**3GPP TSG-RAN WG4 Meeting # 104-bis-e R4-22XXXXX**

**Electronic Meeting, 10– 19 October 2022**

**Agenda item:** 4.6.6

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [104-bis-e][208] NR\_redcap\_RRM\_2

**Document for:** Information

# Introduction

This email discussion is for R17 NR RedCap WI and the scope covers the following agenda items:

* AI 4.6.3.2 Extended DRX enhancements
* AI 4.6.3.3 RRM measurement relaxations
* AI 4.6.3.4 Others (include [R4-2216457](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216457.zip))

It is appreciated that the delegates for this topic put their contact information in the table below.

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Nokia | Juergen Hofmann | juergen.hofmann@nokia.com |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: Extended DRX enhancements

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2216295](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216295.zip) | Huawei, HiSilicon | Proposal 1: Proposal 1: When UE transitions from measurements within PTW and to measurements outside PTW or vice versa during one measurement period, the UE measurement requirements apply based on the longer measurement requirements before or after the transition. |
| [R4-2216296](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216296.zip) | Huawei, HiSilicon | CR |
| [R4-2216454](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216454.zip) | Ericsson | CR |

## Open issues summary

### Sub-topic 1-1 Maintenance on eDRX requirements for Redcap

**Issue 1-1-1: Issue when UE transitions from measurements within PTW and to measurements outside PTW or vice versa during one measurement period**

* Proposals
  + Option 1: When UE transitions from measurements within PTW and to measurements outside PTW or vice versa during one measurement period, the UE measurement requirements apply based on the longer measurement requirements before or after the transition. (Huawei)
* Recommended WF
  + TBA

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| **Company** | **Comments** |
| Huawei | Support option 1.  We would like to explain a bit more on option 1 including identified new issue and the possible solution.  In RRC active mode, UE performs measurements both within PTW and outside PTW when idle\_eDRX is configured. However as per RAN2 definition, the T length within PTW and outside PTW will be different. Then there would be some issues to determine Nserv \_RedCap,when UE transmits from within PTW to outside PTW or vise versa during one measurement period:  Table 5.1B.2.2-1: Nserv\_RedCapfor inactive Redcap UE configured with eDRX\_IDLE cycle, (Frequency range FR1)   |  |  |  |  | | --- | --- | --- | --- | | eDRX\_IDLE cycle length [s] | DRX or eDRX INACTIVE cycle length[s] | T [s] | Nserv \_RedCap [number of T ] | | 2.56 ≤eDRX\_IDLE cycle length ≤10485.76 | 0.32 ≤DRX\_Inactive cycle length ≤2.56; or  2.56 ≤eDRX\_Inactive cycle length ≤10.24 if inactive eDRX is configured | 0.32 | 4\*M1 | | 0.64 | 4\*M1 | | 1.28 | 2 | | 2.56 | 2 | | 5.12 | 2 | | 10.24 | 2 | | Note1: T is dertermined according to clause 7.1 in [1].  Note2: M1=2 if SMTC periodicity (TSMTC) > 20 ms and DRX cycle ≤ 0.64 second. | | | |   One example is given:  If T within PTW is 0.64s, Nserv \_RedCap is defined as 4\* M1, if T outside PTW is 2.56, Nserv \_RedCap is defined as 2. When UE transmits from within PTW and to outside PTW **during one measurement period**, T is changed and the evaluation number Nserv \_RedCap is changed accordingly. The example is presented in below Figure, where M1 is assumed as 1. In this scenario shall UE use 4\* M1 paging cycles (where Twithin PTW=0.64s) or use 2 paging cycles (where Toutside PTW=2.56s)?    Therefore, the identified issue is that **both the number of paging cycles and paging cycle length (i.e., T) would be changed from within PTW to outside PTW (and vice versa) during one measurement period** eDRX\_IDLE is configured for inactive RedCap UE. To address the above identified issues, it is proposed to make the below clarification:  When UE transitions from measurements within PTW and to measurements outside PTW or vice versa during one measurement period, the UE measurement requirements apply based on the longer measurement requirements before or after the transition. |
| Nokia | We support option 1. One clarification is proposed: “…the UE measurement requirements apply based on the longer measurement **period** requirements before or after the transition.” |
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## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| [R4-2216296](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216296.zip) | Huawei: To better understand the CR, we would like to interpret it a bit.  Besides the clarification in option 1 in issue 1-1-1, this CR also covers another change:  The existing M1 for inactive mode is specified as:  “The UE shall measure the SS-RSRP and SS-RSRQ level of the serving cell and evaluate the cell selection criterion S defined in TS 38.304 [1] for the serving cell at least once every M1\*N1 DRX cycle; where:  - M1=2 if SMTC periodicity (TSMTC) > 20 ms and DRX cycle ≤ 0.64 second,  - otherwise M1=1.”  As the logic of serving cell evaluation measurement is based on T (paging occation), it is straight forward to replace DRX with T for M1. |
| Nokia: same comment as for option 1. We propose to modify “... and evaluate the cell selection criterion S defined in TS 38.304 [1] for the serving cell at least once every **Nserv\_RedCap\*T as specified in Table 5.1B.2.2-1or and Table 5.1B.2.2-2**”. The enumeration below first paragraph is not needed as it just repeats NOTE1 and NOTE2 for FR1. |
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| [R4-2216454](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216454.zip) | Nokia: The CR is agreeable. |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic #1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: RRM measurement relaxations

