**3GPP TSG-RAN Meeting #93-e RP-21xxxx**

**Electronic Meeting, September 13-17, 2021**

**Agenda item:** 9.3.4.3

**Source:** Moderator (China Telecom)

**Title:** Moderator's summary for email discussion [93e-25-CRSIntfHandling]

**Document for:** Discussion

# Introduction

This document is the summary of email discussion [93e-25-CRSIntfHandling] on CRS interference handling for NR PDSCH in scenarios with overlapping spectrum for LTE and NR, and the discussion outcome (if any) will be reflected in the revised WID on “Rel-17 Further enhancement on NR demodulation performance”.

All the following 5 tdocs recommend to define NR PDSCH demodulation requirements for neighbouring cell LTE CRS-IM in Rel-17, and the main discussion point is whether network assistance signalling for CRS-IM is needed or not.

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| Tdoc | Title | Source |
| [RP‑211835](file:///D%3A%5C0_Work%5CStandardization%5CRAN%5CRAN%2093%20%28Sep%202021%29%5CTdoc%20list%5Cdocs%5CRP-211835.zip)  | Revised WID: Further enhancement on NR demodulation performance | China Telecom |
| [RP‑211950](file:///D%3A%5C0_Work%5CStandardization%5CRAN%5CRAN%2093%20%28Sep%202021%29%5CTdoc%20list%5Cdocs%5CRP-211950.zip)  | CRS interference handling in NR  | Apple, MediaTek |
| [RP‑212199](file:///D%3A%5C0_Work%5CStandardization%5CRAN%5CRAN%2093%20%28Sep%202021%29%5CTdoc%20list%5Cdocs%5CRP-212199.zip)  | Views on LTE CRS interference handling for NR UE  | Nokia, Nokia Shanghai Bell  |
| [RP‑212226](file:///D%3A%5C0_Work%5CStandardization%5CRAN%5CRAN%2093%20%28Sep%202021%29%5CTdoc%20list%5Cdocs%5CRP-212226.zip)  | Views on Rel-17 CRS-IM requirements in scenarios with overlapping spectrum for LTE and NR | Intel Corporation  |
| [RP‑212490](file:///D%3A%5C0_Work%5CStandardization%5CRAN%5CRAN%2093%20%28Sep%202021%29%5CTdoc%20list%5Cdocs%5CRP-212490.zip)  | LS on RAN4 evaluation for LTE CRS interference handling for NR UE (R4-2115741; to: RAN; cc: -; contact: China Telecom)  | RAN4  |

# Initial round

## Open issues and companies views’ collection

**Issue #1**: Except the network assistance signalling part (which is discussed separately in Issue #2), any comments on the other parts of RAN4 recommendations in LS RP-212490?

*RAN4 recommends to define NR PDSCH demodulation requirements for neighbouring cell LTE CRS-IM in scenarios with overlapping spectrum for LTE and NR in Rel-17:*

*• Use LLR weighting as baseline reference receiver, and further discuss the feasibility of CRS-IC receiver taking into account the UE complexity and PDSCH processing time.*

*• Synchronous network scenario is prioritized. The asynchronous network scenario will be discussed after RAN #93e meeting.*

*• 15 kHz SCS for NR is prioritized. The 30 kHz SCS scenario will be discussed after RAN #93e meeting.*

*• RAN4 will further discuss the necessity of ~~network assistance signaling and~~ UE capability signaling during requirements definition phase.*

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| Company | Comment |
| Huawei | We are fine with the RAN4 recommendation part shown above. |
| OPPO | Fine with the recommendations as above. |
| MTK | The recommendation is fine to us. But we want to clarify that removing network assistance in the last bullet does not mean network assistance information is out of scope, even if we do not reach the conclusion in **Issue #2**. |
| ZTE | RAN4 recommendations are fine with us. |
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**Issue #2:** Whether to assume network assistance information for PDSCH CRS-IM?

* Option 1: Yes (Apple, MediaTek)
* Option 2: No (Nokia - for Rel-17)
* Option 3: Task RAN4 to further discuss the necessity of network assistance signaling during requirements definition phase. (Intel, China Telecom)

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| Company | Comment |
| Huawei | Option 2. From RAN4 discussion, companies have common understanding that it is feasible for UE to acquire the related CRS configuration information by blind detection and PBCH decoding. Also to speed up the feature application in the real network as early as possible and avoid network and UE upgrade to support any additional signalling, it is more valuable not to introduce any network assistance signalling. |
| OPPO | Prefer option 1. Considering UE complexity and realistic network deployment, we support to include network assistance information, along with other signalling/capabilities for Rel-17 UEs. We do not see that much of overhead. Besides, since this NW assistance will only be supported by Rel-17 UEs, there still exists enough time period for BSs to implement this before Rel-17 UEs will be launched in the market. |
| MTK | Support Option 1UE complexity needs to be considered. As we mentioned during GTW, UE complexity cannot be seen from the throughput simulation results. The observation of similar UE performance between with and without assistance information should not be used as an argument to preclude network assistance information. We also want to take this chance to discuss a bit about the definition of network assistance information. In our view, it is impossible for UE to do CRS-IM if network does not provide any piece of information (not even provide the LTE MO for UE to do cell search). Without MO, UE has no idea about the LTE center frequency and will need to blindly scan all possible LTE PSS/SSS frequency locations. The process is time-consuming, and the complexity is huge. With this understanding, we believe that the network assistance information is anyway needed. The discussion point is only about its content.  |
| ZTE | We support Option 2.RAN4 has confirmed that LLR weighting without network assistance can achieve better performance, thus for the time being RAN4 can focus on specifying enhanced PDSCH demodulation requirements based on LLR weighting receiver without network assistance for synchronous scenarios with 15kSCS. After that, RAN4 can work with asynchronous cases and other SCSs. In such a way, the performance improvement demands can be satisfied under the current stage. Further potential optimization with network assistance can be deferred to a later stage. |
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## Initial round summary

# Intermediate round

## Open issues and companies views’ collection

## Intermediate round summary

# Final round

## Open issues and companies views’ collection

## Final round summary

# Final conclusions

# Annex: Contacts

Please provide a company contact that the email discussion moderator can contact if required.

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| **Company** | **Contact name and email** |
| Huawei | Michal Szydelko, michal.szydelko@huawei.com |
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