
| OPPO | It is true that later deployment of the endorsed CR will make situation worse. On the other hand a quick decision may have consequence for legacy UE which is even more serious considering the huge amount of legacy UE in the field. |
| Nokia | It is our understanding that most operators start deploying NR SA and this is the opportune time for operators to make a clear decision to have an alternative solution or not for network and UE vendors to start implementing and considering deploying in the field. As implementation and testing need to take due considerations into account and that takes time, delaying the issue will just make the problem worse. |
| LG Uplus | Same views with previous companies and since this CR provides flexibilty for operators to choose either the original way or extended way it is worth to have the approval in advance we have commercial SA(Standalone) device in real field. |
| Telecom Italia | We should avoid any other delay: as other operators already stated, there will be the risk that many more NR SA capable UEs will need firmware upgrades if we don’t try to solve the issue now by approving the RAN2 CRs. If there are concerns with testing/verification, we could live with NTT DOCOMO’s suggestion to at least approve the CRs for Rel-15 and Rel-16 at this RAN plenary |
| vivo | We agree that every delay in not approving the CRs may make the problem more complex as new UE will continue to come in operator networks. |
| KT | As 5G SA deloyments been already started, we should not hesitate approving the CRs. |
| KDDI | Likewise the operators above, we should have the CRs approved ASAP. As to the verification, it is OK to add some conditions as Vodafone described above. |
| Intel | With regard to this question, we think it makes sense to follow the views of operators. From a technical point of view, we don’t see a strong argument to delay the CR by one quarter.  Regarding the Vodafone comment, it wasn't totally clear to us what was meant by "it makes sense that CR approval at RAN#89e is conditioned on companies having until RAN#90e to perform such verification”. If some problem is found with the CR in the next 3 months then we will of course discuss at that time what to do next, but I think this is just 'business as usual' rather than any special process for this particular case. |
| SoftBank | We sympathize with the vendors who have correctly implemented the functionality concerned. We also respect their efforts not to create another problem. However, we would like to advocate that this issue should be solved as soon as possible in order to avoid the delay of 5G SA deployments. |
| Telstra | We strongly agree with Vodafones comments – lets move to approve the CR’s now in the hope to improve the situation but monitor any unforeseen impacts |
| BT | We agree with Vodafone here. The more we delay the decision; the greater will be the number of NR Standalone UEs that will require the firmware upgrade.  On the other hand, at this stage no one can guarantee this change doesn’t reveal new non-standard behaviors in legacy devices. That fact that we give device vendors extra time to internally evaluate their products seems reasonable to us. We don’t want to have to upgrade UEs more than once.  In addition, we consider that a common testbed is required to do conclude with a fair result, i.e., the number of SIBs included in SIB1 SI where the number is no less than two. It will be difficult to conclude the CRs introduce new issues if we aren’t sure they are correctly implemented.  We’re fine to freeze the CR in RAN#89e and give time to vendors to prove they introduce new issues. If this cannot be proved, we can finally approve them in RAN#90e. |
| Samsung | Agree with majority view that the problem shall be solved as soon as possible. |

## Other Comments on CR

*Other Comments on the R2 endorsed CR, please provide below*

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| **Company** | **Comments** |
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## SI message multiplexing restriction

MODERATOR UNDERSTANDING: this seems somewhat less urgent, but it would be good to get a common view.

On the Proposal to capture in the TS the limitation that SIB19+ SIBs cannot be multiplexed in a SI message with SIB18- SIBs (by Samsung).

