**3GPP TSG-RAN WG4 Meeting # 95-e R4-200XXXX**

**Electronic Meeting, 25 May – 5 June, 2020**

**Agenda item:** 6.17.1

**Source:** Moderator (CMCC)

**Title:** Email discussion summary for [95e][227] NR\_HST\_RRM

**Document for:** Information

# Introduction

This email discussion focuses on RRM for Rel-16 NR HST, and in particular the agenda items:

6.17.1 RRM core requirements

6.17.1.1 Cell re-selection

6.17.1.2 Cell identification delay

6.17.1.3 RLM

6.17.1.4 Beam management

6.17.1.5 Inter-RAT measurement

The targets of email discussion for 1st round and 2nd round are:

* 1st round: discuss the open issues and strive to minimize the open issues. Companies are encouraged to provide comments on the open issues and CRs
* 2nd round: according to 1st round discussion, discuss left open issues for 2nd round, and strive to minimize the open issues. Strive to agree on CRs

# Topic #1: Cell re-selection requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2006719**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006719.zip) | Qualcomm, Inc. | Observation 1: With relaxation factor M2 = 1.5 and M3 = 2, measurement requirement in DRx=0.32s is still sufficient for NR HST application scenarios.Observation 2: Connectivity might be affected in the worst-case scenario with 500km/h and ISD = 700m when M = 1.5. However, if ISD is larger than 700m or speed is slower than 500km/h, M=1.5 is a feasible configuration to maintain the connectivity.Proposal 1: Support operators view on whether to add a note for relaxation factor. Observation 3: Frequency offset considered in HST has significant impact on SINR measurement, especially in high SNR region.Proposal 2: SINR accuracy requirement is not applicable to HST scenario when SNR > 5dB.Proposal 3: Inter-RAT cell identification for LTE in NR SA requirement is specified by

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | TdetectEUTRA\_FDD [s] (number of DRX cycles) | TmeasureEUTRA\_FDD [s] (number of DRX cycles) | TevaluateEUTRA\_FDD[s] (number of DRX cycles) |
| 0.32 | 4.16 (13) | 0.96 (3) | 1.6 (5) |
| 0.64 | 8.32 (13) |  1.92 (3) | 3.2 (5) |
| 1.28 | 12.8 (10) | 2.56 (2) | 6.4 (5) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

Proposal 4: Inter-RAT cell identification for LTE in NR SA requirement is specified by

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 0.64 | Note1 (10) | Note1 (10) |
| 0.64 < DRx cycle <= 1.28 | Note1 (8) | Note1 (8) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: The requirement only applicable to CSSFinterRAT = 1 case, otherwise number of DRx cycles should be scaled by CSSFinterRAT |

Proposal 5: Inter-RAT cell identification for LTE in NR SA requirement is specified by:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR[s] (number of DRX cycles) |  |
|  |
| 0.32 | 5.12 (16 x M) | 0.96xM (3 x M) | 1.6xM (5 x M) |   |
| 0.64 | 10.24 (16) |  1.92 (3) | 3.2 (5) |   |
| 1.28 | 16.64 (13) | 2.56 (2) | 6.4 (5) |   |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |   |
| Note 1: M = 1.5 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M=1. |  |

Proposal 6: Cell re-selection requirements on EUTRA-NR inter-RAT in idle mode follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra   | TSSB\_time\_index\_intra |
| No DRX | max[600ms, [8] x max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, [3] x max(MGRP, SMTC period)] × Nfreq |
| DRX cycle ≤ 320ms | max[600ms, ceil([8]xM) x max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil([3] x M) x max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle > 320ms | 4xM x DRX cycle × Nfreq | 4xM × DRX cycle × Nfreq | [3] x DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

 |
| [**R4-2006770**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006770.zip) | CMCC | Proposal 1: it is not preferred to introduce additional note in the spec, such as Note x: Operation with scaling factor M=1.5, M=2 may not be sufficient in all high speed train deployments considered in this release of the specifications should be added in NR high speed specifications.Proposal 2: Rel.16 HST RRM enhanced requirement are proposed to be release independent from Rel-15. |
| [**R4-2006774**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006774.zip) | CMCC | 38.133 CR on cell re-selection requirements for Rel-16 NR HST |
| [**R4-2006965**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006965.zip) | CMCC | LS on supporting Rel-16 NR HST RRM enhanced requirements from Rel-15 UEs |
| [**R4-2007162**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007162.zip) | Nokia, Nokia Shanghai Bell | Observation 1: Serving cell measurements are more relaxed than intra-frequency neighbour cell measurements for SMTC=40ms.Related to this we propose:Proposal 1: For HST M1=2 if SMTC periodicity (TSMTC) > 40 ms and DRX cycle ≤ 0.64 second for the serving cell measurements.Proposal 2: For HST M1=2 if SMTC periodicity (TSMTC) > 40 ms and DRX cycle ≤ 0.32 second for the serving cell measurements.Proposal 3: Include a note for NR HST when at least NR HST mobility can be ensured with the existing measurement assumptions. |
| [**R4-2007272**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007272.zip) | vivo | Proposal 1 Not to align serving cell and neighbour cell requirement for intra-frequency cell re-selection in NR HST.Proposal 2 If the alignment needs to be done, Table II is acceptable as a compromise. Table II. Compromised proposal for cell re-selection requirements for NR HST

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR\_Intra [s] (number of DRX cycles) | Tmeasure,NR\_Intra [s] (number of DRX cycles) | Tevaluate,NR\_Intra[s] (number of DRX cycles) |
| 0.32 | [2.56 x M2 (8 x M2)] | [0.64 x M3 (2 x M3)] | [0.96 x M4 (3 x M4)] |
| 0.64 | [5.12 (8)] | [1.28 (2)] | [1.92 (3)] |
| 1.28 | [8.96 (7)] | [1.28 (1)] | [3.84 (3)] |
| 2.56 | [58.88 (23)] | [2.56 (1)] | [7.68 (3)] |
| Note 1: when SMTC < =40ms, M2=M3=M4=1; when SMTC >40ms, M2 = M3 =1.5, M4 = 2 |

