**3GPP TSG RAN Meeting #91e RP-210823**

**Electronic Meeting, March 16 - 26, 2021**

**Source: Ericsson (Moderator), Oppo (rapporteur)**

**Title: New WID on NR Sidelink Relay**

**Document for: Approval**

**Agenda Item: 9.1.2**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: NR Sidelink Relay

## Acronym: NR\_SL\_Relay

## Unique identifier: *{A number to be provided by MCC at the plenary}*

NOTE: For new WIs/SIs leave the Unique identifier empty and make a proposal for an Acronym.

 For a revised WI/SI: Take Unique identifier and acronym as shown in 3GPP workplan.

 If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI.

 Please tick (X) the applicable box(es) in the table below:

 Either:

|  |  |
| --- | --- |
| **This WID includes a Core part** | **X** |
| **This WID includes a Performance part** | **X** |

 or:

|  |  |
| --- | --- |
| **This WID includes a Testing part** |  |
| **and it addresses the following 3GPP work area:** | **Radio Access** |  |
| **Core Network** |  |
| **Services** |  |

Potential target Release: Rel-17

## 1 Impacts *{ For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study.}*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X | X | X |  |
| **No** | X |  |  |  |  |
| **Don't know** |  |  |  |  | X |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

This work item is a …

|  |  |
| --- | --- |
| X | Feature |
|  | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 800015 | Network Controlled Interactive Service | *Related SA1 work on determine service requirements for commercial use cases, e.g. interactive services. (FS\_NCIS)* |
| 830033 | Study on System enhancement for Proximity based Services in 5GS | *Related SA2 work on identifying and evaluating architecture enhancements of 5G System design needed to support proximity based services. (FS\_5G\_ProSe)* |
| 880005 | Study on Security Aspects of Enhancement for Proximity Based Services in 5GS | *SA3 study item, which studies ProSe security aspects (FS\_5G\_ProSe\_Sec)* |
| 900030 | Proximity based Service in 5GS | *Work Item in SA2 (5G\_ProSe)* |
| 860038 | Study on NR Sidelink relay | *Study Item in RAN2 (FS\_NR\_SL\_relay)* |

**Dependency on non-3GPP (draft) specification**:

*{This section is to be typically used to identify the IETF dependencies. Delete the header "Dependency on non-3GPP (draft) specification:" if no such dependency.}*

## 3 Justification

For Release 16, a first version of NR sidelink has been developed and it solely focused on supporting V2X related road safety services. The design aims to provide support for broadcast, groupcast and unicast communications in both out-of-coverage and in-network coverage scenarios. On top of that, sidelink-based relaying functionality was additionally studied in order for sidelink/network coverage extension and power efficiency improvement, considering wider range of applications and services.

A Rel-17 Study Item of “Study on NR Sidelink Relay” has been carried out by 3GPP in RAN2, which covers the enhancements and solutions necessary to support the UE-to-network Relay and UE-to-UE Relay coverage extension. The accomplishments of the study for Sidelink Relay are documented in 3GPP TR38.836.

The investigation covers discovery procedure, and both Layer-2 and Layer-3 UE-to-Network Relay and UE-to-UE Relay, including detailed aspects of relay (re)selection, authorization, QoS management, service continuity, security, protocol stack design and CP procedure.

Mechanisms for Layer-2 relay and Layer-3 relay have been studied and identified by RAN2, striving for minimum specification impact. In this study, both L2 and L3 based relaying have been found to be feasible, and it was recommended to support NR Sidelink Relay for coverage extension.

## 4 Objective

### 4.1 Objectives Core part WI

The objective of this work item is to specify solutions to enable single-hop, sidelink-based, L2 and L3 based UE-to-Network (U2N) relaying.

Work Item objectives on aspects common to both L2 and L3:

1. Specify mechanisms for U2N **relay discovery and (re)selection** for L3 and L2 relaying [RAN2, RAN4]
	1. Re-use LTE relay discovery and (re)selection as baseline
2. Specify mechanisms for **Relay and Remote UE authorization** for L3 and L2 relaying [RAN3]
	1. Re-use LTE as baseline

Work Item objectives specific to Layer-2 (L2) relaying:

1. Specify mechanisms for E2E, i.e. PC5 and Uu, **QoS management** [RAN2]:
2. Specify mechanisms for **service continuity**
	1. Limited to intra-gNB cases [RAN2]
3. Specify mechanisms for U2N **Adaptation layer design** [RAN2]
	1. For bearer mapping and Remote UE identification, incl. RAN related security aspects
4. Specify **Control Plane procedures** for U2N, including RRC connection management, system information delivery, paging mechanism and access control for Remote UE [RAN2, RAN3]
	1. Focus RRC state combinations to RRC\_Connected

NOTE 1: RAN requests RAN2 to strive for completion of the common parts (objectives 1) by RAN#92 (June). RAN understands that RAN2 will also initially work on other aspects that have cross-group dependencies.

