**3GPP TSG RAN WG4 #97-e Meeting R4-2016924**

**Electric Meeting, 02nd – 13th November 2020**

### **Agenda Item: 12.10.1**

### **Source: LG Electronics**

### **Title: Work plan for NR sidelink enhancement in Rel-17**

**Document for: Approval**

# Introduction

In the last RAN Plenary #89 meeting, revised WI on NR sidelink enhancement was agreed [1]. In this contribution, we provide a work plan for new WI on NR sidelink enhancement including NR V2X, public safety and other commercial use cases using NR sidelink operation in Rel-17.

# Objectives for NR sidelink enhancements

The objectives of this work are to enhance NR radio solutions for the V2X, public safety and commercial use cases.

The detailed Core part objectives in RAN WG4 are as follows:

4. Support of new sidelink frequency bands for single-carrier operations [RAN4]

* Support of new sidelink frequency bands should ensure coexistence between sidelink and Uu interface in the same and adjacent channels in licensed spectrum.
* The exact frequency bands are to be determined based on company input during the WI, considering both licensed and ITS-dedicated spectrum in both FR1 and FR2.

6. UE Tx and Rx RF requirement for the new features introduced in this WI [RAN4]

7. UE RRM core requirement for the new features introduced in this WI [RAN4]

The solutions should cover both the operating scenario where the carrier(s) is/are dedicated to ITS and the operating scenario where the carrier(s) is/are licensed spectrum and also used for NR Uu/LTE Uu operation.

In ITS carriers, it is assumed that any co-channel coexistence requirements and mechanisms of NR sidelink with non-3GPP technologies will not be defined by 3GPP.

Based on this objective we propose the work plan as follow

# Time schedule for V2X WI

The WI on NR sidelink enhancement will be specified in Rel-17 time frame and this new WI should be completed by September 2021 in Core requirement aspects based on the approved WID [1]. However, the WI completion deadline can be extended to March 2022 in next RAN Plenary # 90-e meeting.

## Work plan for RF aspect

We propose work plan for RF aspects as follow

1. RAN4 # 97-e (2020 Nov.)
* Discussion
* FR1 operating bands for SL enh.
* FR2 band request for NR SL (28GHz or 39GHz)
* Based on operator request, RAN4 can decide whether or not coexistence evaluation at FR2
* Agreement
* Work plan
* FR2 Operating band request deadline is for RAN4 #98
* WF on FR1 operating band request for SL enh.
1. RAN4 # 98-e (2021 Jan.)
* Discussion
* General scope to introduce NR SL enhancement for RF requirements at FR1
* n79 partial used SL operation with NR n79 Uu and other Uu operating bands
	+ Cover the Frequency separation issues and timing alignment issue
	+ Simulation assumptions on co-existence study for licensed bands which the SL application scenario is different from n38 and n79. Initial simulation results can also be provided if available.
* High power UE (PC2) for SL enhancements
	+ Single antenna High power UE, SL-MIMO high power UE and PC2 inter-band con-current operation
* Other RF/general requirements for New SL enhancement
	+ New SL operating bands for public safety service
	+ System parameters for newly introduced SL bands
	+ Additional RF requirements when the necessity of additional RF requirements identified from other WG.
	+ Additional RF requirements according to request the exact operating bands based on the coexistence evaluation results
* Agreement
* Scope and priority in FR1 are agreed.
* If FR2 operating bands are identified, related work plan will be updated, otherwise, FR2 discussion will be closed.
1. RAN4 # 98BIS-e (2021 APR.)
* Discussion
* Discussion on NR SL UE General requirements (operating bands, operating channel bandwidths)/ Tx/ Rx requirements at FR1
* Continue to discuss partial used SL operation with NR Uu at n79 and other Uu operating bands
* Continue to discuss High power UE requirements
* Continue to discuss other RF/general issues for New SL enhancement
* co-existence study based on simulation results for licensed bands
* Agreement
* Agree principle how to define NR SL UE Tx/Rx RF requirements for partial used SL operation at n79
* Agree basic MPR/A-MPR simulation assumption for PC2 at FR1.
1. RAN4 # 99-e (2021 May)
* Discussion
* NR SL UE RF General requirements/Tx/Rx requirements at FR1
* Continue to discuss partial used SL operation with NR Uu at n79/other bands
* Continue to discuss High power UE requirements
* Continue to discuss other RF/general issues for New SL enhancement
* If needed, further results for coexistence evaluation simulation
* Agreement
* Provide initial MPR/A-MPR requirements
* Specify operating bands and general part for partial used SL operation at licensed band
1. RAN4 # 100~#102-e (2021 Aug. ~ 2022 Feb.)
* Discussion
* Further discussion on NR SL UE RF General/Tx/Rx requirements at FR1
* Finalize the General/Tx/Rx RF requirements
* Finalize coexistence evaluation results
* Agreement
* Approve TPs/CRs on General/Tx/Rx RF requirements

For treating of CR, WI rapporteurs can merge draft CRs and manage the draft big CR. The Formal big CR will be proposed by rapporteurs to complete NR SL enhancement UE Tx/Rx RF requirements.

# Conclusions

In this contribution, we provided work plan for NR SL enhancement services with sidelink operation. Our proposal is as follows

**Proposal 1: Approve the proposed work plan in RF session for NR SL enhancement service to complete Core requirements in Rel-17 timeline (Sept. 2021 can be extended to March 2022).**

# References

1. RP-190766, “New WID on 5G V2X with NR sidelink”, LG Electronics, Huawei
2. TR 38.885 v1.1.0: “NR Study on Vehicle-to-Everything”
3. TR 36.785 v14.0.0: “V2V Services based on LTE sidelink; UE radio transmission and reception”