Proposal 3 No note is added to the HST requirements in TS 38.133.Observation 1 Due to high Doppler shift in HST scenario, ICI exists, and its impact is on both serving cell and neighbour cell SS-SINR accuracy.Proposal 4 For SS-SINR requirement in HST, adopt option 1, i.e. SINR accuracy requirement is not applicable to HST scenario in R16. The issue can be left to R17.Proposal 5 On NR-EUTRAN inter-RAT cell identification requirement in connected mode, slightly prefer option 1, i.e. adopt Table III. Table III Proposed NR-EUTRAN inter-RAT cell identification requirement in connected mode

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 1.28 | Note1 (10) | Note1 (10) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

Proposal 6 On NR-EUTRAN inter-RAT cell measurement requirement in connected mode, R15 NR requirement can be reused for NR HST.Proposal 7 On EUTRAN-NR inter-RAT requirement in connected mode, adopt Table IV.Table IV. Proposed requirement for EUTRAN-NR inter-RAT requirement in connected mode

|  |  |  |  |
| --- | --- | --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra   | TSSB\_time\_index\_intra |
| No DRX | max[600ms, 8 × max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, 3 × max(MGRP, SMTC period)] × Nfreq |
| DRX cycle < 320ms | max[600ms, ceil(8 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil(3 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle ≥ 320ms | 8 × M × DRX cycle × Nfreq | 6 × M × DRX cycle × Nfreq | 3 × DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

Proposal 8 On NR-EUTRAN inter-RAT cell reselection requirement, adopt option 2 or 3 in last meeting’s WF.Proposal 9 On EUTRAN-NR inter-RAT cell re-selection requirements, adopt Table V.Table V Proposed requirement for EUTRAN-NR inter-RAT cell reselection requirement

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR [s] (number of DRX cycles) |
|  |
| 0.32 | 5.12 x M1 (16 x M1) | 0.64 x M1 (2 x M1 ) | 0.96 x M2 (3 x M2) |  |
| 0.64 | 7.68 (12) | 1.28 (2 ) | 1.92(3) |  |
| 1.28 | 12.8 (10) | 1.28 (1 ) | 6.4(3) |  |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |  |
| Note 1: M1 = 1.5 and M2 = 2 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M1=M2=1. |  |

Proposal 10 NR HST RRM features should be ‘mandatory with capability signaling’, and no early implementation for HST RRM features is preferred. |
| [**R4-2008040**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008040.zip) | Nokia Corporation | CR for Measurement and evaluation of serving cell in HST |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1: Additional note in the spec for cell re-selection requirements in idle mode

**Background:**

* For cell re-selection requirements for neighbor cell, when SMTC < =40ms, remove M2, M3, M4; when SMTC >40ms, M2 = 1.5, M3 = M4 = 2
	+ FFS whether additional note such as Note x: Operation with scaling factor M=1.5, M=2 may not be sufficient in all high speed deployments considered in this release of the specifications should be added in NR high speed specifications

**Issue 1-1: for cell re-selection requirements, whether additional note should be added to the spec, such as Note x: Operation with scaling factor M=1.5, M=2 may not be sufficient in all high speed deployments considered in this release of the specifications.**

* Proposals
	+ Option 1 (Nokia, Ericsson): Yes
	+ Option 2 (CMCC, vivo, QC, HW): No
* Recommended WF
	+ 6 companies discuss issue 1-1, 4 companies prefer not to add the additional note, 2 companies suggest to add the note.
	+ Different operators have different deployment for high speed train scenario, e.g. ISD, velocity. That’s why from Rel-14 LTE HST to now, when we discuss the RRM enhancement requirements for HST, general requirements are expected target for general scenarios. Network has the knowledge of network deployment, then network can configure corresponding parameters to adapt different scenarios. Taking above consideration into account, Moderator would like to check whether following option 2 can be acceptable:
* No need to add additional note in the spec

### Sub-topic 1-2: : Cell re-selection requirements for serving cell

**Background:**

In current requirements, Table 4.2.2.2-1 in TS 38.133 lists the measurement requirements for the serving cell as following table:

|  |  |  |
| --- | --- | --- |
| **DRX cycle length [s]** | **Scaling Factor (N1)** | **Nserv [number of DRX cycles]** |
| **FR1** | **FR2Note1** |
| 0.32 | 1 | 8 | M1\*N1\*4 |
| 0.64 | 5 | M1\*N1\*4 |
| 1.28 | 4 | N1\*2 |
| 2.56 | 3 | N1\*2 |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length. |

For the M1 RAN4 has defined followed:

M1=2 if SMTC periodicity (TSMTC) > 20 ms and DRX cycle ≤ 0.64 second

In the last meeting, it was agreed that the scaling factor is 1.5 or 2 when SMTC periodicity (TSMTC) > 40 ms for the cell re-selection requirements of neighbour cell.

**Issue 1-2: whether need to align the serving cell measurement requirements with the agreement for intra-frequency neighbour cell measurement, ie, M1=2 if SMTC periodicity (TSMTC) > 40 ms and DRX cycle ≤ 0.32 second**

* Proposals
	+ Option 1 (Nokia): for the measurement requirements for serving cell, M1=2 if SMTC periodicity (TSMTC) > 40 ms and DRX cycle ≤ 0.32 second
* Recommended WF
	+ More discussion is needed.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1: Sub topic 1-2:….Others: |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2006774**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006774.zip) | Company A |
| Company B |
|  |
| [**R4-2008040**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008040.zip) | Company A |
| Company B |
|  |

