**3GPP TSG-RAN WG1 Meeting #108-e R1-220XXXX**

**e-Meeting, February 21 – March 3, 2022**

**Agenda Item: 5**

**Source: Moderator (Huawei)**

**Title: Summary of [108-e-R16-V2X-08] Addition of Rel-16 NR V2X bands to TR 37.985**

**Document for: Discussion and Decision**

# Introduction

This document is created to collect company views on the [draft CR in [1]](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202442.zip), to address an omission in
[TR 37.985](https://www.3gpp.org/ftp/Specs/archive/37_series/37.985/37985-g00.zip) v16.0.0.

# Background

The LTE part of TR 37.985 summarizes in clause 5.1.3 the RAN4 listing of bands for PC5 operation (b47), and concurrent PC5-Uu operation, taken from TS 36.101 clause 5.5G. It also, separately, discusses
LTE-V SL CA.

The equivalent listing of NR PC5 bands and PC5-Uu concurrent operation for NR was omitted in the
Rel-16 TR, meaning the TR gives an incomplete understanding of Rel-16 technology to external readers, and is inconsistent between LTE-V2X and NR-V2X.

Recalling that this TR is supposed to give an overview of 3GPP V2X technologies to external organizations (hence the 900-series number), it is important not to omit this information of relevance to the NR-V2X industry.

# Discussion

## Revised draft CR

During the preparation phase, some companies noted concerns on use of “multicarrier” in the new clause 6.2.6 title. The editor notes that “multicarrier” is reused from the LTE clause title, where it is distinct from carrier aggregation, which is mentioned separately. The intention was that “multicarrier” addresses the concurrent PC5-Uu operation described in TS 36.101 and TS 38.101-1.

Recognizing these concerns, an alteration to the CR is proposed which aligns terminology more closely between TR 37.985 and TS 36.101/38.101-1, as follows (with temporary change-on-change):

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 LTE V2X**<Unchanged parts omitted>**5.1.3 Concurrent operation and carrier aggregationV2X operation is defined in band 47 in TS 36.101 [11, clause 5.5G], which supports single-carrier and multi-carrier operation:**Table 5.1.3-1: V2X operating band**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **E‑UTRA Operating Band** | **E-UTRA V2X Operating Band** | **V2X UE transmit** | **V2X UE receive** | **Duplex Mode** | **Interface** |
| **FUL\_low – FUL\_high** | **FDL\_low – FDL\_high** |
| 47 | 47 | 5855 MHz |  | 5925 MHz | 5855 MHz |  | 5925 MHz | HD | PC5 |

The V2X sidelink in band 47 can be operated concurrently with Uu FDD bands 3, 5, 7, 8, 20, 28, and Uu TDD bands 34, 39, 41, and 71. **<Unchanged parts omitted>**6 NR V2X**<Unchanged parts omitted>**6.2.6 Concurrent operationNR-V2X operation is defined in bands n38 and n47 in TS 38.101-1 [22, clause 5.2E], which support single-carrier operation:**Table 6.2.6-1: NR-V2X operating bands**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **V2X Operating Band** | **Sidelink (SL) Transmission operating band** | **Sidelink (SL) Reception operating band** | **Duplex Mode** | **Interface** |
|  | **FUL\_low – FUL\_high** | **FDL\_low – FDL\_high** |  |  |
| n381 | 2570 MHz | - | 2620 MHz | 2570 MHz | - | 2620 MHz | HD | PC5 |
| n47 | 5855 MHz | - | 5925 MHz | 5855 MHz | - | 5925 MHz | HD | PC5 |
| Note 1: When this band is used for V2X SL service, the band is exclusively used for NR V2X in particular regions. |

The NR-V2X sidelink in band n47 can be operated concurrently with Uu band n71. 6.3 V2X sidelink resource allocation**<Unchanged parts omitted>** |

