**3GPP TSG-RAN WG4 Meeting # 111 R4-2408929**

**Fukuoka, Japan, 20 ‒ 24 May 2024**

**Agenda item:** 7.8.8

**Source:** Moderator (Nokia)

**Title:** Topic summary for [111][118] NR\_FR1\_lessthan\_5MHz\_BW\_R18

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

Summary for contributions submitted under agenda items 7.8.1 and 7.8.2 for NR support for dedicated spectrum less than 5MHz for FR1. R4-2408674 submitted to agenda item 4.1 is also included.

List of candidate target of discussion for 1st round and 2nd round:

* 1st round: Discussion and agreement on open issues listed below.
* 2nd round: Continue discussion and agreement on open issues listed below.

# Topic #1: System parameters

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

* R4-2405765 and R4-2405766 are moved to agenda item 9.10.

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2407432 | Nokia | Proposal 1: To reserve GSCN = 1, which is not included in any frequency range in RAN4 specifications, instead of GSCN = 2 per RAN2 request.  Observation 1: GSCN = 2 and NR operating band = 1024 do not match RAN4 current allocation of operating band number in different frequency ranges. |
| R4-2408791 | ZTE Corporation, Sanechips | Proposal 1: Define band n200 as a reserved value for dl-CarrierFreq-r18.  Observation 1: RAN4 has already defined 65 to 256 is reserved for new LTE and new NR bands in FR1 and 257 to 512 is reserved for new NR bands in FR2. |
| R4-2408792 | ZTE Corporation, Sanechips | Proposal 1: Introduce band n200 as a reserved value. Add a note to define GSCN=2 (corresponding to ARFCN-ValueNR = 250) as a reserved value.  Observation 1: From RAN4 perspective, we can define NR band n200 and GSCN=2 (corresponding to ARFCN-ValueNR = 250) as reserved values. |
| R4-2408793 | ZTE Corporation, Sanechips | Proposal 1: Introduce band n200 as a reserved value. Add a note to define GSCN=2 (corresponding to ARFCN-ValueNR = 250) as a reserved value.  Observation 1: RAN4 has already defined 65 to 256 is reserved for new LTE and new NR bands in FR1 and 257 to 512 is reserved for new NR bands in FR2. |
| R4-2408810 | Qualcomm Inc. | Proposal 1: A note is added to operating band table to indicate n1024 is reserved. A note is added to GSCN table to indicate GSCN 2 is reserved. This note also includes the NR-ARFCN value, as the signaling uses NR-ARFCN instead of GSCN.  Observation 1: RAN2 has set GSCN = 2, i.e. NR-ARFCN 250 and operating band n1024 reserved in their specifications, and requested RAN4 to set these reserved in RAN4 specifications too. |
| R4-2408811 | Qualcomm Inc. | Proposal 1: A note is added to operating band table to indicate n1024 is reserved. A note is added to GSCN table to indicate GSCN 2 is reserved. This note also includes the NR-ARFCN value, as the signaling uses NR-ARFCN instead of GSCN.  Observation 1: RAN2 has set GSCN = 2, i.e. NR-ARFCN 250 and operating band n1024 reserved in their specifications, and requested RAN4 to set these reserved in RAN4 specifications too. |
| R4-2408812 | Qualcomm Inc. | Proposal 1: A note is added to operating band table to indicate n1024 is reserved.  Observation 1: RAN2 has set GSCN = 2, i.e. NR-ARFCN 250 and operating band n1024 reserved in their specifications, and requested RAN4 to set these reserved in RAN4 specifications too. |
| R4-2409447 | Huawei, HiSilicon | Proposal 1: Band n1024 with GSCN=2 is going to be sent via SIB4, so the legacy UEs, will not try to camp on the neighbouring cells that are dedicated for less than 5MHz operations.  Observation 1: Via LS R2-2404038, RAN2 requested RAN4 to introduce a reserved NR band, called band n1024 and assign GSCN=2 to it. |
| R4-2409458 | Huawei, HiSilicon | Proposal 1: Band n1024 with GSCN=2 is going to be sent via SIB4, so the legacy UEs, will not try to camp on the neighbouring cells that are dedicated for less than 5MHz operations.  Observation 1: Via LS R2-2404038, RAN2 requested RAN4 to introduce a reserved NR band, called band n1024 and assign GSCN=2 to it. |

## Open issues summary

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

### Sub-topic 1-1

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 1-1: GSCN and operating band to be reserved.**

* Proposals
  + Option 1: GSCN = 1 and operating band = 1024 to be reserved (Nokia).
  + Option 2: GSCN = 2 and operating band = 200 to be reserved (ZTE, Sanechips).
  + Option 3: GSCN = 2 and operating band = 1024 to be reserved (Qualcomm, Huawei, HiSilicon).
* Recommended WF
  + FFS.

