**3GPP TSG-RAN WG4 Meeting # 96-e R4-200XXXX**

**Electronic Meeting, 17 – 28 August 2020**

**Agenda item:** 7.1.4 (Rel-16 NR-U BS RF requirements)

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [96e][305] NR\_unlic\_RF\_BS

**Document for:** Information

# Introduction

This email discussion focuses on NR-U BS RF requirements (AI 7.1.4). Following sub-AIs are covered in this discussion:

7.1.4 BS RF requirements [NR\_unlic-Core] – 6 Tdocs submitted

7.1.4.1 Transmitter characteristics [NR\_unlic-Core] – 1 Tdocs submitted

7.1.4.2 Receiver characteristics [NR\_unlic-Core] – 3 Tdocs submitted

There are 3 Topics proposed to be discussed under this summary:

* **Topic #1:** CRs with NR-U introduction to specifications
  + Issue 1-1: CRs to TS 38.104
  + Issue 1-2: CR to TS 37.107
  + Issue 1-3: CRs to TS 36.104
  + Issue 1-4: CR to TS 37.104
  + Issue 1-5: CR to TS 37.105
* **Topic #2:** Details of NR-U BS transmitter requirements
  + Issue 2-1: Details of NR-U BS transmitter requirements
* **Topic #3:** Details of NR-U BS receiver requirements
  + Issue 3-1: Discussion on BS core specification drafting
  + Issue 3-2: NR-U BS RX ACS, IBB, OOBB, IMD requirements

# Topic #1: CRs with NR-U introduction to specifications

CRs with introduction of NR-U feature for respective specification are discussed under this topic #1. CR R4-2010961 was submitted to sub agenda 7.1.4.2 but moderator moved it to set of other CRs.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2010738**  (CR to TS 38.104: Introduction of NR-U into BS core specification) | Nokia, Nokia Shanghai Bell | This is running Big CR with introduction of NR-U requirements to BS core specification TS 38.104.  Following changes were made compare to big CR after RAN4#95e meeting (R4-2008762):  - Latest version of specification (v16.4.0) is used  - Inclusion of values for Rx requirements: Reference sensitivity, Dynamic range, In-channel sensitivity according as captured in R4-2008694  - Introduction of the requirements for a 6 GHz band for NR-U (band n96). |
| **R4-2010739**  (CR to TS 37.107 with introduction of NR-U feature – core part) | Nokia, Nokia Shanghai Bell | This CR introduces NR-U feature to specification TS 37.107. Changes are introduced to core part. |
| **R4-2010962**  (CR to 36.104: Introduction of Band n46 in 36.104) | ZTE Corporation | Introduction of Band n46 in 36.104 |
| **R4-2011409**  (CR to 36.104: Introduction of NR-U co-existence requirements) | Nokia, Nokia Shanghai Bell | Introduction on NR-U co-existence requirements. |
| **R4-2011410**  (CR to 37.104: Introduction of NR-U co-existence requirements) | Nokia, Nokia Shanghai Bell | Introduction on NR-U co-existence requirements. |
| **R4-2011411**  (CR to 37.105: Introduction of NR-U co-existence requirements) | Nokia, Nokia Shanghai Bell | Introduction on NR-U co-existence requirements. |
| **R4-2010961**  (CR to 38.104: Introduction of NR-U BS RX requirement into TS38.104) | ZTE Corporation | CR adds NR-U BS RX requirement. |

Submitted CRs for respective specification:

|  |  |
| --- | --- |
| **Specification** | **CR Tdoc** |
| 38.104 | R4-2010738  R4-2010961 |
| 37.107 | R4-2010739 |
| 36.104 | R4-2010962  R4-2011409 |
| 37.104 | R4-2011410 |
| 37.105 | R4-2011411 |

## Open issues summary

Below submitted CR are split for given issue according specifications.

### Sub-topic 1-1

It should be noted that big CR to TS 38.104 may require additional corrections or complements when discussion some details in topic #2 (BS Tx requirements) and topic #3 (BS Rx requirements).

**Issue 1-1: CRs to TS 38.104**

* Proposals
  + Option 1: to agreed R4-2010738 (big CR)
  + Option 2: to agreed R4-2010961 (focused on BS Rx part only)
  + Option 3: TBA
* Recommended WF
  + TBA

### Sub-topic 1-2

**Issue 1-2: CR to TS 37.107**

* Proposals
  + Option 1: to agreed R4-2010739
  + Option 2: TBA
* Recommended WF
  + TBA

### Sub-topic 1-3

**Issue 1-3: CRs to TS 36.104**

* Proposals
  + Option 1: to agreed R4-2010962
  + Option 2: to agreed R4-2011409
  + Option 3: TBA
* Recommended WF
  + TBA

### Sub-topic 1-4

**Issue 1-4: CR to TS 37.104**

* Proposals
  + Option 1: to agreed R4-2011410
  + Option 2: TBA
* Recommended WF
  + TBA

### Sub-topic 1-5

**Issue 1-5: CR to TS 37.105**

* Proposals
  + Option 1: to agreed R4-2011411
  + Option 2: TBA
* Recommended WF
  + TBA

## 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** |
| R4-2010738  CR to 38.104 | Company A |
| Company B |
|  |
| R4-2010739  CR to 37.107 | Company A |
| Company B |
|  |
| R4-2010962  CR to 36.104 | Company A |
| Company B |
|  |
| R4-2011409  CR to 36.104 | Company A |
| Company B |
|  |
| R4-2011410  CR to 37.104 | Company A |
| Company B |
|  |
| R4-2011411  CR to 37.105 | Company A |
| Company B |
|  |
| R4-2010961  CR to 38.104 | 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: Details of NR-U BS transmitter requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2010959**  (Discussion on NR-U BS Tx requirements) | ZTE Corporation | Observation 1: even considering higher maximum output power for NR-U BS type 1-H, ED threshold setting could still alleviate the interference radiated by NR-U BS type 1-H to neighbour APs correspondingly;  Proposal 1: Prated,C,AC used in WF [4] and CR [3] should be updated as Prated,x;  Proposal 2: For NR-U BS type 1-C, to reuse the OBUE offset 10MHz and ΔfOOB offset 20MHz from LAA;  Proposal 3: to reuse OBUE offset 40MHz and ΔfOOB offset 60MHz of NR BS type 1-H for NR-U BS type 1-H at band n46;  Proposal 4 : to remove LO leakage exception requirements for NR-U BS. |

## Open issues summary

### Sub-topic 2-1

**Issue 2-1: Details of NR-U BS transmitter requirements**

* Proposals
  + Option 1: To agree respective proposals:
    - Proposal 1: Prated,C,AC used in WF [4] and CR [3] should be updated as Prated,x;
    - Proposal 2: For NR-U BS type 1-C, to reuse the OBUE offset 10MHz and ΔfOOB offset 20MHz from LAA;
    - Proposal 3: to reuse OBUE offset 40MHz and ΔfOOB offset 60MHz of NR BS type 1-H for NR-U BS type 1-H at band n46;
    - Proposal 4: to remove LO leakage exception requirements for NR-U BS.
  + Option 2: TBA
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1: |
|  |  |

### 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** |
| XXX | 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”* |

1. Topic #3: Details of NR-U BS receiver requirements

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

* 1. Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2010743**  (Discussion on BS core specification drafting) | Nokia, Nokia Shanghai Bell | Proposal: It is proposed to use option 1 for introduction of 60 kHz SCS Rx requirements that are based on legacy NR FRCs i.e. Option 1) Have NR-U Rx 60 kHz requirements in 2 places in specification (once in nominal NR tables and once in NR-U tables). |
| **R4-2010960**  (NR-U BS RX ACS, IBB, OOBB, IMD requirements) | ZTE Corporation | Proposal 1: to use the following frequency offset for ACS interfering signal in Table 7.4.1.2-2a;  Proposal 2: for NR-U BS 1-C, it should reuse interfering signal and freq offset of LAA BS IBB/OOBB requirement;  Proposal 3: for NR-U BS 1-H, ΔfOOB could be defined as 60MHz.  Proposal 4: to use the following frequency offset for RX IMD interfering signal in Table 7.7.2-2a; |
| **R4-2010961**  (CR to 38.104: Introduction of NR-U BS RX requirement into TS38.104) | ZTE Corporation | NR-U BS RX requirements are not defined in TS38.104 and propose to add this feature.  CR is adding NR-U BS Rx requirement to TS 38.104. |

* 1. Open issues summary
     1. Sub-topic 3-1

**Issue 3-1: Discussion on BS core specification drafting**

* Proposals
  + Option 1: To agree option 1 for introduction of 60 kHz SCS Rx requirements that are based on legacy NR FRCs i.e. Option 1) Have NR-U Rx 60 kHz requirements in 2 places in specification (once in nominal NR tables and once in NR-U tables).
  + Option 2: TBA
* Recommended WF
  + TBA
    1. Sub-topic 3-2

**Issue 3-2: NR-U BS RX ACS, IBB, OOBB, IMD requirements**

* Proposals
  + Option 1: To agreed respective proposals:
    - Proposal 1: to use the following frequency offset for ACS interfering signal in Table 7.4.1.2-2a;
    - Proposal 2: for NR-U BS 1-C, it should reuse interfering signal and freq offset of LAA BS IBB/OOBB requirement;
    - Proposal 3: for NR-U BS 1-H, ΔfOOB could be defined as 60MHz.
    - Proposal 4: to use the following frequency offset for RX IMD interfering signal in Table 7.7.2-2a;
  + Option 2: TBA
* Recommended WF
  + TBA
  1. Companies views’ collection for 1st round
     1. Open issues

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

* + 1. 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** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

* 1. Summary for 1st round
     1. 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 |  |  |

* + 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”* |

* 1. Discussion on 2nd round (if applicable)
  2. 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”* |