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2215963](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215963.zip) | vivo | **Proposal 1: For the issue 2-1-3, option 3 can be considered and the wording of option 3 could be updated.** |
| [R4-2216219](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216219.zip) | Nokia, Nokia Shanghai Bell | 1. RAN4 to proceed along option 1 for Issue 2-1-3, i.e. UE shall not relax measurements on any of the neighbour cells in case UE has failed to meet the S criterion. 2. RRM relaxation of neighbour cell measurements is allowed for SDT at inactive state and depends on whether configured relaxation criteria are met, e.g. whether single stationary criterion is met, single low mobility criterion is met, or stationary not-at-cell-edge criteria are met. |
| [R4-2216297](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216297.zip) | Huawei, HiSilicon | CR |
| [R4-2216763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216763.zip) | Ericsson | Observation 1 Whether UE can apply relaxed measurement when failing to meet the S-criterion was overlooked in Rel-16 RRM relaxation WI.  Observation 2 Rel-17 RedCap UE is allowed to not measure on any of the neighbour cells for 4 hours compared to the longest relaxation period of 1 hour for Rel-16 NR UE.   1. If the UE is configured with and has fulfilled multiple relaxation criteria that allows the UE to not measure for 4 hours and if UE has failed to meet the S-criterion, then the UE shall not relax measurements on any of the neighbour cells. |
| [R4-2216883](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216883.zip) | Nokia, Nokia Shanghai Bell | CR |

## Open issues summary

### Sub-topic 2-1 Remaining issues on RRM measurment relaxation for Redcap

**Issue 2-1-1: Clarification on RRM relaxation applying conditions**

* Proposals
  + Option 1: For the issue 2-1-3 in [R4-2215162], option 3 can be considered and the wording of option 3 could be updated. (vivo)
    - Note: option 3 is “If the UE is configured with and has fulfilled the stationary and not-at-cell-edge criteria in sections 4.2B.2.10.3 and 4.2B.2.11.3 and if UE has failed to meet the S-criterion, then the UE shall not relax measurements on any of the neighbour cells”.
  + Option 2: RAN4 to proceed along option 1 for Issue 2-1-3, i.e. UE shall not relax measurements on any of the neighbour cells in case UE has failed to meet the S criterion. (Nokia)
  + Option 3: If the UE is configured with and has fulfilled multiple relaxation criteria that allows the UE to not measure for 4 hours and if UE has failed to meet the S-criterion, then the UE shall not relax measurements on any of the neighbour cells. (Ericsson)
* Recommended WF
  + This topic has been discussed for a few meetings and any compromise is encouraged. Proponent could check whether option 1 and option 3 are identical.

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| **Company** | **Comments** |
| Nokia | We support option 2 related to failed S criterion, the event which indicates the need for cell reselection and hence to identify potential reselection candidates as fast as possible. In our view this should be valid independent if single relaxation criterion or multiple relaxation criteria are fulfilled. |
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**Issue 2-1-2: RRM measurement relaxation for SDT at inactive state**

* Proposals
  + Option 1: RRM relaxation of neighbour cell measurements is allowed for SDT at inactive state and depends on whether configured relaxation criteria are met, e.g. whether single stationary criterion is met, single low mobility criterion is met, or stationary not-at-cell-edge criteria are met. (Nokia)
* Recommended WF

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| **Company** | **Comments** |
| Huawei | Option1 is not very clear to us. We think SDT TA validation requirements have no relation with measurement relaxation criteria. |
| Nokia | We support option 1. In our view, this issue should be addressed as applicability of RRM measurement relaxation for neighbour cells during SDT in inactive state is currently not mentioned in 38.133. Such clarification we see needed.  To Huawei: It is not related to SDT TA validation requirements. We propose to add this clarification in a separate section, see CR in R4-2216883. |
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## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| R4-2216297 | Nokia: Generally, the CR is OK. Some scenarios require rewording though, as the referred fulfilled relaxation criteria are left unclear “and has also fulfilled both criteria” (change 2, change 6) and “criteria” at the end of the insertion should be put in singular (change 4, change 5). |
| Company B |
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| R4-2216883 | Company A |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: Others