### Sub-topic 1-2

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 1-2: CR set to be revised.**

* Proposals
  + Option 1: Revise R4-2408792 and R4-2408793 if option 1 or 2 in issue 1-1 is agreed (different note index formats are used in the tables).
  + Option 2: Revise R4-2408810 R4-2408811 and R4-2408812 if option 3 in issue 1-1 is agreed (merge with R4-2409447 and R4-2409458).
* Recommended WF
  + FFS.

### Sub-topic 1-3

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 1-3: Reply LS to RAN2 cc RAN1.**

* Proposals
  + Option 1: Approve R4-2408791.
  + Option 2: Revise R4-2408791.
  + Option 3: Note R4-2408791.
* Recommended WF
  + FFS.

# Topic #2: UE RF requirements

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2408489 | Intel Corporation | Proposal 1: Addition of UE asymmetric bandwidth support for n28: UL 3MHz and DL 5MHz with ABCS 0 as defult configurations.  Observation 1: UE asymmetric bandwidth support for n28 was agreed: UL 3MHz and DL 5MHz. Default ABCS 0 is needed for this configuration. |
| R4-2408504 | Rakuten Mobile, Inc | Proposal 1: Adds Asymmetric Channel BW combinations for n28.  Observation 1: To introduce asymmetric UL DL channel BW combnations for n28 that is required to support 3Mhz Uplink with 5Mhz Downlink. |
| R4-2408627 | Nokia, Skyworks Solutions Inc., Rakuten Mobile, Inc | Proposal 1: 3 MHz channel bandwidth for NS\_17 is only specified at 715-718 MHz.  Observation 1: NS\_17 for 3 MHz channel bandwidth in band n28 operation for Japan is not properly specified. It needs to be aligned with E-UTRA requirement, i.e., 3 MHz channel bandwidth for uplink only at 715-718 MHz without A-MPR. |
| R4-2408674 | Huawei, HiSilicon, Rakuten | Proposal 1: Add clarifications on the UE capability of asymmetric channel bandwidth combination set.  Observation 1: Clarifications on the indication of asymmetric channel bandwidth combination set via its corresponding UE capability. |
| R4-2408676 | Huawei, HiSilicon, Rakuten | Proposal 1: Add clarifications on the UE capability of asymmetric channel bandwidth combination set.  Observation 1: Clarifications on the indication of asymmetric channel bandwidth combination set via its corresponding UE capability. |

## Open issues summary

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

### Sub-topic 2-1

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 2-1: CRs in R4-2408489 and R4-2408504 (with similar changes)**

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| R4-2408489  Proposal 1: Addition of UE asymmetric bandwidth support for n28: UL 3MHz and DL 5MHz with ABCS 0 as defult configurations.  Observation 1: UE asymmetric bandwidth support for n28 was agreed: UL 3MHz and DL 5MHz. Default ABCS 0 is needed for this configuration.  R4-2408504  Proposal 1: Adds Asymmetric Channel BW combinations for n28.  Observation 1: To introduce asymmetric UL DL channel BW combnations for n28 that is required to support 3Mhz Uplink with 5Mhz Downlink. |

* Proposals
  + Option 1: Agree CR in R4-2408489 and note CR in R4-2408504.
  + Option 2: Note CR in R4-2408489 and agree CR in R4-2408504.
* Recommended WF
  + Option 2: Note CR in R4-2408489 and agree CR in R4-2408504 (ABCS 0 is mandatory for UE to support so cannot be used for optional 3 MHz in R4-2408489, also draft CR of R4-2408504 already endorsed in R4-2406620).

### Sub-topic 2-2

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 2-2: CR in R4-2408627**

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| Proposal 1: 3 MHz channel bandwidth for NS\_17 is only specified at 715-718 MHz.  Observation 1: NS\_17 for 3 MHz channel bandwidth in band n28 operation for Japan is not properly specified. It needs to be aligned with E-UTRA requirement, i.e., 3 MHz channel bandwidth for uplink only at 715-718 MHz without A-MPR. |

* Proposals
  + Option 1: Agree the CR.
  + Option 2: Revise the CR.
  + Option 3: Note the CR.
* Recommended WF
  + Option 1: Agree the CR (Draft CR already endorsed in R4-2405659).

### Sub-topic 2-3

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 2-3: CRs in R4-2408674 and R4-2408676.**

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| Proposal 1: Add clarifications on the UE capability of asymmetric channel bandwidth combination set.  Observation 1: Clarifications on the indication of asymmetric channel bandwidth combination set via its corresponding UE capability. |

* Proposals
  + Option 1: Agree the CR in R4-2408676 and revise the CR in R4-2408674 (R4-2408674 is a Rel-17 CR but use a Rel-18 WI code in the cover page).
  + Option 2: Revise both CRs.
  + Option 3: Note both CRs.
* Recommended WF
  + FFS.

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