3GPP TSG-RAN WG2 Meeting #115 Electronic [R2-210xxxx](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-210xxxx.zip)

Elbonia, 16 – 27 August 2021

**Agenda item: 6.1.4.3**

**Source: Nokia (Rapporteur)**

**Title: Summary of [AT115-e][029][NR16] n77 (Nokia)**

**WID/SID: NR\_RF\_FR1-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report of the following email discussion:

* [AT115-e][029][NR16] n77 (Nokia)

 Scope: Await on-line. Take on-line outcome into account. Determine agreeable parts and agree CRs, Treat [R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip) – 7947, [R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip), [R2-2108756](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108756.zip), [R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip)

 Intended outcome: Report, Agreed CRs.

 Deadline: Await on-line, Schedule 1

The "**Schedule 1**" cporresponds to the following;:

* *A* ***first round*** *with* ***Deadline for comments Thursday Aug 19 1200 UTC*** *to settle scope what is agreeable etc*
* *A Final round with* ***Final deadline Thursday Aug 26 1200 UTC.*** *to settle details / agree CRs etc. Additional check points etc if needed are defined by the Rapporteur. In case some parts of an email discussion need more time, doesn’t converge, need on-line treatment etc Rapporteur please contact chair.*

This topic was also noted in the guidance from RAN#92e as follows:

*13) R17 RF requirements enhancement for NR FR1 [RAN4 WI: NR\_RF\_FR1\_enh], on Band n77: (See RP-211587)*

*1. RAN4 focuses on the necessary updates to RAN4 requirements and leave signaling work, if any, to RAN2.*

*2. RAN2 focuses on signaling aspects, with an aim to ensure the network can properly deal with legacy n77 UEs that do not support 3.45-3.55 GHz operation in US*

*3. RAN tasks RAN4/2 to complete the required work in Aug. and report back to RAN#93-e*

*4. RAN4 chair is kindly asked to use an appropriate agenda to facilitate the work in Aug. meeting, i.e., R16 maintenance, R16 TEI, etc.*

This discussion is handled in phases, with phase 1 intended to understand the potential solutions, and phase 2 to understand additional details. After that, rappporteur provides proposal on how to progress with the issue and whether online comeback is needed.

* Phase 1 starts at ***Monday Aug 16 1630 UTC*** and ends by ***Wednesday Aug 18 1000 UTC***
* Phase 2 starts at ***Wednesday Aug 18 1200 UTC*** and ends by ***Thursday Aug 19 1200 UTC***

# 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 |
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# 3 Discussion

## 3.1 Signalling solutions (phase 1)

As discussed online (as well as in all of [R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip), [R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip), [R2-2108756](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108756.zip) and [R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip)), the primary question to decide is how to ensure inter-operability between current UEs (who may not support the new requirements for n77) and new UEs (who will support the new requirements). The view in all of the submitted contributions was that having signalling (in one way or another) is the simplest way to accomplish that, and (as e.g. [R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip) states), the usual way RAN2 deals with such changes to existing features.

To get to the bottom of this, it seems that the starting point would be to list all the possible solution (combinations) that could be considered. The rapporteur notes that the following solutions that utilize signalling have been mentioned:

1. New capability signalling (with e.g. per-UE granularity) (see e.g. [R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip))
2. Reusing existing per-band *modifiedMPR* capability signalling (see e.g. [R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip))
3. Defining new per-band capability signalling similar to modifiedMPR that allows to modifications to frequency bands (see e.g. [R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip))
4. Defining a new frequency band (with a new band number) (see e.g. [R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip))

Some contributions ([R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip), [R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip)) also note that the signalling would be needed not only for NR CA/DC cases but also for LTE to support EN-DC deployments utilizing n77 in the US. Finally, [R2-2108756](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108756.zip) notes that defining a new NS-value could be used to avoid all UEs (i.e. also roaming UEs) from camping on a cell utilizing the n77 extension in the US.

Naturally, other signalling options may also be possible. In case companies have different proposals that they think would work better, the rapporteur requests companies to add those in the list below:

1. TO BE ADDED BY PROPONENT COMPANY
2. TO BE ADDED BY PROPONENT COMPANY
3. TO BE ADDED BY PROPONENT COMPANY

**Question 1**: Which signalling solution(s) would be acceptable to companies?

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| --- |
| Answers to Question 1 |
| Company | Acceptable solutions (i.e. 1-N)  | Technical arguments |
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**Summary 1**: TBD.

**Proposal 1**: TBD.

## 3.2 Solution details and LS communication (phase 2)

**TBD - once the candidate signalling solution has been chosen, the more precise details will be discussed in phase 2 (including CRs). In case LS to RAN4 is needed, a draft version may be created during Phase 2.**

# 4 Conclusion

TBD.

# Annex A: RAN2 online notes (including list of documents)

Below shows the result of the initial online discussion on this topic, including the list of documents discussed.

Extended band n77

Treat on-line first

* [AT115-e][029][NR16] n77 (Nokia)

 Scope: Await on-line. Take on-line outcome into account. Determine agreeable parts and agree CRs, Treat [R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip) – 7947, [R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip), [R2-2108756](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108756.zip), [R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip)

 Intended outcome: Report, Agreed CRs.

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[R2-2107935](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107935.zip) Inter-operability of band n77 extension in US Nokia, Nokia Shanghai Bell discussion Rel-16 NR\_RF\_FR1-Core

[R2-2107936](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107936.zip) Distinguishing support of extended band n77 for EN-DC, Alt.1 (R16, 36306) Nokia, Nokia Shanghai Bell CR Rel-16 36.306 16.5.0 1820 - C NR\_RF\_FR1-Core

[R2-2107937](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107937.zip) Distinguishing support of extended band n77 for EN-DC, Alt.1 (R16, 36331) Nokia, Nokia Shanghai Bell CR Rel-16 36.331 16.5.0 4702 - C NR\_RF\_FR1-Core

[R2-2107938](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107938.zip) Distinguishing support of extended band n77 for NR, Alt.1 (R16, 38306) Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.5.0 0615 - C NR\_RF\_FR1-Core

[R2-2107939](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107939.zip) Distinguishing support of extended band n77 for NR, Alt.1 (R16, 38331) Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.5.0 2747 - C NR\_RF\_FR1-Core

[R2-2107940](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107940.zip) Distinguishing support of extended band n77 for EN-DC, Alt.2 (R15, 36306) Nokia, Nokia Shanghai Bell CR Rel-15 36.306 15.10.0 1821 - C NR\_RF\_FR1-Core

[R2-2107941](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107941.zip) Distinguishing support of extended band n77 for EN-DC, Alt.2 (R16, 36306) Nokia, Nokia Shanghai Bell CR Rel-16 36.306 16.5.0 1822 - A NR\_RF\_FR1-Core

[R2-2107942](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107942.zip) Distinguishing support of extended band n77 for EN-DC, Alt.2 (R15, 36331) Nokia, Nokia Shanghai Bell CR Rel-15 36.331 15.14.0 4703 - C NR\_RF\_FR1-Core

[R2-2107943](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107943.zip) Distinguishing support of extended band n77 for EN-DC, Alt.2 (R16, 36331) Nokia, Nokia Shanghai Bell CR Rel-16 36.331 16.5.0 4704 - A NR\_RF\_FR1-Core

[R2-2107944](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107944.zip) Distinguishing support of extended band n77 for NR, Alt.2 (R15, 38306) Nokia, Nokia Shanghai Bell CR Rel-15 38.306 15.14.0 0616 - C NR\_RF\_FR1-Core

[R2-2107945](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107945.zip) Distinguishing support of extended band n77 for NR, Alt.2 (R16, 38306) Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.5.0 0617 - A NR\_RF\_FR1-Core

[R2-2107946](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107946.zip) Distinguishing support of extended band n77 for NR, Alt.2 (R15, 38331) Nokia, Nokia Shanghai Bell CR Rel-15 38.331 15.14.0 2748 - C NR\_RF\_FR1-Core

[R2-2107947](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2107947.zip) Distinguishing support of extended band n77 for NR, Alt.2 (R16, 38331) Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.5.0 2749 - A NR\_RF\_FR1-Core

[R2-2108287](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108287.zip) Band n77 issues in the US Ericsson discussion Rel-17 TEI17

[R2-2108756](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108756.zip) Discussion on n77 issue MediaTek Inc. discussion

[R2-2108332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_115-e/Docs/R2-2108332.zip) UE capability signalling for Band n77 Ues DENSO CORPORATION discussion Rel-16 NR\_RF\_FR1\_enh