3GPP TSG-RAN WG2 Meeting #118 Electronic [R2-220xxxx](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-220xxxx.zip)

Elbonia, 09 – 20 May 2022

**Agenda item: 6.24.1**

**Source: Nokia (Rapporteur)**

**Title: Report of [AT118-e][039][NR17] n77 Canada (Nokia)**

**WID/SID: TEI17 - Release 17**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report of the following email discussion:

n77 for Canada

offline, CB online W2 if needed

* [AT118-e][039][NR17] n77 Canada (Nokia)

Scope: Treat [R2-2204459](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204459.zip), [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip), [R2-2205450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205450.zip), Ph1 Determine agreeable parts, Ph2 agree CRs

 Intended outcome: Report, Agreed CRs

 Deadline: Schedule 1

[R2-2204459](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204459.zip) LS On Canada band n77 (R4-2206568; contact: Telus) RAN4 LS in Rel-17 To:RAN2 Cc:RAN

[R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip) Distinguishing support of band n77 restrictions in Canada Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Telus, Bell Canada CR Rel-17 36.306 17.0.0 1847 - C TEI17

[R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip) Distinguishing support of band n77 restrictions in Canada Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Telus, Bell Canada CR Rel-17 36.331 17.0.0 4799 - C TEI17

[R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip) Distinguishing support of band n77 restrictions in Canada Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Telus, Bell Canada CR Rel-17 38.306 17.0.0 0714 - C TEI17

[R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip) Distinguishing support of band n77 restrictions in Canada Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Telus, Bell Canada CR Rel-17 38.331 17.0.0 3078 - C TEI17

[R2-2205450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205450.zip) Discussion on n77 issues Xiaomi Communications discussion Rel-17 TEI17

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Nokia (Rapporteur) | Tero Henttonen | tero.henttonen@nokia.com |
| Huawei, HiSilicon | Yang Zhao | zhaoyang@huawei.com |
| Apple | Naveen Palle | naveen.palle@apple.com |
| ZTE | Wenting Li | Li.wenting@zte.com.cn |
| Samsung | Jaehyuk JANG | jack.jang@samsung.com |
| OPPO | Zhongda Du | duzhongda@oppo.com |
| Qualcomm Incorporated | Masato Kitazoe | mkitazoe@qti.qualcomm.com |
| vivo | Boubacar Kimba | kimba@vivo.com |
| Xiaomi | Yumin Wu | wuyumin@xiaomi.com |
| Bell Mobility | Melissa Pinheiro | Melissa.pinheiro@bell.ca |
| TELUS Communications | Navaneeth Madan Gopal | Navaneeth.madangopal@telus.com |
| MediaTek | Felix Tsai | chun-fan.tsai@mediatek.com |
| AT&T | Joe Schumacher | joseph.schumacher@att.com |
| Intel | Youn Heo | Youn.hyoung.heo@intel.com |

# 3 Discussion

This discussion was triggered by the document [R2-2204459](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204459.zip), requesting to provide similar signallling for the band n77 in Canada as was provided earlier for band n77 in the US. This was also discusssed in RAN#95e with the following decisions (with yellow highlighting showing the decisions impacting current RAN2 meeting and cyan highlighting showing how RAN plans to progress with the general issue):

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| **RP-221008** **Moderator's summary for discussion [95e-39-R17-TEIs]** ***RAN4 Chair (Huawei)***Replaces RP-220899 conclusion: proposals #1, #2, #3 of RP-221008 are endorsed Solution specific to Canada n77 band:Proposal #1: RAN tasks RAN4 and RAN2 to finalize the work to address Canada n77 issue based on RP-220038 in TEI17 and provide CRs for approval in RAN#96. n77-like issues:Proposal #2: It is recommended to have a two-quarter RAN-level SI to systematically study the regulatory compliance issues for regional frequency ranges on large global bands- Investigate and identify the root cause of this issue as the first step- If needed (pending outcome of the bullet above), provide a general solution for regulatory compliance issues for regional frequency ranges on large global bands considering - Introduction of new bands - Solutions without introduction of new bands, i.e., reusing the existing band numbers with appropriate signaling to differentiate UE support - The UE should be ensured to support the full frequency range on its supported bands, and the fragmentation of market should be avoidedNOTE: The SI is expected to be submitted in RAN#96 Extension of switching to multiple TAG for UL CA:Proposal #3: To support Tx switching with multiple TAG on 2 bands, it is proposed to add the following note in Rel-18 WI on multi-carrier enhancements in RAN#96, and consider release independence for the switching band pairsNote: Extension of TX switching for 2 bands to multiple TAG configurations is included in the scope. The work is limited to RAN4. |

The documents [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip) take a very concrete approach to this by having the exact same approach for CRs as was done for the US (with slight differences in the cover page), i.e. one capability bit and a new NS-value. In contrast, the proposals in [R2-2205450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205450.zip) propose more than one capability bit (e.g. two bits or a bitmap) and some UAC enhancements for cell barring, which seems to be related to the SI that . To start with, it seems the question is whether anything else than what was done for US is needed, after which it's easier to progress with the CR details.

### Phase 1: CR approach and inter-operability issues

**Question 1**: Which approach to do in RAN2#118e: Alt.1) The US-like approach (as per [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip)) or Alt.2) more extensive approach (as per [R2-2205450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205450.zip))?

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| Answers to Question 1 |
| Company | Alt.1/Alt.2 | Technical Arguments |
| Huawei, HiSilicon | Alt1 | We think Alt1 is simple and already sufficient, we do not think anything else is needed. |
| Ericsson | Alt1 | We think RAN2 already got tasked to do Alt 1 |
| Apple | Alt1 | US n77 like approach is simpler, and extensible without many changes. |
| ZTE | Alt1 |  |
| Samsung | Alt1 |  |
| OPPO | Alt1 |  |
| Qualcomm Incorporated | Alt1 |  |
| vivo | Alt1 | Alt1 is simple and straightforward.  |
| Xiaomi | Alt2 | We are the proponent of Alt2, but are also fine to follow the majority. However the reason for us to bring more extensive solutions is because our solutions are trying to fulfil the requests (i.e. more than one capability bit (e.g. two bits or a bitmap) and some UAC enhancements for cell barring) provided by RAN4 in [R2-2204459](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204459.zip).We would suggest that we provide the endorsed solution of Alt1 to RAN4 to ask RAN4 to verify whether the solution has already fulfilled the RAN4 requests, as Alt1 cannot bar existing devices or identify the global UE supporting full range “3300-4200 MHz” of n77 and new NS value 57.  |
| Nokia, Nokia Shanghai Bell | Alt1 | Alt.1 is what RAN already tasked RAN2 and RAN4 to do by RAN#96. There is a SI to be started in the after RAN#96 when the general case will be discussed, so we shouldn't mix the immediate solution with that. |
| Bell Mobility | Alt1 |  |
| TELUS Communications | Alt1 | Alt1 would enable a quick and easy solution to this issue. |
| MediaTek | Alt1 |  |
| AT&T | Alt1 | Alt1 is consistent with the well-understood solution adopted for a similar case in the US. |
| LGE | Alt1 |  |
| Intel | Alt1 |  |

Phase 1: Thanks to all the companies for their input. Rapporteur proposes the following summary and proposal.

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| **Summary 1**: Clear majority of the companies supported Alt1 i.e. the US-like approach (as per [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip))**Proposal 1**: Alt1 i.e. the US-like approach (as per [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip)) is selected and in the Phase2 CR details are discussed and finalized. |

Whichever approach is selected, CRs are needed. As the CRs in [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip) likely cover all the impacted specifications, moderator would propose to start discussing the exact contents of those already in the first phase to better converge on how to write the cover page an inter-operability impacts: Since the NOTE 12 in 38.101-1 doesn't apply for band n77 in Canada, the situation is slightly different than for US, but in practice moderator assumes much the same assumptions apply. Therefore, whichever solution is adopted, it's good to discuss what the cover page inter-operability statement should say for these CRs.

**Question 2**: Are there any inter-operability issues for UEs supporting band n77 from these RAN2 CRs? If so, what should be written to the cover page?

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| Answers to Question 2 |
| Company | Yes/No | Technical Arguments |
| Huawei, HiSilicon |  | We think the current analysis in the coversheet looks good. If to discuss details, we understand:* If the network is implemented according to the CR and the UE is not, we understand there is no inter-operability issue as the network is upgraded and can identify these UEs are legacy UEs without reporting the new capability.
* If the UE is implemented according to the CR and the network is not, there may be a grey area. It depends on how the legacy network handled the frequency range now, if the network assumes 3450 – 3650GHz, there is no inter-operability issue; if the network assumes the UE can be operated in any range defined in n77, there could be a chance the configuration is not supported by the UE.
 |
| Ericsson | No | With Alt1 (NS-value + capability bit), legacy UEs will be barred. Only new UEs which support the NS-value and the capability bit are able to connect. |
| Apple | No | US n77 based approach also takes care of this. |
| ZTE | No | Similar view as Apple |
| Samsung | No |  |
| OPPO | No |  |
| Qualcomm Incorporated | No |  |
| vivo | No | With new NS-value, legacy UEs will be barred by cells operating with new frequency range(3650~3980MHz) in Canada.With new UE capability, new gNB can identify legacy UEs and avoid configuring them to work with new frequency range.When new UEs access to legacy gNB, gNB will configure UE without operating on new frequency range.  |
| Xiaomi | Yes | For IDLE/INACTIVE UE:If the cell SIB1 indicates the new NS value 57 which is not supported by the legacy UE, the legacy UE will not be barred, and still be required to measure the frequency for cell reselection. Companies may need to firstly have aligned understandings on the legacy UE behaviours.For CONNECTED UE:We are wondering how the global UE supporting full range “3300-4200 MHz” of n77 and new NS value 57 indicates its capability. |
| Nokia, Nokia Shanghai Bell | No | Agree with Huawei analysis: For Xiaomi's comments, UE measuring something it doesn't end up using is not a problem for inter-operability but UE battery consumption. As for the global UEs, if they don't support NS-57 they will bar the cell as per Rel-15 behaviour (which is also the intention with the new NS-value, as was already discussed for the US case). |
| Bell Mobility | No | Agree with Huawei analysis. |
| TELUS Communications | No |  |
| MediaTek | No |  |
| AT&T | No | We agree with the Huawei analysis. We don’t see a problem with a *legacy* network supporting the extended frequency band in the first place, and agree with Nokia’s comments regarding UEs in IDLE mode. |
| LGE | No |  |
| Intel | No | Huawei’s analysis is reasonable but we would like to clarify the case “if the network assumes the UE can be operated in any range defined in n77”. The network in Canada should not assume the UE can be operated in any range defined in n77 nor the network doesn’t need to assume such because the legacy network in Canada is deployed only in 3450 - 3650 MHz range. That is, we don’t need the case that the network assumes the UE can be operated in any range defined in n77.  |

Phase 1: Thanks to all the companies for their input. Rapporteur proposes the following summary and proposal.

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| **Summary 2**: Clear majority of the companies do not see inter-operability issues for UEs supporting band n77 and the cover page of the CRs in [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip) is seen reasonable. **Proposal 2**: Confirm the final cover page for the CRs based on the current text of the CRs in [R2-2205393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205393.zip), [R2-2205394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205394.zip), [R2-2205395](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205395.zip), [R2-2205396](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205396.zip) during the Phase 2 discussion. |

### Phase 2: CR details

Based on Phase 1, clear majority of the companies supported Alt1 i.e. the US-like approach (as per R2-2205393, R2-2205394, R2-2205395, R2-2205396). Therefore, it was proposed to proceed with the Alt1 i.e. the US-like approach based on the CRs in R2-2205393, R2-2205394, R2-2205395, R2-2205396. During the Phase 2 the final check of the CRs should be done and see if any small updates to the CR are needed.

**Question 3**: Can we agree the CRs in R2-2205393, R2-2205394, R2-2205395, R2-2205396 without any further updates? If you see need for any further updates to the CR text, please provide detailed proposal what needs to be updated, how and why.

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| Answers to Question 3 |
| Company | Yes/No | Technical Arguments |
| Huawei, HiSilicon | Yes | We support the CRs in general. However regarding the field name, we still feel the name “*extendedBand-n77-Canada*” is not good, as we never added a specific country name in the field. Although in the field description we have to mention the specific region on this specific issue, it is still preferable to avoid using it in the field name. If in the future there are similar cases emerging in other regions, do we also introduce specific region name as well? Perhaps we could ask MCC for guidance. To us the naming like *extendedBand-n77-2* could be a more generic way. |
| LGE |  | Since this field indicate whether restriction only to 3450-3650MHz is applied or not, it seems more clear to change the field description:***extendedBand-n77-Canada***This field defines whether the UE supports the restriction to frequency ranges of 3450 - 3650 MHz of band n77 in Canada. If absent, the UE may only support the frequency range 3450 - 3650 MHz for band n77 in Canada. UE only indicates this capability if it indicates support for the NR band n77. A UE that indicates this field shall support NS value 57 as specified in TS 38.101-1 [85]. |
| Ericsson |  | From a pure specification point of view, we shouldn’t say that the UE "may" support something beyond what the UE capabilities define. The UE capability signalling indicates what the UE supports. The network should, based on the UE capability signalling know exactly what the UE supports. If the UE does not indicate support for feature X, the UE does not support feature X.It is of course possible to build a UE which supports feature X, but doesn’t indicate support for feature X. That would be a poor UE implementation though. We should not start writing the specification in a way that assumes that the UE supports features for which the UE doesn’t indicate support. From a specification point of view, the UE capability signalling is defining (exactly) what the UE supports.Hence, we think we should do this change:"If absent, the UE ~~may~~ only supports the frequency range 3450 - 3650 MHz"The "may" wording seem to even suggest that the UE may not even supporting 3450 - 3650 MHz. If read in this way, the specification would break. To compare with the yellow from the "USA-bit":This field is only applicable for UEs that indicate support for band n77. If present, the UE supports the restriction to 3450 - 3550 MHz and 3700 - 3980 MHz ranges of band n77 in the USA as specified in Note 12 of Table 5.2-1 in TS 38.101-1 [33]. If absent, the UE supports only restriction to the 3700 - 3980 MHz range of band n77 in the USA. A UE that indicates this field shall also support NS value 55 as specified in TS 38.101-1 [33].One could of course consider aligning the wording more with the USA bit (would be nice but not critical):This field is only applicable for UEs that indicate support for band n77. If present, the UE supports the restriction to 3450 - 3650 MHz and 3650 - 3980 ranges of band n77 in Canada. If absent, the UE supports only restriction to the 3450 - 3650 MHz range of band n77 in Canada. A UE that indicates this field shall also support NS value 57 as specified in TS 38.101-1 [33]. |
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**Summary 3**: TBD.

**Proposal 3**: TBD.

**Question 4**: Can we agree the cover page text of the CRs in R2-2205393, R2-2205394, R2-2205395, R2-2205396 without any further updates? If you see need for any further updates to the cover page text, please provide detailed proposal what needs to be updated, how and why.

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| Answers to Question 4 |
| Company | Yes/No | Technical Arguments |
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**Summary 4**: TBD.

**Proposal 4**: TBD.

# 4 Conclusion

TBD.