**3GPP TSG-RAN WG4 Meeting # 112 R4-2414273**

Maastricht, Netherlands, 19th-23th, Aug, 2024

Title: WF on introduction of NR band n68

Agenda item: 7.16.1

Source: Ericsson

Document for: Approval

# 1 Background

This contribution is a WF on band n68.

# 2 Discussion

## 2.1 System parameters

The following system parameters for n68 are agreed.

* Band definition:

Table 2.1-1: NR operating bands in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | Uplink (UL) *operating band* BS receive / UE transmit  FUL\_low  – FUL\_high | Downlink (DL) *operating band* BS transmit / UE receive  FDL\_low – FDL\_high | Duplex Mode |
| n68 | 698 MHz – 728 MHz | 753 MHz – 783 MHz | FDD |

* UL MIMO :

Table 2.1-2: NR operating bands for UL MIMO in FR1

|  |
| --- |
| NR operating band |
| n68 |

* Channel BWs:

Table 2.1-3 Channel bandwidths for each NR band

| NR Band | SCS (kHz) | UE Channel bandwidth (MHz) | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **60** | **70** | **80** | **90** | **100** |
| n68 | 15 |  | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

* Channel raster:

Table 2.1-4: Applicable NR-ARFCN per operating band

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | ΔFRaster  (kHz) | Uplink  Range of NREF  (First – <Step size> – Last) | Downlink  Range of NREF  (First – <Step size> – Last) |
| n68 | 100 | 139600 – <20> – 145600 | 150600 – <20> – 156600 |

* Enhanced channel raster:

Table 2.1-5: Applicable NR-ARFCN per operating band for enhanced channel raster

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | ΔFRaster  (kHz) | Uplink  Range of NREF  (First – <Step size> – Last) | Downlink  Range of NREF  (First – <Step size> – Last) |
| n68 | 10 | 139600 – <2> – 145600 | 150600 – <2> – 156600 |

* Sync raster:

Table 2,1-6: Applicable SS raster entries per operating band for above 3 MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | SS Block SCS | SS Block pattern1 | Range of GSCN  (First – <Step size> – Last) |
| n68 | 15 kHz | Case A | 1888 – <1> – 1951 |

* TX-RX frequency separation:

Table 2,1-7: UE TX-RX frequency separation

| **NR Operating Band** | **TX – RX  carrier centre frequency separation** |
| --- | --- |
| n68 | 55 MHz |

## 2.2 UE RF requirements

### 2.2.1 Changes overview

Agreement on the following UE RF expected changes:

Table 2.2.1-1: Expected UE RF changes to TS 38.101-1 due to the introduction of band n68

|  |  |
| --- | --- |
| **Requirement** | **n68 proposal** |
| **UE maximum output power** | PC3 |
| **A-MPR** | NS\_26 and NS\_36 to be updated |
| **Spurious emissions for UE co-existence** | LTE requirement is a baseline |
| **REFSENS power level** | Re-evaluate NR REFSENS (10 and 15 MHz CBW) as NRB are not the same for LTE and NR |
| **REFSENS UL allocation** | Re-use LTE specification |
| **IBB** | Add n68 into Table 7.6.2-2 |
| **OBB** | Add n68 into Table 7.6.3-2 |
| **NBB** | Add n68 into Table 7.6.4-1 |

### 2.2.2 A-MPR evaluation

Agreement: Re-evaluate NS\_26 and NS\_36 A-MPR for 10 and 15 MHz channel BW with the following assumptions:

* + PA model calibration
    - DFT-s-OFDM QPSK 20MHz
    - 100 RBs
    - 4dB post PA loss
    - 1dB MPR
  + Carrier Leakage: 28dBc
  + IQ Image: 28dBc
  + CIM3: 60dBc
  + EVM: 17.5%
  + SCS: 15kHz, 30kHz
  + Waveform type: DFT-s-OFDM, CPOFDM
  + ACLR: 30dB for PC3

## 2.3 BS requirements

Agreement on the following BS RF expected changes:

Table 2.3-1: Expected BS RF changes to TS 38.104 due to the introduction of band n68

|  |  |
| --- | --- |
| **Requirement** | **n68 proposal** |
| **OBUE** | Add band n68 to cat A and cat B limits for bands below 1GHz, in clauses 6.6.4.2.1 and 6.6.4.2.2: |
| **Spurious - coexistence** | Add band n68 and corresponding exceptions |
| **Spurious - colocation** | Add band n68 |

## 2.4 AOB

### 2.4.1 Work split

|  |  |
| --- | --- |
| **Specification** | **Responsible company for draft and formal CRs** |
| 38.101-1 | Ericsson |
| 38.133 | CATT |
| 38.106 | ZTE |
| 38.115-1 | ZTE |
| 38.174 | ZTE |
| 38.176-1 | ZTE |
| 38.176-2 | ZTE |
| 36.104 | Ericsson |
| 36.141 | Nokia |
| 37.104 | Nokia |
| 37.141 | Nokia |
| 38.104 | Ericsson |
| 38.141-1 | Nokia |
| 38.141-2 | Nokia |
| 38.307 | Nokia |
| 37.105 | Ericsson |
| 37.145-1 | ZTE |
| 37.145-2 | ZTE |
| 38.101-5 | Ericsson |

# 3 Conclusion

This contribution captures the agreements for introduction of band n68 made in RAN4#112.

# 4 References

[1] RP-241664,New WID on introduction of NR band n68, Ericsson