1st round summary

Variant of [102-e][203] Maintenance_NR_unlic_NWM Version 0.0.2

RAN4

3GPP TSG-RAN WG4 Meeting # 102-e, R4-2206746

Electronic Meeting, February 21 - March 3, 2022

Source: Moderator (Nokia, Nokia Shanghai Bell)

Title: Email discussion summary for [102-e][203] Maintenance_NR_unlic_NWM

Agenda item: 5.1.1.3

Document for: Information

1 Introduction

This is the document for the email discussion of the following items under the NR-U RRM agenda (email discussion with the flag [102-e][203] Maintenance_NR_unlic_NWM):

- 5.1 NR WIs and TEI
- 5.1.1 NR-based access to unlicensed spectrum [NR_unlic]
  - (...)
  - **5.1.1.3 RRM requirements [NR_unlic-Core/Perf]**
  - (...)

As part of this discussion one technical issue is covered in Topic #1, while comments to draft CRs should be captured in Topic #2.

2 Topic #1: NR-U Core requirements maintenance

2.1 Companies contributions summary

Table 1: Companies' contributions summary

T-doc number	Company	Proposals/Observations

R4-2205522	Ericsson	Observation 1: If the UE is configured with e_{DRX_IDLE} cycle in LTE, the search time is update to MAX(10 s, one e_{DRX_IDLE} cycle). Proposal 1: RAN4 to introduce the max function for timer T = max(10s, M1*(P1s +K1)*DRX cycles) for NR-U, where - K1 is 16 if DRX cycle is 0.32s, 8 if DRX cycle is 0.64s, otherwise, K1 = 4. - P1s is the number of DRX cycles each with at least one SMTC occasion not available during the TPLMN and P1s ≤ P1s,max. - P1s,max = 32 if DRX cycle is 0.32s; 16 if DRX cycle is 0.64s, otherwise, P1s,max = 8. The UE shall initiate cell selection procedures for the selected PLMN if P1s exceeds P1s,max.

Open issues summary

2.2 Open issues summary

2.2.1 Sub-topic 1-1 - Cell selection in Idle mode for NR-U

Issue 1-1: Time period before cell selection in Idle mode

This issue relates to a discussion that was captured in Issue 3 of R4-2120241, WF on Rel-15 NR RRM core requirements maintenance, and the relationship to requirements with CCA.

- Proposals:
  - Proposal 1: RAN4 to introduce the max function for timer T = max(10s, M1*(P1s +K1)*DRX cycles) for NR-U, where
    - K1 is 16 if DRX cycle is 0.32s, 8 if DRX cycle is 0.64s, otherwise, K1 = 4.
    - P1s is the number of DRX cycles each with at least one SMTC occasion not available during the TPLMN and P1s ≤ P1s,max.
    - P1s,max = 32 if DRX cycle is 0.32s; 16 if DRX cycle is 0.64s, otherwise, P1s,max = 8. The UE shall initiate cell selection procedures for the selected PLMN if P1s exceeds P1s,max.

- Recommended WF:
    - Please comment on the proposal, and if it is acceptable.

2.3 Companies' views collection for the 1st round

Feedback Form 1: Issue 1-1: Time period before cell selection in Idle mode

1 – Apple Poland Sp. z.o.o.

This topic is up to the discussion of issue 1-2-1 on thread #201. Besides that, we have one question about the P1s,max:

In current spec, the CCA based reselection defined that, The UE shall restart the measurements upon exceeding Mm,max, Md.max, or Me,max.

- Mm,max = 16 for DRX cycle length = 0.32s; Mm,max = 8 for DRX cycle length = 0.64s; Mm,max = 4 for DRX cycle length = 1.28s; Mm,max = 4 for DRX cycle length = 2.56 s.
- Md,max=4*Mm,max, $Me,max=2$*Mm,max.

So if P1s exceeds P1s,max =32 but smaller than 64 (Md,max=4*Mm,max), in this proposal we require UE to initiate cell selection procedures, then UE won't have any possibility to restart the measurement upon exceeding Md,max, does it conflict with current NR-U requirement?

2 – Nokia Belgium

Prefer to wait agreement on thread 201.

