**3GPP TSG-RAN Meeting #97-e RP-22xxxx**

**Electronic Meeting, September 12 – 16, 2022**

**Agenda item:** 9.1.5, 10.1.5

**Source:** Moderator (RAN4 Chair)

**Title:** Email discussion summary for [97e-35-CompanyCR-Band-n77]

**Document for:** Information

# Introduction

In this email thread we will discussion the CRs for n77 in US and Canada.

The following contributions will be covered.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Type** | **AI** |
| RP-222344 | Operation in the n77 frequency range in US and Canada | Nokia, Nokia Shanghai Bell | Other | 9.12 |
| RP-222350 | Extension of operation in the n77 frequency range in US (Cat-C Rel-16) | Nokia, Nokia Shanghai Bell | CR | 9.12 |
| RP-222352 | Extension of operation in the n77 frequency range in US (Cat-A Rel-17) | Nokia, Nokia Shanghai Bell | CR | 9.12 |
| RP-222353 | Extension of operation in the n77 frequency range in Canada | Nokia, Nokia Shanghai Bell | CR | 9.12 |

In this document, we capture comments and conclusions for this email thread.

# Topic #1: n77 requirements in US and Canada

## Companies’ contributions summary

The background information is provided in RP-222344.

*Handling of NS\_55 for US and NS\_57 for Canada has been discussed for several meetings in RAN4 as well as RAN2 and requirements for non-CA case was already addressed. Although RAN4#104-e addressed CA case, CRs were not agreed. One of the reasons was RAN2 addressed both an n77 specific issue as well as a non-CA/CA NS mapping issue common to all bands and some companies preferred to wait for the RAN2 conclusion before RAN4 agrees relevant CRs.*

*On the other hand, RAN2#119-e agreed following CRs [1, 2] specific to the n77 CA issue, though the conclusion of the NS mapping issue was postponed. Hence, this contribution provides background of our companion CRs of [3, 4] which* ***address both US and Canada n77 issues without NC\_CA\_NS and CA\_NS,*** *respectively to complete the issues independently from NS mapping issue based on the agreed RAN2 CRs [1, 2].*

## Initial round

### Comments & responses for Rel-16/17 38.101-1 CRs (RP-222350/352) for n77 in US

**Sub-topic 1-1: Comments for 38.101-1 CR RP-222350 for n77 in US**

------------------------------------------ Changes ------------------------------------------------------------------------

**Table 6.2.3.1-1: Additional maximum power reduction (A-MPR)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Network signalling label** | **Requirements (clause)** | **NR Band** | **Channel bandwidth (MHz)** | **Resources blocks (*N*RB)** | **A-MPR (dB)** |
| NS\_01 |  | Table 5.2-1  (NOTE 7) | 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | Table 5.3.2-1 | N/A |
| … | … | … | … | … | … |
| NS\_100 | 6.5.2.4.2 | n1, n2, n3, n5, n8, n18, n25, n26, n65, n66, n80, n81, n84, n86, n89  (NOTE 1) |  |  | Table  6.2.3.1-2 |
| NOTE 1: This NS can be signalled for NR bands that have UTRA services deployed.  NOTE 2: No A-MPR is applied for 5 MHz BWChannel where the lower channel edge is ≥ 1930 MHz,10 MHz BWChannel where the lower channel edge is ≥ 1950 MHz and 15 MHz BWChannel where the lower channel edge is ≥ 1955 MHz.  NOTE 3: Applicable when the NR carrier is within 1447.9 – 1462.9 MHz.  NOTE 4: Applicable when the upper edge of the channel bandwidth frequency is greater than 1980 MHz.  NOTE 5: Applicable when the NR carrier is within 2545 – 2575 MHz.  NOTE 6: This NS value is applicable for cells in the range 3450 – 3550 MHz for operations in the USA. This NS value does not indicate any additional emission requirements.  NOTE 7: The NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands. | | | | | |

------------------------------------------ Changes ------------------------------------------------------------------------

------------------------------------------ Changes ------------------------------------------------------------------------

6.2A.3.1.2.0 General

Table 6.2A.3.1.2-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable CA band(s) for each CA\_NC\_NS value. The mapping of NR CA band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2A.3.1.2-2.

**Table 6.2A.3.1.2-1: Additional Maximum Power Reduction (A-MPR) for intra-band non-contiguous CA**

|  |  |  |  |
| --- | --- | --- | --- |
| **CA Network Signalling value** | **Requirements (clause)** | **Uplink CA Configuration** | **A-MPR for sub-blocks in order of increasing uplink carrier frequency** |
| **A-MPR [dB]**  **(clause)** |
| CA\_NC\_NS\_01 |  | All applicaple NR CA configurations | N/A |
| CA\_NC\_NS\_04 | 6.5A.2.3.2.1  6.5A.3.3.2.1 | CA\_n41(2A) | 6.2A.3.1.2.1 |

When UEs are configured with intra-band non-contiguous CA in n77 with NS\_01 for an uplink component carrier in the range 3700-3980 MHz and NS\_55 for an uplink component carrier in the range 3450-3550 MHz in *FrequencyInfoUL-SIB*, A-MPR does not apply to the UEs regardless of which value of *additionalSpectrumEmission* in *FrequencyInfoUL* is used for the carrier in the range of 3450-3550 MHz.

------------------------------------------ Changes ------------------------------------------------------------------------

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

|  |  |
| --- | --- |
| **Company** | **Comments** |
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### Comments & responses for Rel-17 38.101-1 CR (RP-222353) for n77 in Canada

**Sub-topic 1-2: Comments for 38.101-1 CR RP-222353 for n77 in Canada**

------------------------------------------ Changes ------------------------------------------------------------------------

**Table 6.2.3.1-1: Additional maximum power reduction (A-MPR)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Network signalling label** | **Requirements (clause)** | **NR Band** | **Channel bandwidth (MHz)** | **Resources blocks (*N*RB)** | **A-MPR (dB)** |
| NS\_01 |  | Table 5.2-1  (NOTE 8) | 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | Table 5.3.2-1 | N/A |
| … | … | … | … | … | … |
| NS\_100 | 6.5.2.4.2 | n1, n2, n3, n5, n8, n18, n25, n26, n65, n66, n80, n81, n84, n86, n89  (NOTE 1) |  |  | Table  6.2.3.1-2 |
| NOTE 1: This NS can be signalled for NR bands that have UTRA services deployed.  NOTE 2: No A-MPR is applied for 5 MHz BWChannel where the lower channel edge is ≥ 1930 MHz,10 MHz BWChannel where the lower channel edge is ≥ 1950 MHz and 15 MHz BWChannel where the lower channel edge is ≥ 1955 MHz.  NOTE 3: Applicable when the NR carrier is within 1447.9 – 1462.9 MHz.  NOTE 4: Applicable when the upper edge of the channel bandwidth frequency is greater than 1980 MHz.  NOTE 5: Applicable when the NR carrier is within 2545 – 2575 MHz.  NOTE 6: This NS value is applicable for cells in the range 3450 – 3550 MHz for operations in the USA. This NS value does not indicate any additional spurious emission and maximum output power reduction requirements.  NOTE 7: The 1Tx architecture is assumed. For power class 2 UE indicating *txDiversity-r16* [TS 38.306], the additional relaxation of [2] dB is applicable.  NOTE 8: The NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.  NOTE 9: 5 MHz only applies to n90, not n41  NOTE 10: This NS value is applicable for cells in the range 3650-3980 MHz for operations in Canada. This NS value does not indicate any additional emission requirements. | | | | | |

------------------------------------------ Changes ------------------------------------------------------------------------

------------------------------------------ Changes ------------------------------------------------------------------------

6.2A.3.1.1 UE additional maximum output power reduction for Intra-band contiguous CA

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [7]*.* Relation between NR CA band and NR frequency band is specified in Table 5.2A.1-1.

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2A.1.5-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2A.2.4. In absense of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2A.3.1.1-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable CA band(s) for each CA\_NS value. The mapping of NR CA band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2.3.1.1-2.

**Table 6.2A.3.1.1-1: Additional maximum power reduction (A-MPR)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Network signalling label** | **Requirements (clause)** | **NR CA Band** | **Aggregated channel bandwidth (MHz)** | **Resources blocks (*N*RB)** | **A-MPR (dB)** |
| CA\_NS\_01 |  | Table 5.2A.1-1 | All applicaple NR CA bands | All applicaple NR CA configurations | N/A |
| CA\_NS\_04 | 6.5A.2.3.1.1  6.5A.3.3.1.1 | CA\_n41 | Table 5.5A.1-1 | 6.2A.3.1.1.1 | 6.2A.3.1.1.1 |
| CA\_NS\_27 | 6.5A.2.3.1.2  6.5A.3.3.1.2 | CA\_n48 | Table 5.5A.1-1 | 6.2A.3.1.1.2 | 6.2A.3.1.1.2 |
| CA\_NS\_46 | 6.5A.3.3.1.3 | CA\_n7 | Table 5.5A.1-1 | 6.2A.3.1.1.3 | 6.2A.3.1.1.3 |
|  | | | | | |

[The CA\_NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.]

When UEs are configured with intra-band contiguous CA in n77 with NS\_01 for an uplink component carrier in the range 3450-3650 MHz and NS\_57 for an uplink component carrier in the range 3650-3980 MHz in *FrequencyInfoUL-SIB*, A-MPR does not apply to the UEs regardless of which value of *additionalSpectrumEmission* in *FrequencyInfoUL* is used for the carrier in the range of 3650-3980 MHz

------------------------------------------ Changes ------------------------------------------------------------------------

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

|  |  |
| --- | --- |
| **Company** | **Comments** |
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### Summary

Moderator summarizes discussion status for initial round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

## Intermediate round

### Comments & responses

In this round, the following issues need be further discussed and addressed.

Companies are invited to provide comments and responses in the following table.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
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### Summary

Moderator summarizes discussion status for this round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

## Final round

### Comments & responses

*Based on the status of the final round, recommendations will be provided.*

Companies are invited to provide comments and responses in the following table.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
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### Summary

Moderator summarizes discussion status and provide the recommendation.

# Summary of Recommendations