**TSG SA Rel-18 Prioritization Workshop SP-211172r01**

**9-10 December 2021, Electronic meeting**

**SA WG2 Meeting #S2-148ES2-2109359**

**15 - 22 November, 2021, Electronic meeting** (revision of S2-2108525r06)

**Source: CATT, OPPO**

**Title: New SID on Study on System enhancement for Proximity based Services in 5GS - Phase 2**

**Document for: Approval**

**Agenda Item: 9.1.4**

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: Study on System enhancement for Proximity based Services in 5GS - Phase 2

Acronym: FS\_5G\_ProSe\_Ph2

Unique identifier: TBD

Potential target Release: Rel-18

# 1 Impacts

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

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

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| AIPN-SAE | SA1 | 320022 | Requirements for evolution of the 3GPP system architecture |
| SMARTER | SA1 | 720005 | New Services and Markets Technology Enablers |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 900007 | Proximity based Services in 5GS | Rel-17 Stage 2 5G\_ProSe work item. |
| 800015 | Network Controlled Interactive Service | Related SA1 work on determine service requirements for commercial use cases, e.g. interactive services. |
| 840030 | WID on Network Controlled Interactive Service(NCIS) Requirements  | SA1 work item, which specifies the requirements for interactive service. |
| 830033 | Study on System enhancement for Proximity based Services in 5GS | Rel-17 SA2 Study on identifying and evaluating architecture enhancements of 5G System design needed to support proximity based services. |
| 930008 | Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS) | Rel-17 SA3 work item on security aspects. |
| 860038 | Study on NR Sidelink relay | Rel-17 RAN study item, which studies RAN aspects of NR sidelink relay. |
| 911005 | NR Sidelink Relay | Rel-17 RAN work item on NR Sidelink Relay. |

# 3 Justification

The 5G System has been enhanced to support Proximity Services in Release 17 as specified in TS 23.304, based on the service requirements defined in TS 22.278, TS 22.261 and TS 22.115. The following Proximity Services features are standardized within the Rel-17 timeframe:

- 5G System architecture reference models for Proximity Services.

- Support of PC5 Direct Discovery (including in-coverage and out-of-coverage cases).

- Support of PC5 unicast, groupcast and broadcast modes communication (including in-coverage and out-of-coverage cases).

- Support of PC5 Service Authorization and Policy/Parameter Provisioning.

- Support of direct communication path selection between PC5 and Uu.

- Support of Charging for PC5.

- Support of Layer-3 and Layer-2 based UE-to-Network Relay (including QoS and service continuity aspects).

However, due to lack of time the following objectives were de-prioritized from Rel-17 FS\_5G\_ProSe study item at the SA#86 meeting:

- Support of direct communication path switching between Uu interface and PC5 interface.

- Enhancement of UE-to-Network Relay for support of multiple hops.

There are also some issues not finalized during the Rel-17 FS\_5G\_ProSe study item as their dependency on other work items, e.g.:

- Support of 5MBS traffic over UE-to-Network Relay.

It was also decided at the SA2#145e meeting that UE-to-UE Relay is not pursued in Rel-17 5G ProSe work item.

All these above items not standardized within Rel-17 worth to be further investigated in the Rel-18 study item, in order to increasingly fulfil the service requirements defined in TS 22.278 and TS 22.261.

There are also some new requirements about Proximity Services captured in TS 22.278 and TS 22.261, e.g. multiple hop relay, non-3GPP access over PC5, emergency services over relay, etc., which imposes architecture enhancements that need to be addressed by Rel-18 study item.

# 4 Objective

The study item aims at further investigating 5G System enhancements to support Proximity Services, based on what has been specified in Rel-17, and based on the services requirements defined in TS 22.278, TS 22.261 and TS 22.115.

The detailed objectives are to investigate potential 5GS enhancements in order to support the followings:

**Objective A. 5G System enhancements to support Rel-17 5G ProSe leftovers**

WT#1. Support of single NR PC5 hop UE-to-UE Relay for unicast.

NOTE 1: WT#1 should take into account the forward compatibility for supporting more than one hop in a later release.

WT#2. Support of service continuity when switching between two indirect network communication paths for UE-to-Network Relay (NR PC5 and NR Uu are used).

NOTE 2: Whether WT#2 scope is intra-gNB indirect-to-indirect path switching only or both intra-gNB and inter-gNB indirect-to-indirect path switching for Layer-2 UE-to-Network Relay needs to be confirmed with RAN.

WT#4. Whether and how to support path switching between direct NR Uu communication path and direct NR PC5 communication path (i.e. non-relay case).

WT#6. Support of multiple NR PC5 hops UE-to-UE Relay.

**Objective B. 5G System enhancements to support new Proximity Services requirements**

WT#7. Support of service continuity when switching between direct network communication path and indirect network communication path for Layer-2 UE-to-Network Relay, including inter-gNB indirect-to-direct and inter-gNB direct-to-indirect path switching.

WT#8. Support of multi-path transmission using only one direct network communication path and only one indirect network communication path for UE-to-Network Relay for improved reliability or data rates.

WT#9. Whether and how to support of non-3GPP RAT (e.g. Wi-Fi or Bluetooth) over PC5 reference point for Layer-3 UE-to-Network Relay.

WT#10. Support of Emergency Services for Remote UE over UE-to-Network Relay.

NOTE 3: Whether all the regulatory service requirements for Emergency Services to be supported for UE-to-Network Relay (WT#10) needs investigation.

WT#11. Support of PC5 DRX for Direct Communication, Direct Discovery, UE-to-Network Relay and UE-to-UE Relay.

NOTE 4: Support of PC5 DRX (WT#11) will be refined pending on conclusions/decisions about PC5 DRX support for Rel-17 5G\_ProSe.

NOTE 5: The UE-to-Network Relay and UE-to-UE Relay in the above WTs include both Layer-3 and Layer-2 Relays unless explicitly stated otherwise.

NOTE 6: Whether and how objectives with RAN dependencies (all WTs except for WT#4 and WT#9) will be supported need to be confirmed with RAN.

NOTE 7: Support of PWS for Remote UE over UE-to-Network Relay can be done in alignment with other WGs in normative phase.

Architectural implications for RAN will be coordinated with RAN WGs.

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **Inter Work Tasks Dependency**  |
| WT#1 | 0.5 | 0.5 | Yes | WT#1 is self-contained. |
| WT#2 | 1.5 | 0.75 | Yes | WT#2 is self-contained. |
|  |  |  |  |  |
| WT#4 | 0.75 | 0.25 | No | WT#4 is self-contained. |
|  |  |  |  |  |
| WT#6 | 1.5 | 0.75 | Yes | WT#6 is depended on completion of WT#1. |
| WT#7 | 0.25 | 0.25 | Yes | WT#7 is self-contained. |
| WT#8 | 1 | 0.5 | Yes | WT#8 is self-contained. |
| WT#9 | 1 | 0.5 | No | WT#9 is self-contained. |
| WT#10 | 2 | 1 | Yes | WT#10 is self-contained. |
| WT#11 | 0.5 | 0.25 | Yes | WT#11 is self-contained. |

**Total TU estimates for the study phase: 9**

**Total TU estimates for the normative phase: 4.75**

**Total TU estimates: 9 + 4.75= 13.75**

# 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# | Rapporteur |
| Internal TR | 23.XXX | Study on System enhancement for Proximity based Services (ProSe) in the 5G System (5GS) - Phase 2 | TSG#97 | TSG#98 | Deng, Qiang, CATT, dengqiang1@catt.cnLu, Fei, OPPO,lufei2@oppo.com |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

Deng, Qiang, CATT, dengqiang1@catt.cn, Primary Rapporteur.

Lu, Fei, OPPO, lufei2@oppo.com, Secondary Rapporteur is responsible for Objective B.

# 7 Work item leadership

SA2.

# 8 Aspects that involve other WGs

SA3 for the Security aspects, SA5 for the Charging aspects, RAN for the RAN related issues.

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| CATT |
| OPPO |
| China Telecom |
| CAICT |
| China Mobile |
| Tencent |
| ZTE |
| KPN |
| Convida Wireless |
| Xiaomi |
| Qualcomm Incorporated |
| Vivo |
| Interdigital |
| Intel |
| MediaTek Inc. |
| Spreadtrum |
| Apple |
| Philips |
| Matrixx |
| China Unicom |
| one2many |
| SyncTechno Inc. |
| LG Electronics |
| FirstNet |
| AT&T |
| Samsung |
| Panasonic |
| Ericsson |
| Verizon UK Ltd |
| Lenovo |
| Motorola Mobility |
| Huawei |
| HiSilicon |
| Orange |
| Sennheiser |