## 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.*

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

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: Cell identification delay requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2006231**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006231.zip) | CATT | CR on cell identification requirements for NR HST |
| [**R4-2006983**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006983.zip) | Ericsson | Proposal 1 A note such as Note x : Operation with scaling factor M=1.5, M=2 may not be sufficient in all high speed deployments considered in this release of the specifications should be added in NR high speed specifications. |
| [**R4-2007163**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007163.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: RAN4 includes a note addressing the use of long DRX cycles in HST scenario.Proposal 2: Add a note that in HST the UE can be assumed to perform more than measurement per DRX cycle. |
| [**R4-2008090**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008090.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: If RAN4 decides to specify SS-SINR accuracy requirements for HST, then reusing the Rel-15 intra-frequency SS-SINR accuracy requirements that apply to [-3] dB ≤ SNR ≤ [7] dB. |
| [**R4-2006719**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006719.zip) | Qualcomm, Inc. | Observation 1: With relaxation factor M2 = 1.5 and M3 = 2, measurement requirement in DRx=0.32s is still sufficient for NR HST application scenarios.Observation 2: Connectivity might be affected in the worst-case scenario with 500km/h and ISD = 700m when M = 1.5. However, if ISD is larger than 700m or speed is slower than 500km/h, M=1.5 is a feasible configuration to maintain the connectivity.Proposal 1: Support operators view on whether to add a note for relaxation factor. Observation 3: Frequency offset considered in HST has significant impact on SINR measurement, especially in high SNR region.Proposal 2: SINR accuracy requirement is not applicable to HST scenario when SNR > 5dB. |
| [**R4-2006770**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006770.zip) | CMCC | Proposal 1: it is not preferred to introduce additional note in the spec, such as Note x: Operation with scaling factor M=1.5, M=2 may not be sufficient in all high speed train deployments considered in this release of the specifications should be added in NR high speed specifications.Proposal 2: Rel.16 HST RRM enhanced requirement are proposed to be release independent from Rel-15. |
| [**R4-2007272**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007272.zip) | vivo | Proposal 3 No note is added to the HST requirements in TS 38.133.Observation 1 Due to high Doppler shift in HST scenario, ICI exists, and its impact is on both serving cell and neighbour cell SS-SINR accuracy.Proposal 4 For SS-SINR requirement in HST, adopt option 1, i.e. SINR accuracy requirement is not applicable to HST scenario in R16. The issue can be left to R17. |
| [**R4-2006772**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006772.zip) | CMCC | Proposal 1: it is proposed to specify SS-SINR requirements. Proposal 2: For HST scenario, specify SS-SINR accuracy requirement for SNR <= [11] dB. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1: Addtional note in the spec for cell identification requirements in the connected mode

**Background:**

* For cell identification requirements in connected mode
	+ In connected mode, when SMTC < =40ms, remove 1.5x scaling factor; when SMTC > 40ms, keep the scaling factor.
		- FFS whether additional note such as Note x: Operation with scaling factor 1.5 may not be sufficient in all high speed deployments considered in this release of the specifications should be added in NR high speed specifications
* Measurement delay in connected mode:
	+ For DRX <=160ms
		- 5 DRX cycles
		- when SMTC < =40ms, remove 1.5x scaling factor; when SMTC > 40ms, keep the scaling factor
	+ For 160ms < DRX<=320ms
		- 4 DRX cycles
		- when SMTC < =40ms, remove 1.5x scaling factor; when SMTC > 40ms, keep the scaling factor
	+ For DRX > 320ms
		- 3 DRX cycles when SMTC <= 40ms, 5 DRX cycles when SMTC > 40ms

**Issue 2-1: for cell identification requirements, whether additional note should be added in the specifications, such as Note x: Operation with scaling factor 1.5 may not be sufficient in all high speed deployments considered in this release of the specifications**

* Proposals
	+ Option 1 (Ericsson): Yes
	+ Option 2(CMCC, vivo, QC, HW): No
* Recommended WF
	+ Issue 2-1 is similar as Issue 1-1, Moderator suggests companies focus on the discussion of Issue 1-1.

### Sub-topic 2-2: Applied DRX cycle in connected mode for HST

**Background:**

* For NR HST in connected mode, enhanced requirements are applied for DRX cycle <= 1.28s
	+ FFS whether additional note is added to the spec, such as “Requirements with 0.64s and 1.28s DRX cycle may not be sufficient in all high speed deployments considered in this release of the specifications” should be added in NR high speed specifications”

**Issue 2-2: whether additional note is added to the spec, such as “Requirements with 0.64s and 1.28s DRX cycle may not be sufficient in all high speed deployments considered in this release of the specifications” should be added in NR high speed specifications”**

* Proposals
	+ Option 1 (Nokia): Yes, add a note that in HST the UE can be assumed to perform more than measurement per DRX cycle
	+ Option 2 (CMCC, vivo, QC): No
* Recommended WF
	+ More discussion is needed.

### Sub-topic 2-3: SS-SINR

**Issue 2-3: SS-SINR**

* Proposals
	+ Option 1 (CMCC): Specify SS-SINR accuracy requirement for SNR <= [11] dB
	+ Option 2 (QC): SINR accuracy requirement is not applicable to HST scenario when SNR > 5dB
	+ Option 3 (vivo): SINR accuracy requirement is not applicable to HST scenario in R16. The issue can be left to R17.
	+ Option 4 (Nokia): If RAN4 decides to specify SS-SINR accuracy requirements for HST, then reusing the Rel-15 intra-frequency SS-SINR accuracy requirements that apply to [-3] dB ≤ SNR ≤ [7] dB.
* Recommended WF
	+ More discussion is needed.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: Sub topic 2-2:….Others: |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2006231**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006231.zip) | Company A |
| Company B |
|  |

## 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.*

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

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: RLM

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2008058**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008058.zip) | Nokia, Nokia Shanghai Bell | CR to TS 38.133: NR HST RLM requirements |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

According to the contributions, there is no open issues on RLM. Moderator suggests companies provide comments on the CR

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2008058**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2004297.zip) | Company A |
| Company B |
|  |

## 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.*

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

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #4: Beam management

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2008065**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008065.zip) | Nokia, Nokia Shanghai Bell | CR to TS 38.133: NR HST beam management requirements |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

According to the contributions, there is no open issues on beam management. Moderator suggests companies provide comments on the CR

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2008065**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2008065.zip) | Company A |
| Company B |
|  |

## 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.*

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

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #5: Inter-RAT measurement

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2006771**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006771.zip) | CMCC | NR-EUTRA inter-RAT measurement requirementsProposal 1: for high speed scenario, the cell re-selection requirements on NR-EUTRA inter-RAT measurement are proposed as following:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra[s] (number of DRX cycles) |
| 0.32 | 2.56 (8) | 0.32(1) | 0.96(3) |
| 0.64 | 5.12 (8) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96 (7) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

Proposal 2: for NR-EUTRA inter-RAT measurement requirements in connected mode with DRX, the TIdentify,E-UTRAN are proposed as following:

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 0.64 | Note1 (10) | Note1 (10) |
| 0.64 < DRx cycle <= 1.28 | Note1 (8) | Note1 (8) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

EUTRA-NR inter-RAT measurement requirementsProposal 3: for high speed scenario, the EUTRA-NR inter-RAT cell re-selection requirements are proposed as following:Table: Tdetect,NR, Tmeasure,NR and Tevaluate,NR

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra[s] (number of DRX cycles) |
| 0.32 | 2.56 x M2 (11 x M2) | 0.32 x M3 (1 x M3) | 0.96 x M4 (3 x M4) |
| 0.64 | 5.12 (11) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96(10) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |
| Note 1: M2 = M3 = M4 = 1 when SMTC < =40, and M2 = 1.5, M3 = M4 = 2 when SMTC >40 |

Proposal 4: for EUTRA-NR inter-RAT measurement requirements in connected mode, the cell identification requirements are proposed as following:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra | TSSB\_time\_index\_intra |
| No DRX | Max(600ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(200ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(120ms, 3 x max(MGRP, SMTC period)) ×Nfreq |
| DRX cycle < 320ms | Max(600ms, ceil( 8 × M) × max(MGRP, SMTC period, DRX cycle)) ×Nfreq | Max(200ms, ceil(8 × M) x max(MGRP, SMTC period, DRX cycle))×Nfreq | Max(120ms, ceil(3 × M) x max(MGRP, SMTC period, DRX cycle)) ×Nfreq |
| DRX cycle≥320ms | 4× M × DRX cycle ×Nfreq | 4× M × DRX cycle ×Nfreq | [3] × DRX cycle ×Nfreq |
| Note 1: M = 1 when SMTC < =40, and M = 1.5 when SMTC >40 |

 |
| [**R4-2006773**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006773.zip) | CMCC | 36.133 CR on cell identification in connected mode for EUTRAN-NR measurement for Rel-16 NR HST |
| [**R4-2006984**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006984.zip) | Ericsson | Proposal 1 : RAN4 should target an RRM delay for interRAT measurements of not more than 2x the intrafrequency HST delay.Proposal 2 : Requirements for Cell re-selection for NR- EUTRA inter-RAT are specified as:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra [s] (number of DRX cycles) |
| 0.32 |  5.76(16) | 0.64 (2) | 0.96(3) |
| 0.64 | 7.68 (12) | 1.28 (2) | 1.92 (3) |
| 1.28 | 8.96(7) | 1.28 (1) | 3.84 (3) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

Proposal 3 : Requirements for Cell identification for NR- EUTRA inter-RAT are specified as:

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 1.28 | Note1 (10) | Note1 (10) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

Proposal 4 : Requirements for Cell re-selection for EUTRA-NR inter-RAT are specified as:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR [s] (number of DRX cycles) |
| 0.32 | 2.56 x M2 (8 x M2) | 0.32 x M3 (1 x M3) | 0.96 x M4 (3 x M4) |
| 0.64 | 5.12 (8) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96(7) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |
| Note 1: M2 = M3 = M4 = 1 when SMTC < =40, and M2 = 1.5, M3 = M4 = 2 when SMTC >40 |

Proposal 5 : Requirements for Cell identification for EUTRA-NR inter-RAT are specified as:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra  | TSSB\_time\_index\_intra |
| No DRX | Max(600ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(200ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(120ms, 3 x max(MGRP, SMTC period)) ×Nfreq  |
| DRX cycle < 320ms | Max(600ms, ceil( 8 x M) x max(MGRP, SMTC period, DRX cycle)) ×Nfreq | Max(200ms, ceil(8 x M) x max(MGRP, SMTC period, DRX cycle))×Nfreq | Max(120ms, ceil(3 x M) x max(MGRP, SMTC period, DRX cycle)) ×Nfreq |
| DRX cycle≥320ms | 4xM x DRX cycle ×Nfreq | 4xM × DRX cycle ×Nfreq | [3] x DRX cycle ×Nfreq |
| Note 1: M = 1 when SMTC < =40, and M = 1.5 when SMTC >40 |

 |
| [**R4-2006985**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006985.zip) | Ericsson | Cell re-selection for EUTRAN-NR high speed in TS36.133 |
| [**R4-2007164**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007164.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: Cell re-selection requirements for EUTRA-NR inter-RAT in idle mode is based on option 1 in [1].Proposal 2: In option 1 the delay for the longest DRX cycle is reduced with 1 DRX cycle.Proposal 3: For E-UTRAN-NR inter-RAT measurement requirements:

|  |  |
| --- | --- |
| DRX | Option 4 |
| 0.32 | 6.08 |
| 0.64 | 8.96 |
| 1.28 | 11.52 |

Proposal 4: For NR-E-UREAN inter-RAT measurement requirements:

|  |  |
| --- | --- |
| DRX | Option 4 |
| 0.32 | 6.72 |
| 0.64 | 9.6 |
| 1.28 | 11.52 |

 |
| [**R4-2007165**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007165.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: EUTRA - NR Inter-RAT measurement requirements for LTE connected mode follow option 1 in [1] |
| [**R4-2007273**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007273.zip) | vivo | CR on cell re-selection requirement for NR-EUTRAN measurement in TS38.133 |
| [**R4-2007740**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007740.zip) | Huawei, Hisilicon | Proposal 1: Additional note of scaling factor is not needed.Proposal 2: R16 EUTRA HST enhanced cell reselection requirements can be reused for NR to EUTRA inter-RAT cell reselection.