## Companies’ contributions summary

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| T-doc number | Company | Proposals / Observations |
| [R4-2215470](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215470.zip) | Xiaomi | **Proposal 1: RAN4 to consider sharing mechanism to define the measurement requirement when the NCD-SSB offset configured with 5ms.** |
| [R4-2215598](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215598.zip) | Apple | CR |
| [R4-2216220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216220.zip) | Nokia, Nokia Shanghai Bell | 1. MG configuration with appropriate combination of gap offset and MGTA, selected by network, can resolve the depicted issue to preclude UE having to drop MG assisted CD-SSB inter-frequency measurements. 2. RAN4 to consider the scenario NCD-SSB time offset = 5ms and CD-SSB in a different BWP to NCD-SSB with MG for CD-SSB being applied. 3. RAN4 to not further treat the scenario with NCD-SSB offset = 5ms, as there is no specification impact. Network can select appropriate MG configuration based on gap offset and MGTA to preclude UE having to drop MG assisted CD-SSB inter-frequency measurements. |
| R4-2216457 | Ericsson | ***Proposal 1: In RedCap, RAN4 to define UE behaviour when the MG and the SMTC meets the proximity condition with the time distance = 4ms.***  ***Proposal 2: When the SMTC for intra-frequency layer is fully-partially overlapping with the MG due to NCD-SSB offset, UE is required to perform intra-frequency measurement and drop the configured MG.*** |

## Open issues summary

### Sub-topic 3-1 On offset to transmit CD-SSB and NCD-SSB at different times

**Issue 3-1-1: Issue when NCD-SSB time offset = 5ms**

* Proposals
  + Option 1: RAN4 to consider sharing mechanism to define the measurement requirement when the NCD-SSB offset configured with 5ms. (xiaomi)
  + Option 2: RAN4 to consider the scenario NCD-SSB time offset = 5ms and CD-SSB in a different BWP to NCD-SSB with MG for CD-SSB being applied. RAN4 to not further treat the scenario with NCD-SSB offset = 5ms, as there is no specification impact. Network can select appropriate MG configuration based on gap offset and MGTA to preclude UE having to drop MG assisted CD-SSB inter-frequency measurements. (Nokia)
  + Option 3: In RedCap, RAN4 to define UE behaviour when the MG and the SMTC meets the proximity condition with the time distance = 4ms; When the SMTC for intra-frequency layer is fully-partially overlapping with the MG due to NCD-SSB offset, UE is required to perform intra-frequency measurement and drop the configured MG. (Ericsson)
* Recommended WF

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| **Company** | **Comments** |
| Huawei | Network can control the gap configuration, NCD-SSB/CD-SSB periodicity and offset between NCD and CD-SSB. The fully-partial overlapping case pointed in option 3 can be avoided, e.g., network configures 20ms offset. Therefore we think there is no specification impact. |
| Nokia | Option 2. In our view, this issue can be resolved with proper network configuration. Regarding option 3, we do not think that the proximity condition is valid here, as it is applied between two measurement gaps, whilst here one measurement (CD-SSB) is done gap-assisted, while the other (NCD-SSB) is done w/o gap. |
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## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| CR/TP number | Comments collection |
| R4-2215598 | Nokia: The CR is agreeable. The cover sheet should use the term “system information update” or “SI update” rather than “system update”. |
| Company B |
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|  | Company A |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
|  | Status summary |
| Sub-topic#1 | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| CR/TP number | CRs/TPs Status update recommendation |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
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**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| [R4-2216295](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216295.zip) |  | Discussion on Extended DRX enhancements for inactive RedCap UE | Huawei, HiSilicon |  |  |
| [R4-2216296](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216296.zip) |  | Clarification on measurement for inactive mode RedCap UE | Huawei, HiSilicon |  |  |
| [R4-2216454](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216454.zip) |  | CR on RedCap eDRX | Ericsson |  |  |
| [R4-2215963](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215963.zip) |  | on remaining issues on RRM relaxation for Redcap | vivo |  |  |
| [R4-2216219](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216219.zip) |  | Discussion on RRM relaxations | Nokia, Nokia Shanghai Bell |  |  |
| [R4-2216297](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216297.zip) |  | Correction on relaxed measurement for RedCap | Huawei, HiSilicon |  |  |
| [R4-2216763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216763.zip) |  | Discussions on RRM measurement relaxations | Ericsson |  |  |
| [R4-2216883](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216883.zip) |  | CR 38.133: RRM relaxations in case of failed S-criterion and SDT for RedCap | Nokia, Nokia Shanghai Bell |  |  |
| [R4-2215470](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215470.zip) |  | Discussion on NCD-SSB time offset impact for RedCap UE | Xiaomi |  |  |
| [R4-2215598](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215598.zip) |  | CR on scheduling restrictions for L3 measurements in FR1 for RedCap | Apple |  |  |
| [R4-2216220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216220.zip) |  | Discussion on impact from NCD-SSB time offset | Nokia, Nokia Shanghai Bell |  |  |
| R4-2216457 |  | Discussions on RedCap measurement requirements | Ericsson |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

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| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents