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

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

**Agenda item:** 7.4.5

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [104-bis-e][315] LTE\_terr\_bcast\_bands\_BSRF

**Document for:** Information

# Introduction

This document summarizes the email discussion for the agenda item 7.4.4.

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

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Ericsson | Dominique Everaere | dominique.everaere@ericsson.com |
| SWR | Roland Beutler | Roland.Beutler@swr.de |
| Qualcomm Incorporated | Gene Fong | gfong@qti.qualcomm.com |
| Huawei | Peng (Henry) Zhang | zhangpeng169@huawei.com |
| ZTE | Fei Xue | Xue.fei25@zte.com.cn |

Note:

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

# Topic #1: BS requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **[R4-2215342](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2215342.zip)** | SWR | **Proposal 1:** Derive the required values for ACLR and ACS values by the outlined methodology based on ITU-R Recommendations or equivalent regulatory documentation. |
| **[R4-2216550](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216550.zip)** | ZTE Corporation | **Proposal 1:** to define the BS type 1-C for LTE based broadcast.  **Proposal 2:** to reuse the Wide area BS class for LPLT and define new BS class for HPHT and MPMT.  **Proposal 3:** to start the discussion on BS RF requirement as proposed in table 1 for LTE based broadcast  **Proposal 4:** to use the reference approach instead of explicitly list the regulatory requirement in the spec. |
| **[R4-2216735](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104bis-e/Docs/R4-2216735.zip)** | Nokia, Nokia Shanghai Bell | Document provides analysis on 36.104 BS Tx and relevant Rx requirements impact due to introduction of LTE based 5G terrestrial broadcast band(s). |

## Open issues summary

The email discussion will focus on the following open issues for LTE based broadcast:

* BS type
* BS classes
* BS RF requirements
* Regulatory requirements

### Sub-topic 1-1

*Sub-topic description: BS type*

*Open issues and candidate options before e-meeting:*

**Issue 1-1: BS type**

* Proposals
  + Option 1: Define the BS type 1-C for LTE based broadcast
  + Option 2: Other
* Recommended WF
  + TBA

### Sub-topic 1-2

*Sub-topic description: BS classes*

*Open issues and candidate options before e-meeting:*

**Issue 1-2: BS classes**

* Proposals
  + Option 1: Reuse the Wide area BS class for LPLT and define new BS class for HPHT and MPMT
  + Option 2: Other
* Recommended WF
  + TBA

### Sub-topic 1-3

*Sub-topic description: BS RF requirements (excluding ACLR)*

*Open issues and candidate options before e-meeting:*

**Issue 1-3: BS RF requirements (excluding ACLR)**

* Proposals
  + Option 1: According to R4-2216550
  + Option 2: According to R4-2216735
  + Option 3: Other
* Recommended WF
  + TBA

### Sub-topic 1-4

*Sub-topic description: BS ACLR requirement*

*Open issues and candidate options before e-meeting:*

**Issue 1-4: BS ACLR requirement**

* Proposals
  + Option 1: According to R4-2216550 (depends on the outcome of coexistence study)
  + Option 2: According to R4-2215342 (derive the required values for ACLR values by the outlined methodology based on ITU-R Recommendations or equivalent regulatory documentation)
  + Option 3: Other
* Recommended WF
  + TBA

### Sub-topic 1-5

*Sub-topic description: Regulatory requirements*

*Open issues and candidate options before e-meeting:*

**Issue 1-5: Regulatory requirements**

* Proposals
  + Option 1: Use the reference approach instead of explicitly list the regulatory requirement in the spec
  + Option 2: Other
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Option 1. |
| ZTE | We support the option 1 |

Sub topic 1-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | New class(es) would most likely be needed but to be confirmed when specifying the Tx requirements. |
| SWR | Option 1 |
| Huawei | It’s better to identify whether there are some different RF requirements between LPLT and HPHT firstly, |
| ZTE | We support the option 1 |

Sub topic 1-3

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Options 1 and 2 should be merged. |
| Huawei | Both option 1 and 2 are too general. Maybe check one by one. |
| ZTE | Options 1 and 2 should be merged.  The details for option1 could be found as following:   |  |  | | --- | --- | | **Tx requirements** | **Applicability notes** | | **BS output power** | up to the declaration and no need to define any requirements | | **Output power dynamics** |  | | **RE power control dynamic range** | N/A, we don’t expect to have the RE power control to alleviate the co-channel interference by this approach | | **Total power dynamic range** | N/A, we don’t expect the vision/sound signal of broadcast would be transmitted in the partial PRBs. | | **Transmit ON/OFF power** | N/A | | **Transmitted signal quality** |  | | **Frequency error** | to reuse the same requirement defined in TS 36.104 | | **Modulation quality** | The supported the modulation order up to 256QAM and reuse the EVM requirement in TS 36.104. 1024QAM should not be applicable for LTE based broadcast. | | **Time alignment error** | FFS, this depend whether MIMO scheme is supposed to be supported for LTE based broadcast. If not, then this requirement is also not needed. | | **Unwanted emissions** |  | | **Occupied bandwidth** | to reuse the same requirement defined in TS36.104 which is following ITU-R Recommendation SM.328 | | **Adjacent Channel Leakage Power Ratio** | this depends on the outcome of coexistence study. | | **Operating band unwanted emissions** | this depends on the outcome of coexistence study and ITU/regional regulation which was captured in [4]. Further consideration how to accommodate these requirement into the TS 36.104 | | **Transmitter spurious emissions** | FFS  Coexistence requirement for the protection of other TN BS receiver should be considered. The legacy value is not applicable due to its aggressor transmitter power and potential MCL assumption. | | **Transmitter intermodulation** | Not applicable for MPMT and HPHT since it’s not expected to have surrounding interfering gNB.  FFS for LPLT. If the practical deployment, there are also no surrounding interfering gNB next to the victim BS, then this requirement should be also not applicable. | |

Sub topic 1-4

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Option 1 if there is any coexistence study done (see other thread in main) |
| SWR | Option 2 (our proposal) |
| Qualcomm | Option 2. |
| Huawei | If we have to follow the regulation, not sure whether we need to specify BS requirement in spec explictly. |
| ZTE | We slightly prefer the option 2, however it’s also reasonable to check its coexistence performance in RAN4 further. |

Sub topic 1-5

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | It would be good to clarify what the “reference approach” exactly means but, from our current understanding, this might be ok. Also, is it the intention to list all existing broadcast regulations worldwide? |
| SWR | We interpret “reference approach” as referring to existing documentation, hence we support Option 1 |
| Qualcomm | Option 2. We prefer the requirement are explicitly listed in the spec in addition to listing the references either generally or specifically. For example, the specifications should capture a numerical ACLR requirement for the basestation. Of course, there is a general statement that regional regulatory requirements would also need to be met. But there should be a baseline value. The basis of that baseline value could come from the regulations, but then the question is which one. Since the ETSI regulations have been mostly commonly cited in the papers submitted, then those could be used for baseline requirements. |
| Huawei | Based on the WID RP-220518, we should follow objective as below.  *For BS the requirements for signal quality, occupied bandwidth, ACLR, unwanted emissions shall be applied as provided by the corresponding regulatory bodies in the different regions for 6/7/8 MHz, as applicable. The specifications shall contain corresponding references [RAN4].* |
| ZTE | Just as clarified by SWR, regarding Ericsson’s comments, if possible, we need to list as much as possible.  Here regulatory requirement means the coexistence requirement for the BS coexisting with broadcast BS, it might differ among regions, we plan to list which one is baseline since this will trigger other unnecessary discussions. |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **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 1-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-3** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-4** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-5** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

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

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Notes:

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

## 2nd round

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

Notes:

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