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra[s] (number of DRX cycles) |
| 0.32 | 2.56 (8) | 0.32(1) | 0.96(3) |
| 0.64 | 5.12 (8) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96 (7) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

Proposal 3: For NR-EUTRA inter-RAT measurement in connected mode, the cell identification requirements for NR HST can be descripted as below,

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.16<DRx cycle<=0.32 |  Note1 (15\*CSSFinterRAT) |
| 0.32<DRx cycle <= 0.64 | Note1 (10\*CSSFinterRAT) |
| DRx cycle = 1.024 | Note1 (10\*CSSFinterRAT) | Note1 (10\*CSSFinterRAT) |
| DRx cycle = 1.28 | Note1 (8\*CSSFinterRAT | Note1 (8\*CSSFinterRAT) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2. |

Proposal 4: The EUTRA-NR inter-RAT cell reselection requirements in NR HST can be specified as below,

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR\_Intra [s] (number of DRX cycles) | Tmeasure,NR\_Intra [s] (number of DRX cycles) | Tevaluate,NR\_Intra[s] (number of DRX cycles) |
| 0.32 | [3.52 x M2 (11 x M2)] | [0.32 x M3 (1 x M3)] | [0.96 x M4 (3 x M4)] |
| 0.64 | [7.04 (11)] | [0.64 (1)] | [1.92 (3)] |
| 1.28 | [12.8 (10)] | [1.28 (1)] | [3.84 (3)] |
| 2.56 | [58.88 (23)] | [2.56 (1)] | [7.68 (3)] |

 |
| [**R4-2007741**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007741.zip) | Huawei, Hisilicon | Cell identification in connected mode for NR-EUTRAN measurement in HST |
| [**R4-2006719**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006719.zip) | Qualcomm, Inc. | Observation 1: With relaxation factor M2 = 1.5 and M3 = 2, measurement requirement in DRx=0.32s is still sufficient for NR HST application scenarios.Observation 2: Connectivity might be affected in the worst-case scenario with 500km/h and ISD = 700m when M = 1.5. However, if ISD is larger than 700m or speed is slower than 500km/h, M=1.5 is a feasible configuration to maintain the connectivity.Proposal 1: Support operators view on whether to add a note for relaxation factor. Observation 3: Frequency offset considered in HST has significant impact on SINR measurement, especially in high SNR region.Proposal 2: SINR accuracy requirement is not applicable to HST scenario when SNR > 5dB.Proposal 3: Inter-RAT cell identification for LTE in NR SA requirement is specified by

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | TdetectEUTRA\_FDD [s] (number of DRX cycles) | TmeasureEUTRA\_FDD [s] (number of DRX cycles) | TevaluateEUTRA\_FDD[s] (number of DRX cycles) |
| 0.32 | 4.16 (13) | 0.96 (3) | 1.6 (5) |
| 0.64 | 8.32 (13) |  1.92 (3) | 3.2 (5) |
| 1.28 | 12.8 (10) | 2.56 (2) | 6.4 (5) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

Proposal 4: Inter-RAT cell identification for LTE in NR SA requirement is specified by

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 0.64 | Note1 (10) | Note1 (10) |
| 0.64 < DRx cycle <= 1.28 | Note1 (8) | Note1 (8) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: The requirement only applicable to CSSFinterRAT = 1 case, otherwise number of DRx cycles should be scaled by CSSFinterRAT |

Proposal 5: Inter-RAT cell identification for LTE in NR SA requirement is specified by:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR[s] (number of DRX cycles) |  |
|  |
| 0.32 | 5.12 (16 x M) | 0.96xM (3 x M) | 1.6xM (5 x M) |   |
| 0.64 | 10.24 (16) |  1.92 (3) | 3.2 (5) |   |
| 1.28 | 16.64 (13) | 2.56 (2) | 6.4 (5) |   |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |   |
| Note 1: M = 1.5 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M=1. |  |

Proposal 6: Cell re-selection requirements on EUTRA-NR inter-RAT in idle mode follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra   | TSSB\_time\_index\_intra |
| No DRX | max[600ms, [8] x max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, [3] x max(MGRP, SMTC period)] × Nfreq |
| DRX cycle ≤ 320ms | max[600ms, ceil([8]xM) x max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil([3] x M) x max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle > 320ms | 4xM x DRX cycle × Nfreq | 4xM × DRX cycle × Nfreq | [3] x DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

 |
| [**R4-2007272**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007272.zip) | vivo | Proposal 1 Not to align serving cell and neighbour cell requirement for intra-frequency cell re-selection in NR HST.Proposal 2 If the alignment needs to be done, Table II is acceptable as a compromise. Table II. Compromised proposal for cell re-selection requirements for NR HST

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR\_Intra [s] (number of DRX cycles) | Tmeasure,NR\_Intra [s] (number of DRX cycles) | Tevaluate,NR\_Intra[s] (number of DRX cycles) |
| 0.32 | [2.56 x M2 (8 x M2)] | [0.64 x M3 (2 x M3)] | [0.96 x M4 (3 x M4)] |
| 0.64 | [5.12 (8)] | [1.28 (2)] | [1.92 (3)] |
| 1.28 | [8.96 (7)] | [1.28 (1)] | [3.84 (3)] |
| 2.56 | [58.88 (23)] | [2.56 (1)] | [7.68 (3)] |
| Note 1: when SMTC < =40ms, M2=M3=M4=1; when SMTC >40ms, M2 = M3 =1.5, M4 = 2 |

Proposal 3 No note is added to the HST requirements in TS 38.133.Observation 1 Due to high Doppler shift in HST scenario, ICI exists, and its impact is on both serving cell and neighbour cell SS-SINR accuracy.Proposal 4 For SS-SINR requirement in HST, adopt option 1, i.e. SINR accuracy requirement is not applicable to HST scenario in R16. The issue can be left to R17.Proposal 5 On NR-EUTRAN inter-RAT cell identification requirement in connected mode, slightly prefer option 1, i.e. adopt Table III. Table III Proposed NR-EUTRAN inter-RAT cell identification requirement in connected mode

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 1.28 | Note1 (10) | Note1 (10) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

Proposal 6 On NR-EUTRAN inter-RAT cell measurement requirement in connected mode, R15 NR requirement can be reused for NR HST.Proposal 7 On EUTRAN-NR inter-RAT requirement in connected mode, adopt Table IV.Table IV. Proposed requirement for EUTRAN-NR inter-RAT requirement in connected mode

|  |  |  |  |
| --- | --- | --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra   | TSSB\_time\_index\_intra |
| No DRX | max[600ms, 8 × max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, 3 × max(MGRP, SMTC period)] × Nfreq |
| DRX cycle < 320ms | max[600ms, ceil(8 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil(3 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle ≥ 320ms | 8 × M × DRX cycle × Nfreq | 6 × M × DRX cycle × Nfreq | 3 × DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

Proposal 8 On NR-EUTRAN inter-RAT cell reselection requirement, adopt option 2 or 3 in last meeting’s WF.Proposal 9 On EUTRAN-NR inter-RAT cell re-selection requirements, adopt Table V.Table V Proposed requirement for EUTRAN-NR inter-RAT cell reselection requirement

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR [s] (number of DRX cycles) |
|  |
| 0.32 | 5.12 x M1 (16 x M1) | 0.64 x M1 (2 x M1 ) | 0.96 x M2 (3 x M2) |  |
| 0.64 | 7.68 (12) | 1.28 (2 ) | 1.92(3) |  |
| 1.28 | 12.8 (10) | 1.28 (1 ) | 6.4(3) |  |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |  |
| Note 1: M1 = 1.5 and M2 = 2 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M1=M2=1. |  |

Proposal 10 NR HST RRM features should be ‘mandatory with capability signaling’, and no early implementation for HST RRM features is preferred. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 5-1: NR- EUTRA Inter-RAT measurement

**Issue 5-1: Cell re-selection requirements on NR- EUTRA inter-RAT measurement**

* Proposals
	+ Option 1 (CMCC, HW):

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra[s] (number of DRX cycles) |
| 0.32 | 2.56 (8) | 0.32(1) | 0.96(3) |
| 0.64 | 5.12 (8) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96 (7) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

* + Option 2 (QC):

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | TdetectEUTRA\_FDD [s] (number of DRX cycles) | TmeasureEUTRA\_FDD [s] (number of DRX cycles) | TevaluateEUTRA\_FDD[s] (number of DRX cycles) |
| 0.32 | 4.16 (13) | 0.96 (3) | 1.6 (5) |
| 0.64 | 8.32 (13) |  1.92 (3) | 3.2 (5) |
| 1.28 | 12.8 (10) | 2.56 (2) | 6.4 (5) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

* + Option 3 (Ericsson, vivo):

|  |  |  |  |
| --- | --- | --- | --- |
| **DRX cycle length [s]** | **TdetectEUTRA\_FDD [s] (number of DRX cycles)** | **TmeasureEUTRA\_FDD [s] (number of DRX cycles)** | TevaluateEUTRA\_FDD**[s] (number of DRX cycles)** |
| 0.32 |  5.76(16) | 0.64 (2) | 0.96(3) |
| 0.64 | 7.68 (12) | 1.28 (2) | 1.92 (3) |
| 1.28 | 8.96(7) | 1.28 (1) | 3.84 (3) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

* + Option 4 (Nokia):

|  |  |
| --- | --- |
| **DRX** | **Overall delay** |
| **0.32** | **6.72** |
| **0.64** | **9.6** |
| **1.28** | **11.52** |

* Recommended WF
	+ 6 companies discuss this issue, and companies’ view are different.
	+ Taking companies’ view into consideration, to move forward, Moderator would like to check whether following compromised option is acceptable:

|  |  |  |  |
| --- | --- | --- | --- |
| **DRX cycle length [s]** | **TdetectEUTRA\_FDD [s] (number of DRX cycles)** | **TmeasureEUTRA\_FDD [s] (number of DRX cycles)** | TevaluateEUTRA\_FDD**[s] (number of DRX cycles)** |
| 0.32 |  4.16(13) | 0.64 (2) | 0.96(3) |
| 0.64 | 7.68 (12) | 1.28 (2) | 1.92 (3) |
| 1.28 | 8.96(7) | 1.28 (1) | 3.84 (3) |
| 2.56 Note1 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

**Issue 5-2: NEUTRA\_carrier issue in the cell re-selection requirements on NR- EUTRA inter-RAT measurement taking the per inter-RAT carrier flag into account. This issue is more related to how to draft the CR on inter-RAT cell re-selection requirements.**

**Background:**

NEUTRA\_carrier is the total number of configured E-UTRA carriers in the neighbour frequency list. In the current spec, the cell re-selection requirements for NEUTRA\_carrier is (NEUTRA\_carrier) \* Tdetect,EUTRAN。

In the last meeting, RAN4 agreed to introduce network flag per inter-RAT carrier to indicate UE whether the enhanced inter-RAT measurement requirements need to be applied to the inter-RAT carrier. As results, there will the case that EUTRA inter-RAT carrier includes both high speed carrier (NEUTRA\_carrier\_HST) and non-high-speed carrier (NEUTRA\_carrier\_nonHST). And for different type of carriers, different requirements applied.

The question is how to handle the case when both high speed carrier and non-high-speed carrier exists in the cell reselection requirements. This issue is more related on how to draft the CR on inter-RAT cell re-selection requirements

* Recommended WF
	+ Following the approach of current spec, in which the total cell re-selection delay is requirements per carrier multiplied by the number of carriers, Moderator would like to check with companies whether following suggestion is acceptable:
	+ The EUTRA inter-RAT cell reselection requirements for NEUTRA\_carrier is :

NEUTRA\_carrier\_HST \* Tdetect,EUTRAN\_HST + NEUTRA\_carrier\_nonHST \* Tdetect,EUTRAN\_nonHST

Where:

NEUTRA\_carrier is the total number of configured E-UTRA carriers,

NEUTRA\_carrier =NEUTRA\_carrier\_HST +NEUTRA\_carrier\_nonHST,

NEUTRA\_carrier\_HST is the total number of configured high speed carriers,

NEUTRA\_carrier\_nonHST is the total number of configured non-high-speed carriers.

Tdetect,EUTRAN\_HST is the requirements specified for high speed scenario.

Tdetect,EUTRAN\_nonHST is the requirements specified for normal scenario.