NOTE 2: For L2 UE-to-Network Relay, it is assumed that the Remote UE has a single active connection towards gNB via only a single Relay UE at a given time in this release.

NOTE 3: Only NR Uu interface, i.e. gNB, and 5GC is considered, and it is limited to NR SA scenario in this release.

NOTE 4: Work specific to the mobility scenario of “between indirect (via a first Relay UE) and indirect (via a second Relay UE)”, and the group mobility is not supported in this release.

### 4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Define additional RRM performance requirements for Relay discovery and (re)selection [RAN4]

### 4.3 RAN time budget request (not applicable to RAN5 WIs/SIs)

NOTE: For all new RAN related WIs/SIs which are not led by RAN WG5 the WI/SI rapporteur has to fill out the attached Excel table to request time budgets for corresponding RAN WG meetings.
The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI.
One time unit (TU) corresponds to ~ 2 hours in the meeting.
If no TU is needed, then leave the field empty otherwise enter a number >0 in the field.

 For revisions of already approved WI/SI descriptions: Please remove the Excel table from the WID/SID's zip file. The time budgets are already recorded. If you want to modify them, then this has to be done via the status report and not via a revised WID/SID.

 If this WID is covering Core and Performance part, then please fill out one line for each part in the attached Excel table.

**additional comments to the time budget request in the attached Excel table:**

## 5 Expected Output and Time scale

|  |
| --- |
| **New specifications** *{One line per specification. Create/delete lines as needed}* |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Remarks |
| *TS* | *38.3XX* | *NR; Sidelink Adaptation layer Protocol* | *94* | *95* | *rapporteur: Lu, Qianxi, OPPO,* *qianxi.lu@oppo.com**Core Part* |

*{Note 1: Only TSs may contain normative provisions. Study Items shall create or impact only TRs.
"Internal TR" is intended for 3GPP internal use only whereas "External TR" may be transposed by OPs.}*

NOTE: If this is a RAN WI including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec.
By default a new specs can only be new for one of both parts.

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| *38.300* | *NR; NR and NG-RAN Overall Description; Stage 2* | *95* | *Core part* |
| *38.304* | *NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state* | *95* | *Core Part* |
| *38.306* | *NR; User Equipment (UE) radio access capabilities* | *95* | *Core Part* |
| *38.321* | *NR; Medium Access Control (MAC) protocol specification* | *95* | *Core Part* |
| *38.331* | *NR; Radio Resource Control (RRC); Protocol specification* | *95* | *Core part* |
| *38.401* | *NG-RAN; Architecture description* | *95* | *Core part* |
| *38.413* | *NG-RAN; NG Application Protocol (NGAP)* | *95* | *Core part* |
| *38.423* | *NG-RAN; Xn application protocol (XnAP)* | *95* | *Core part* |
| *38.133* | *NR; Requirements for support of radio resource management -Core* | *95* | *Core part* |
| *38.133* | *NR; Requirements for support of radio resource management -Performance* | *97* | *Performance part*  |
|  |  |  |  |

NOTE: If this is a RAN WI including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec.
If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

## 6 Work item Rapporteur(s)

*Lu, Qianxi, OPPO, qianxi.lu@oppo.com (RAN2)*

*Huang, Xueyan, CMCC, huangxueyan@chinamobile.com (RAN3)*

## 7 Work item leadership

*RAN2 (Primary)*

*RAN3, RAN4 (Secondary)*

## 8 Aspects that involve other WGs

*{Specify all the other WG(s) to be involved and, if specific, their task. E.g.: "SA2, SA3, SA5. CT6 for storage, and potentially SA4". If not applicable, indicate "None" or "None identified yet".}*

SA2/CT1 have to captured impacts of NR Sidelink Relay on Discovery/PC5-S and CN.

SA3 has to captured impacts of NR Sidelink Relay on security related part.

NOTE: For RAN WIs: Section 8 applies only toWGs outside of TSG RAN because RAN WG aspects have to be covered in section 4.

## 9 Supporting Individual Members

*{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval.}*

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| Supporting IM name |
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