## Companies views

**Does your company agree to endorse the above updated change text for a CR, and/or have any other comments?**

|  |  |  |
| --- | --- | --- |
| **Company** | **OK to endorse?** | **Comment, if any** |
| Huawei, HiSilicon | OK |  |
| Samsung | OK |  |
| QC | Comment | We are OK with the change in principle. However, we think that the change from multiple carrier operation to concurrent is unnecessary. The current wording is quite clear as it is right now. |
| OPPO | OK |  |
| ZTE, Sanechips | OK |  |
| LG Electronics | Comment | We are wondering whether the yellow-marked parts captured from TS 38.101-1 are also needed to be included as “Inter-band con-current V2X operating bands” in TR 37.985?**Table 5.2E.2-1 Inter-band con-current V2X operating bands**

|  |  |  |
| --- | --- | --- |
| **V2X operating bands V2X con-current operating Band** | **NR or V2X Operating Band** | **Interface**  |
| V2X\_n39-n47  | n39  | Uu  |
| n47  | PC5  |
| V2X\_n40-n47  | n40  | Uu  |
| n47  | PC5  |
| V2X\_n41-n47  | n41  | Uu  |
| n47  | PC5  |
| V2X\_n71-n47  | n71  | Uu  |
| n47  | PC5  |
| V2X\_n78-n47  | n78  | Uu  |
| n47  | PC5  |
| V2X\_n79-n47  | n79  | Uu  |
| n47  | PC5  |

  |
| Sharp | OK |  |
| NTT DOCOMO | OK | “Concurrent” seems to be better. And LGE’s comment would be valid. Why bands other than n71 are not mentioned? |
| Ericsson | OK |  |
| CATT, GOHIGH | OK | Share same concern as LG and DOCOMO.  |
| vivo | Comment | “Concurrent” would be better than “multi-carrier”, because multi-carrier not only includes CA, but also includes the operation where a UE has multiple NR SL transmissions in multiple SL carriers parallelly without aggregation in higher layer, which was supported for Rel-14 LTE V2X but not for NR SL.Regarding the operating bands, we prefer not to copy each specific band in the TR from spec maintenance perspective. Instead, a reference to RAN4 spec TS 38.101-1 would be enough. Otherwise, the TR need to be updated regularly once RAN4 introduce a new band for V2X. |
| NEC | OK |  |
| Nokia, NSB | OK with comments | We prefer “concurrent operation” over “multi-carrier operation”.Regarding the specific bands, we prefer to give a reference to 38.101-1 instead of having to update this TR every time RAN4 add a new band combination. |
| Intel | OK | Prefer “concurrent” over “multicarrier”. Have slight preference to refer to RAN4 table instead of copying. |

### First round summary (moderator)

* It seems agreeable to have a CR.
* Companies generally prefer to use the “concurrent operation” wording as proposed in Section 3.1.
* Some comments on referencing a RAN4 table instead of listing the bands. Moderator (and spec editor) response:
	+ This TR’s purpose is to give external, non-3GPP audiences, a ready availability to understand 3GPP’s technology at approximate stage-2 level, and it is for this reason that the rest of the TR spends the effort it does to explain our specifications without requiring non-3GPP people to dig through too much other 3GPP material.
	+ There is no change proposed to the presentation of bands for the LTE-V part, and that text is now long-since stable. NR should thus present consistently.
	+ The effort to maintain this TR is expected to remain at pretty much once-per-Release via the editor CR process, when the WI is in stable enough condition (if applicable to V2X). There is no expectation to have ‘real-time’ updating during a release. The workload is thus not increased over what would happen anyway.
	+ For these reasons, the moderator (and specification editor) respectfully does not propose to replace the bands listing with a cross-reference.
* To LG: the yellow highlighted bands are in Rel-17, whilst this is a Rel-16 CR. Rel-16 TS 38.101-1 only has concurrent operation with band n71. The new Rel-17 bands will be in the next editor CR for Rel-17.

With addition to the cover page relating to changing “multi-carrier operation” to “concurrent operation”, a CR based on section 3.1 by removing change-on-change may be agreeable.

## Second round

**Proposal: Endorse** [**the updated draft CR to TR 37.985**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Inbox/drafts/7.2.4/%5B108-e-R16-V2X-08%5D/draft_R1-22xxxxx%20CR%20TR%2037.985_v2.docx)**.**

If any remaining comments, to be by email before 11.00 UTC, 23 February 2022.

# Conclusions

TBD.

# References

1. R1-2202442, “Draft CR: Addition of Rel-16 NR V2X bands to TR 37.985”, Huawei (editor), RAN1#108-e.