*Comments below:*

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| **Company** | **Comments** |
| Vodafone | Roaming is one of the key aspects of the 3GPP systems and shall be properly supported by our specifications.  Input documents to RAN 2 and RAN plenary have highlighted that this fault impacts some IoT devices that are difficult to OTA update. At least within Europe, many (most?) IoT devices (have IMSIs from HPLMNs that have no RAN equipment and therefore) are permanently roaming.  Hence it is important to HPLMNs that VPLMNs are correctly configured to enable the IoT devices to continue to operate. |
| Qualcomm | Since it is up to the network configuration, we do not see a need to capture the proposed additional clarification (from RP-201983) in the specification (i.e., the text in the RAN2-endorsed CRs should be sufficient). |
| NTT DOCOMO | We’re O.K to address the SI multiplexing issue. On the other hand, Our top priority is to support and reflect the contents of the RAN2-endorsed CR into the standard for NR SA. |
| CMCC | Firstly we would like to confirm that the multiplexing issue also observed in our field network. Secondly we prefer to capture in the TS the limitation that SIB19+ SIBs cannot be multiplexed in a SI message with SIB18- SIBs. Because if this restriction is not captured in spec, we have to ask all our LTE network vendors (e.g., Huawei, ZTE, Ericsson, Nokia and CATT) to implement the restriction in their base stations. In this sense, it is no difference for us and our vendors to have the spec change. |
| CATT | It is a clear and correct application of network configuration and it is an essential intention of this whole issue. So we do not see a need to capture it in addition. |
| Turkcell | Share the same view of NTT Docomo |
| Verizon | We are supportive to have more discussion on this in 3gpp. |
| Apple | Multiplexing issue can be avoided by network configuration. No strong view whether to capture such restriction into the spec. |
| OPPO | So far nobody can confirm there is no such problem in the field. So to be in safe side we think one note in the spec is necessary to remind such potential issues. |
| Nokia | Agree this is not required to be covered additionally on top of what has been already endorsed technically in RAN2. As many companies duly commented in the online discussion the proposal from Samsung restricts network scheduling freedom and is NON backward compatible proposal which can be seen as even removing functionality from the specification from 3GPP Rel-8. In fact, the proposal is even redundant as the current solution already allows the network to multiplex SIB to SI in 1:1 manner. The proposed change neither fixes any real issue nor adds any value to the technical discussions and endorsed set of CRs from RAN2.  It must be additionally noted that the proposal from Samsung was never discussed in RAN2 and it is impossible for RAN plenary to quickly make a full-fledged technical discussion taking into account all possible implications of this proposal. Hence, this proposal should not be continued to be discussed in this meeting. |
| LG Uplus | Same views with DOCOMO and CMCC. Even though the proposed text is somewhat guideline or clarification, we see the benefits from the situation mentioned in CMCC’s comment. Besides, condiering roaming situation, not all operators are familiar with 3GPP discussion and background for this issue while they care only about the specification so in order to have common understanding over operators it is worth to have the clarificaiton in the specification. |
| Telecom Italia | Agree with NTT DOCOMO comment |
| KT | Problem is well described in RP-201983 and this should cause other problems if not approved in this meeting. We clearly prefer to have restrictions mentioned in the standard rather than asking our vendors to apply the restrictions. |
| KDDI | Same as NTT DOCOMO, CR is the priority and multiplexing restriction can be addressed. |
| Ericsson | The Samsung proposal is to add a NW-behavior (or limitation, if you want) in the RRC specification. The RRC specification shall in general capture UE behavior. There are of course exceptions where NW-limitations are captured in the RRC specification but the reason why NW-behaviors are captured in RRC in such cases is to allow UE vendors to rely on that a certain configuration will not be attempted so that they don’t have to account for certain situations.  But since we in this case are talking about (potential) UEs which already have been (faulty) implemented and exist in field, we would not help anyone by capturing a NW-limitation in the spec. As mentioned by several companies during the GTW-session, if there indeed are issues to multiplex different SIBs in SI-messages as suggested by Samsung, that can be addressed by NW-implementation/configuration by operators.  Hence, this proposed additional wording is not needed. |
| Intel | This issue was raised and discussed in RAN2 but companies where not convinced that the problem really existed in the field as no operators had confirmed it. On this thread some operators now indicate that they do observe problems although the scale of those problems is not clear  The text proposed by Samsung is basically a recommended network workaround in case it is found that there are problem UEs in the network. Even without this text it would still be possible for a network to implement the workaround, and hence I think it cannot be argued that the text is essential. Equally, if the text were included in the spec it would still be possible for the network to not implement it, and hence I think it cannot be argued that it is non backwards compatible or removing functionality from Rel-8.  Having said that it is not essential, if operators think that the problem really exists in their networks then it would still be acceptable to us to add this text to act as a reminder for the network implementer to consider this aspect. |
| Samsung | We like to point out two things   1. It is not non-backward compatible proposal because it only restrict the multiplexing old SIB and new SIB. Multiplexing old SIBs together or new SIBs together are possible. 2. It does not remove the functionality but restrict it during transient period. The problematic UE implementation will be updated step by step. But as we all know, OTA upgrade takes time since not all users click the update button immediately.   We understand some vendor’s concern on specifying this type of things in the specification. But we like to suggest to be pragmatic. Having slightly unusual text in the specification would be much better than risking wrong operation in the field. |

# Summary

# References