**Issue 5-3: Cell identification with DRX in connected mode**

* Proposals
	+ Option 1 (CMCC, QC):

|  |  |
| --- | --- |
| **DRX cycle length (s)** | **TIdentify, E-UTRAN TDD (s) (DRX cycles)** |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 0.64 | Note1 (10) | Note1 (10) |
| 0.64 < DRx cycle <= 1.28 | Note1 (8) | Note1 (8) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

* + Option 2 (Ericsson, vivo):

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<0.32 | Note1 (15) | Note1 (15) |
| 0.32<= DRx cycle <= 1.28 | Note1 (10) | Note1 (10) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20) | Note1 (20) |
| NOTE 1: The time depends on the DRX cycle length. |

* + Option 3 (HW)

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.16<DRx cycle<=0.32 |  Note1 (15\*CSSFinterRAT) |
| 0.32<DRx cycle <= 0.64 | Note1 (10\*CSSFinterRAT) |
| DRx cycle = 1.024 | Note1 (10\*CSSFinterRAT) | Note1 (10\*CSSFinterRAT) |
| DRx cycle = 1.28 | Note1 (8\*CSSFinterRAT | Note1 (8\*CSSFinterRAT) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2. |

* Recommended WF
	+ 5 companies discuss this issue, and companies’ view are different.
	+ Taking companies’ view into consideration, and also considering the **non-decreasing principle**, Moderator would like to check whether following compromised option is acceptable:

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|   | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.16<DRx cycle<=0.32 |  Note1 (15\*CSSFinterRAT) |
| 0.32<DRx cycle <= 0.64 | Note1 (10\* CSSFinterRAT) |
| DRx cycle = 1.024 | Note1 (10\* CSSFinterRAT) | Note1 (10\* CSSFinterRAT) |
| DRx cycle = 1.28 | Note1 (8\* CSSFinterRAT | Note1 (8\* CSSFinterRAT) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\* CSSFinterRAT) | Note1 (20\* CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2. |

### Sub-topic 5-2: EUTRA - NR Inter-RAT measurement

**Issue 5-4: Cell re-selection requirements on EUTRA-NR inter-RAT**

* Proposals
	+ Option 1 (CMCC, Ericsson, HW):

|  |  |  |  |
| --- | --- | --- | --- |
| **DRX cycle length [s]** | **Tdetect,EUTRAN\_Intra [s] (number of DRX cycles)** | **Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles)** | **Tevaluate,E-UTRAN\_intra****[s] (number of DRX cycles)** |
| 0.32 | 2.56 x M2 (11 x M2) | 0.32 x M3 (1 x M3) | 0.96 x M4 (3 x M4) |
| 0.64 | 5.12 (11) | 0.64 (1) | 1.92 (3) |
| 1.28 | 8.96(10) | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |
| Note 1: M2 = M3 = M4 = 1 when SMTC < =40, and M2 = 1.5, M3 = M4 = 2 when SMTC >40 |

* + Option 2 (QC):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR[s] (number of DRX cycles) |  |
|  |
| 0.32 | 5.12 (16 x M) | 0.96xM (3 x M) | 1.6xM (5 x M) |   |
| 0.64 | 10.24 (16) |  1.92 (3) | 3.2 (5) |   |
| 1.28 | 16.64 (13) | 2.56 (2) | 6.4 (5) |   |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |   |
| Note 1: M = 1.5 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M=1. |  |

* + Option 3 (vivo):

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR [s] (number of DRX cycles) |
|  |
| 0.32 | 5.12 x M1 (16 x M1) | 0.64 x M1 (2 x M1 ) | 0.96 x M2 (3 x M2) |  |
| 0.64 | 7.68 (12) | 1.28 (2 ) | 1.92(3) |  |
| 1.28 | 12.8 (10) | 1.28 (1 ) | 6.4(3) |  |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68(3) |  |
| Note 1: M1 = 1.5 and M2 = 2 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M1=M2=1. |  |

* + Option 4 (Nokia):

|  |  |
| --- | --- |
| **DRX** | **Overall delay** |
| **0.32** | **6.72** |
| **0.64** | **9.6** |
| **1.28** | **11.52** |

* Recommended WF
	+ 6 companies discuss this issue, and companies’ view are different.
	+ Taking companies’ view into consideration, to move forward, Moderator would like to check whether following compromised option is acceptable:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,EUTRAN\_Intra [s] (number of DRX cycles) | Tmeasure,EUTRAN\_Intra [s] (number of DRX cycles) | Tevaluate,E-UTRAN\_intra[s] (number of DRX cycles) |
| 0.32 | 4.16 x M2 (13 x M2) | 0.64 x M3 (2 x M3) | 0.96 x M4 (3 x M4) |
| 0.64 | 7.68 (12) | 1.28 (2) | 1.92 (3) |
| 1.28 | 8.96(7) | 1.28 (1) | 3.84 (3) |
| 2.56  | 58.88 (23) | 2.56 (1) | 7.68 (3) |
| Note 1: M2 = M3 = M4 = 1 when SMTC < =40, and M2 = 1.5, M3 = M4 = 2 when SMTC >40 |

**Issue 5-5: NNR\_carrier issue in the cell re-selection requirements on EUTRA-NR inter-RAT measurement taking the per inter-RAT carrier flag into account. This issue is more related to how to draft the CR on inter-RAT cell re-selection requirements.**

**Background:**

NNR\_carrier is the total number of configured NR carriers in the neighbour frequency list for EUTRA-NR inter-RAT measurement. In the current spec, the cell re-selection requirements for NNR\_carrier is (NNR\_carrier) \* Tdetect,NR。

In the last meeting, RAN4 agreed to introduce network flag per inter-RAT carrier to indicate UE whether the enhanced inter-RAT measurement requirements need to be applied to the inter-RAT carrier. As results, there will the case that NR inter-RAT carrier includes both high speed carrier (NNR\_carrier\_HST) and non-high-speed carrier (NNR\_carrier\_nonHST). And for different type of carriers, different requirements applied.

The question is how to handle the case when both high speed carrier and non-high-speed carrier exists in the cell reselection requirements. This issue is more related on how to draft the CR on inter-RAT cell re-selection requirements

* Recommended WF
	+ Following the approach of current spec, in which the total cell re-selection delay is requirements per carrier multiplied by the number of carriers, Moderator would like to check with companies whether following suggestion is acceptable:
	+ The NR inter-RAT cell reselection requirements for NNR\_carrier is:

NNR\_carrier\_HST \* Tdetect,NR\_HST + NNR\_carrier\_nonHST \* Tdetect,NR\_nonHST

Where:

NNR\_carrier is the total number of configured NR carriers,

NNR\_carrier =NNR\_carrier\_HST +NNR\_carrier\_nonHST,

NNR\_carrier\_HST is the total number of configured high speed carriers,

NNR\_carrier\_nonHST is the total number of configured non-high-speed carriers.

