**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.

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. |
| R4-2408676 | 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: CR in 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.
  + Option 2: Revise the CR.
  + Option 3: Note the CR.
* Recommended WF
  + FFS.

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