Same comment as Apple. If this is agreed we need to revisit the UE behaviour to restart the measurement when the maximum number of LBT failures is reached.

3 – Ericsson Japan K.K.

To apple,

From our understanding, this scenario is different with normal cell reselection/measurement behaviour since UE has evaluated Nserv_CCA consecutive DRX cycles and the serving cell quality does not fulfil the cell selection criterion S. In this scenario, UE will trigger the measurements faster than normal Idle mode measurement requirement. Thus, we think if P1s exceeds P1s,max =32 which also implies UE had perform measurements for a long duration, it's better to trigger the cell selection other than wait to Md,max to restart the measurement.

We're also fine to understand UE vendors' opinion and possible UE implementation.

2.4 Summary for the 1st round

2.4.1 Open issues

Table 2: Summary for the 1st round

	Status summary
Sub-topic 1-1	**Issue 1-1: Time period before cell selection in Idle mode** 3 companies commented on the issue, with questions regarding behaviour when exceeding Md,max, and preferences to wait conclusion on thread 201. *Tentative agreements:* - No agreement in the 1st round. *Candidate options:* - Option 1: RAN4 to introduce the max function for timer T = max(10s, M1*(P1s +K1)*DRX cycles) for NR-U, where ○ K1 is 16 if DRX cycle is 0.32s, 8 if DRX cycle is 0.64s, otherwise, K1 = 4. ○ P1s is the number of DRX cycles each with at least one SMTC occasion not available during the TPLMN and P1s ≤ P1s,max. ○ P1s,max = 32 if DRX cycle is 0.32s; 16 if DRX cycle is 0.64s, otherwise, P1s,max = 8. The UE shall initiate cell selection procedures for the selected PLMN if P1s exceeds P1s,max. - Option 2: Wait for conclusion on thread [201] *Recommendations for the 2nd round:* - Discuss options 1 and 2, and the implication on excisting requirements if Option 1 is accept-edC - Confirm if the question on the behaviour upon exceeding Md,max needs further clarification.

2.5 Discussion on the 2nd round

3 Topic #2: CRs

3.1 Companies contributions

Table 3: Companies' contributions summary

Tdoc number	Title	Source	Cat	Comments
R4-2203522	Correction of NR-U inter-frequency cell identification and measurements requirements	Nokia, Nokia Shanghai Bell	F	resubmission of R4-2115277
R4-2203523	Correction of NR-U inter-frequency cell identification and measurements requirements	Nokia, Nokia Shanghai Bell	A	resubmission of R4-211326
R4-2204857	Draft CR on maintenance of measurement requirements for NR-U R16	Huawei, Hisilicon	F	resubmission of R4-2115276
R4-2204858	Draft CR on maintenance of measurement requirements for NR-U R17	Huawei, Hisilicon	A	resubmission of R4-2115276
R4-2205076	Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM	Ericsson	F	resubmission of R4-2115285
R4-2205077	Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM	Ericsson	A	resubmission of R4-2115285

R4-2205523	draftCR on cell selection in Idle mode for NR-U -r16	Ericsson	F	
R4-2205524	draftCR on cell selection in Idle mode for NR-U -r17	Ericsson	A	
R4-2203524	Correction of inter-frequency measurement procedures TCs under CCA	Nokia, Nokia Shanghai Bell	F	resubmission of R4-2115281
R4-2203525	Correction of inter-frequency measurement procedures TCs under CCA	Nokia, Nokia Shanghai Bell	A	resubmission of R4-2115281
R4-2203526	Removal of TCI state switching TC for unlicensed bands	Nokia, Nokia Shanghai Bell	F	resubmission of R4-2113248
R4-2203527	Removal of TCI state switching TC for unlicensed bands	Nokia, Nokia Shanghai Bell	A	resubmission of R4-2113249
R4-2204859	Draft CR on TC of BFD and CBD for NR-U R16	Huawei, Hisilicon	F	resubmission of R4-2115279
R4-2204860	Draft CR on TC of BFD and CBD for NR-U R17	Huawei, Hisilicon	A	resubmission of R4-2115279
R4-2204861	Draft CR on TC of inter-RAT measurement procedure for NR-U R16	Huawei, Hisilicon	F	resubmission of R4-2115280

R4-2204862	Draft CR on TC of inter-RAT measurement procedure for NR-U R17	Huawei, Hisilicon	A	resubmission of R4-2115280
R4-2204863	Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R16	Huawei, Hisilicon	F	resubmission of R4-2115282
R4-2204864	Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R17	Huawei, Hisilicon	A	resubmission of R4-2115282
R4-2204865	Draft CR on TC of intra-frequency measurement accuracy for NR-U R16	Huawei, Hisilicon	F	resubmission of R4-2115283
R4-2204866	Draft CR on TC of intra-frequency measurement accuracy for NR-U R17	Huawei, Hisilicon	A	resubmission of R4-2115283
R4-2204867	Draft CR on TC of RLM for NR-U R16	Huawei, Hisilicon	F	
R4-2204868	Draft CR on TC of RLM for NR-U R17	Huawei, Hisilicon	A	
R4-2205078	Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U	Ericsson	F	resubmission of R4-2115284
R4-2205079	Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U	Ericsson	A	resubmission of R4-2115284

R4-2203845	draft Cat-F CR (R16) to SCell Activation Core NR-U	Qualcomm Incorporated	F	Submitted to AI 5.1.5.3.1
R4-2203846	draft Cat-A CR (R17) to SCell Activation Core NR-U	Qualcomm Incorporated	A	Submitted to AI 5.1.5.3.1
R4-2203849	draft Cat-F CR (R16) to SCell Activation Test Cases NR-U	Qualcomm Incorporated	F	Submitted to AI 5.1.5.3.2
R4-2203850	draft Cat-A CR (R17) to SCell Activation Test Cases NR-U	Qualcomm Incorporated	A	Submitted to AI 5.1.5.3.2
R4-2204552	Draft CR to maintain inter-RAT measurements subject to CCA in TS 36.133	OPPO	F	Submitted to AI 4.1.6 Related to R4-2204308 covered in thread [201]
R4-2204553	Draft CR to maintain inter-RAT measurements subject to CCA in TS 36.133	OPPO	A	Submitted to AI 4.1.6 Related to R4-2204308 covered in thread [201]

3.2 Companies' views collection for the 1st round

3.2.1 Resubmitted documents

During RAN4 #100-e some Draft CRs were endorsed but not captured in the Big CRs R4-2115464 and R4-2115462. Since these draft CR are already endorsed in RAN4 #100-e, it is recommended that we endorse them so that they can be implemented. Please state in the comments if the list of resubmitted CRs can be endorsed. The list of resubmitted Draft CRs can be found in the table that follows, where Cat A mirror CRs are omitted.

Table 4: List of resubmitted Draft CRs which were endorsed during RAN4 #100-e but not implemented.

Tdoc number	Title	Source	Comments
R4-2203522	Correction of NR-U inter-frequency cell identification and measurements requirements	Nokia, Nokia Shanghai Bell	Resubmission of R4-2115277
R4-2204857	Draft CR on maintenance of measurement requirements for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115276
R4-2205076	Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM	Ericsson	resubmission of R4-2115285
R4-2203524	Correction of inter-frequency measurement procedures TCs under CCA	Nokia, Nokia Shanghai Bell	Resubmission of R4-2115281
R4-2203526	Removal of TCI state switching TC for unlicensed bands	Nokia, Nokia Shanghai Bell	Resubmission of R4-2113248
R4-2204859	Draft CR on TC of BFD and CBD for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115279
R4-2204861	Draft CR on TC of inter-RAT measurement procedure for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115280
R4-2204863	Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115282
R4-2204865	Draft CR on TC of intra-frequency measurement accuracy for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115283
R4-2204867	Draft CR on TC of RLM for NR-U R16	Huawei, Hisilicon	resubmission of R4-2115278
R4-2205078	Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U	Ericsson	resubmission of R4-2115284

Feedback Form 2: Comments on resubmitted CRs endorsed during RAN4#100-e

1 – Nokia Belgium

We are fine with the resubmitted documents

3.2.2 Other CRs

This session is dedicated to comments on the CRs that introduce new content.

Feedback Form 3:

1 – HUAWEI TECHNOLOGIES Co. Ltd.

There are similar discussions in other threads for licensed operation. We think they should be aligned

2 – Nokia Belgium

This CR is colliding with **R4-2204728**. This topic is also being disucssed in Thread 201. We should wait for the decision there.

Feedback Form 4: R4-2203845, draft Cat-F CR (R16) to SCell Activation Core NR-U, Qualcomm

1 – Apple Poland Sp. z.o.o.

This topic is also up to the discussion of R15 CR R4-2203837 on thread #201.

2 – Ericsson Hungary Ltd

We agree with Apple, that this depends on the discussion in thread #201. Thus we disagree to this CR.

3 – HUAWEI TECHNOLOGIES Co. Ltd.

There are similar discussions in other threads for licensed operation. We think they should be aligned

4 – Nokia Denmark

We agree with Apple, Ericsson and Huawei. The discussions for this topic should follow the discussion in thread #201.

Feedback Form 5: R4-2203849, draft Cat-F CR (R16) to SCell Activation Test Cases NR-U, Qualcomm

1 – Apple Poland Sp. z.o.o.

This CR is also up to the discussion of R15 CR R4-2203837 on thread #201.

2 – Ericsson Hungary Ltd We agree with Apple, that this depends on the discussion in thread #201. Thus we disagree to this CR.
3 – HUAWEI TECHNOLOGIES Co. Ltd. There are similar discussions in other threads for licensed operation. We think they should be aligned
4 – Nokia Denmark We agree with Apple, Ericsson and Huawei. The discussions for this topic should be aligned to the discussion in thread #201.

Feedback Form 6: R4-2204552, Draft CR to maintain inter-RAT measurements subject to CCA in TS 36.133, OPPO

1 – Ericsson Hungary Ltd We disagree to this CR. The legacy requirements includes cell ranking criteria for inter-RAT NR cell measurements, not sure why they are not applicable for CCA. Also the CR does not refer to any agreements to remove those.
2 – HUAWEI TECHNOLOGIES Co. Ltd. There are similar discussions in other threads for licensed operation. We think they should be aligned
3 – Guangdong OPPO Mobile Telecom. We agree with HW that the CRs should be aligned. Regarding E// has supported the draft CR (R4-2204308) in email thread 201, it seems straightforward to support this one as well. Cell-ranking criteria should not be applicable to inter-RAT measurement. Because cell-ranking criteria is only applicable to intra-frequency or inter-frequency measurement with equal priority, while inter-RAT measurement cannot be configured with the same priority. So we suggest to remove the cell-ranking criteria for inter-RAT measurements.
4 – Nokia Denmark Agree with Huawei and OPPO. The discussion on this topic should be aligned to the discussions in email thread 201.

3.3 Summary for the 1st round

3.3.1 Resubmitted CRs/TPs

Table 5: Status of resubmitted documents after the 1st round

CR/TP number	CRs/TPs Status update recomendation

R4-2203522	No concerns raised on the resubmitted Draft CR
R4-2203523	No concerns raised on the resubmitted Draft CR
R4-2204857	No concerns raised on the resubmitted Draft CR
R4-2204858	No concerns raised on the resubmitted Draft CR
R4-2205076	No concerns raised on the resubmitted Draft CR
R4-2205077	No concerns raised on the resubmitted Draft CR
R4-2203524	No concerns raised on the resubmitted Draft CR
R4-2203525	No concerns raised on the resubmitted Draft CR
R4-2203526	No concerns raised on the resubmitted Draft CR
R4-2203527	No concerns raised on the resubmitted Draft CR
R4-2204859	No concerns raised on the resubmitted Draft CR
R4-2204860	No concerns raised on the resubmitted Draft CR
R4-2204861	No concerns raised on the resubmitted Draft CR
R4-2204862	No concerns raised on the resubmitted Draft CR
R4-2204863	No concerns raised on the resubmitted Draft CR
R4-2204864	No concerns raised on the resubmitted Draft CR
R4-2204865	No concerns raised on the resubmitted Draft CR
R4-2204866	No concerns raised on the resubmitted Draft CR
R4-2204867	No concerns raised on the resubmitted Draft CR
R4-2204868	No concerns raised on the resubmitted Draft CR
R4-2205078	No concerns raised on the resubmitted Draft CR
R4-2205079	No concerns raised on the resubmitted Draft CR

3.3.2 Other CRs/TPs

Table 6: Status of new CRs/TPs after the 1st round

Tdoc number	Comments
R4-2205523	Companies want to wait progress on thread [201]
R4-2205524	Companies want to wait progress on thread [201]
R4-2203845	Companies want to wait progress on thread [201]
R4-2203846	Companies want to wait progress on thread [201]
R4-2203849	Companies want to wait progress on thread [201]
R4-2203850	Companies want to wait progress on thread [201]
R4-2204552	Concerns raised on the CR. Please clarify it is can be agreed in the 2nd round
R4-2204553	Concerns raised on the CR. Please clarify it is can be agreed in the 2nd round

3.4 Discussion on the 2nd round

4 Recommendations for Tdocs

4.1 1st round

Table 7: New Tdocs

Title	Source	Comments
WF on RRM requirements Rel 16 NR_unlic maintenance	Nokia	

Table 8: Existing documents

Tdoc number	Title	Source	Recommendation	Comments
R4-2203522	Correction of NR-U inter-frequency cell identification and measurements requirements	Nokia, Nokia Shanghai Bell	Endorsable	
R4-2203523	Correction of NR-U inter-frequency cell identification and measurements requirements	Nokia, Nokia Shanghai Bell	Endorsable	
R4-2204857	Draft CR on maintenance of measurement requirements for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204858	Draft CR on maintenance of measurement requirements for NR-U R17	Huawei, Hisilicon	Endorsable	
R4-2205076	Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM	Ericsson	Endorsable	
R4-2205077	Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM	Ericsson	Endorsable	
R4-2203524	Correction of inter-frequency measurement procedures TCs under CCA	Nokia, Nokia Shanghai Bell	Endorsable	

R4-2203525	Correction of inter-frequency measurement procedures TCs under CCA	Nokia, Nokia Shanghai Bell	Endorsable	
R4-2203526	Removal of TCI state switching TC for unlicensed bands	Nokia, Nokia Shanghai Bell	Endorsable	
R4-2203527	Removal of TCI state switching TC for unlicensed bands	Nokia, Nokia Shanghai Bell	Endorsable	
R4-2204859	Draft CR on TC of BFD and CBD for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204860	Draft CR on TC of BFD and CBD for NR-U R17	Huawei, Hisilicon	Endorsable	
R4-2204861	Draft CR on TC of inter-RAT measurement procedure for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204862	Draft CR on TC of inter-RAT measurement procedure for NR-U R17	Huawei, Hisilicon	Endorsable	
R4-2204863	Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204864	Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R17	Huawei, Hisilicon	Endorsable	

R4-2204865	Draft CR on TC of intra-frequency measurement accuracy for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204866	Draft CR on TC of intra-frequency measurement accuracy for NR-U R17	Huawei, Hisilicon	Endorsable	
R4-2204867	Draft CR on TC of RLM for NR-U R16	Huawei, Hisilicon	Endorsable	
R4-2204868	Draft CR on TC of RLM for NR-U R17	Huawei, Hisilicon	Endorsable	
R4-2205078	Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U	Ericsson	Endorsable	
R4-2205079	Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U	Ericsson	Endorsable	
R4-2205523	draftCR on cell selection in Idle mode for NR-U -r16	Ericsson	Return to	
R4-2205524	draftCR on cell selection in Idle mode for NR-U -r17	Ericsson	Return to	
R4-2203845	draft Cat-F CR (R16) to SCell Activation Core NR-U	Qualcomm Incorporated	Return to	
R4-2203846	draft Cat-A CR (R17) to SCell Activation Core NR-U	Qualcomm Incorporated	Return to	

R4-2203849	draft Cat-F CR (R16) to SCell Activation Test Cases NR-U	Qualcomm Incorporated	Return to	
R4-2203850	draft Cat-A CR (R17) to SCell Activation Test Cases NR-U	Qualcomm Incorporated	Return to	
R4-2204552	Draft CR to maintain inter-RAT measurements subject to CCA in TS 36.133	OPPO	Return to	
R4-2204553	Draft CR to maintain inter-RAT measurements subject to CCA in TS 36.133	OPPO	Return to	

4.2 2nd round