Tdetect, NR\_HST is the requirements specified for high speed scenario.

Tdetect, NR\_nonHST is the requirements specified for normal scenario.

**Issue 5-6: Cell identification requirements in connected mode**

* Proposals
	+ Option 1 (CMCC, Ericsson, Nokia):

|  |  |  |  |
| --- | --- | --- | --- |
| **DRX cycle** | **TPSS/SSS\_sync\_intra** | **T SSB\_measurement\_period\_intra** | **TSSB\_time\_index\_intra** |
| No DRX | Max(600ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(200ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(120ms, 3 x max(MGRP, SMTC period)) ×Nfreq |
| DRX cycle < 320ms | Max(600ms, ceil( 8 × M) × max(MGRP, SMTC period, DRX cycle)) ×Nfreq | Max(200ms, ceil(8 × M) x max(MGRP, SMTC period, DRX cycle))×Nfreq | Max(120ms, ceil(3 × M) x max(MGRP, SMTC period, DRX cycle)) ×Nfreq |
| DRX cycle≥320ms | 4× M × DRX cycle ×Nfreq | 4× M × DRX cycle ×Nfreq | [3] × DRX cycle ×Nfreq |
| Note 1: M = 1 when SMTC < =40, and M = 1.5 when SMTC >40 |

* + Option 2 (vivo):

|  |  |  |  |
| --- | --- | --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_intra | T SSB\_measurement\_period\_intra   | TSSB\_time\_index\_intra |
| No DRX | max[600ms, 8 × max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, 3 × max(MGRP, SMTC period)] × Nfreq |
| DRX cycle < 320ms | max[600ms, ceil(8 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil(3 × M) × max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle ≥ 320ms | 8 × M × DRX cycle × Nfreq | 6 × M × DRX cycle × Nfreq | 3 × DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

* + Option 3 (QC):

|  |  |  |  |
| --- | --- | --- | --- |
| **Condition NOTE1,2** | **TPSS/SSS\_sync\_intra** | **T SSB\_measurement\_period\_intra**  | **TSSB\_time\_index\_intra** |
| No DRX | max[600ms, [8] x max(MGRP, SMTC period)] × Nfreq | Max(200ms, 8 × Max(MGRP, SMTC period)) × Nfreq | max[120ms, [3] x max(MGRP, SMTC period)] × Nfreq |
| DRX cycle ≤ 320ms | max[600ms, ceil([8]xM) x max(MGRP, SMTC period, DRX cycle)] × Nfreq | Max(200ms, Ceil(8 × M) × Max(MGRP, SMTC period, DRX cycle)) × Nfreq | max[120ms, ceil([3] x M) x max(MGRP, SMTC period, DRX cycle)] × Nfreq |
| DRX cycle > 320ms | 4xM x DRX cycle × Nfreq | 4xM × DRX cycle × Nfreq | [3] x DRX cycle × Nfreq |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: When SMTC < =40ms, M=1; when SMTC >40ms, M = 1.5 |

* Recommended WF
	+ 4 companies discuss this issue, companies’ views are different
	+ Taking companies’ view into consideration, to move forward, Moderator would like to check whether following compromised option is acceptable:

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle | TPSS/SSS\_sync\_NR | TSSB\_measurement\_period\_NR | TSSB\_time\_index\_NR |
| No DRX | Max(600ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(200ms, 8 x max(MGRP, SMTC period))×Nfreq | Max(120ms, 3 x max(MGRP, SMTC period)) ×Nfreq |
| DRX cycle < 320ms | Max(600ms, ceil( 8 × M) × max(MGRP, SMTC period, DRX cycle)) ×Nfreq | Max(200ms, ceil(8 × M) x max(MGRP, SMTC period, DRX cycle))×Nfreq | Max(120ms, ceil(3 × M) x max(MGRP, SMTC period, DRX cycle)) ×Nfreq |
| DRX cycle≥320ms | 8× M × DRX cycle ×Nfreq | 4× M × DRX cycle ×Nfreq | [3] × DRX cycle ×Nfreq |
| Note 1: M = 1 when SMTC < =40, and M = 1.5 when SMTC >40 |

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: Sub topic 2-2:….Others: |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2006773**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006773.zip) | Company A |
| Company B |
|  |
| [**R4-2006985**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006985.zip) | Company A |
| Company B |
|  |
| [**R4-2007273**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007273.zip) | Company A |
| Company B |
|  |
| [**R4-2007741**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007741.zip) | Company A |
| Company B |
|  |

## 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.*

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

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #6: others

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2006770**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006770.zip) | CMCC | Proposal 2: Rel.16 HST RRM enhanced requirement are proposed to be release independent from Rel-15. |
| [**R4-2006965**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2006965.zip) | CMCC | LS on supporting Rel-16 NR HST RRM enhanced requirements from Rel-15 UEs |
| [**R4-2007272**](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_95_e/Docs/R4-2007272.zip) | vivo | Proposal 10 NR HST RRM features should be ‘mandatory with capability signaling’, and no early implementation for HST RRM features is preferred. |

## Release independent

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 6-1: release independent

**Issue 6-1: release independent issue**

**Q1: Whether Rel.16 NR HST RRM requirements can be release independent from Rel-15**

* Proposals
	+ Option 1 (CMCC): Rel.16 NR HST RRM enhanced requirements are release independent from Rel-15. And the approach of early implementation which is used in the release independent of Rel-14 LTE HST can be reused.
	+ Option 2 (vivo): no early implementation for HST RRM features is preferred

**Background:**

In the last meeting, a LS to RAN2 on supporting Rel-16 NR HST demodulation enhancement from Rel-15 UEs was agreed to check with RAN2 whether early implementation approach is applicable for NR HST demodulation enhancement (R4-2005533)

**Q2: Do we need to send LS to RAN2 to check whether “early implementation” approach is applicable for NR HST RRM enhancement?**

* Proposals
	+ Option 1 (CMCC): Yes
	+ Option 2: No
* Recommended WF
	+ More discussion is needed

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: Sub topic 2-2:….Others: |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
|  | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## 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.*

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

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |