**3GPP TSG SA WG2 Meeting #163 S2-2407348**

**27 – 31 May 2024, Jeju, Korea (revision of S2-2405978)**

**Source: LG Electronics, Ericsson**

**Title: New WID on Phase 3 for UAS, UAV and UAM**

**Document for: Approval**

**Agenda Item: 30.1**

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: Phase 3 for UAS, UAV and UAM

Acronym: UAS\_Ph3

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Study  |
|  | Normative – Stage 1 |
| X | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 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) |
| UAV\_Ph3 | SA1 | 1000032 | Uncrewed Aerial System Phase 3 |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 980012 | Further Architecture Enhancement for UAV and UAM | Rel-18 SA2 UAS\_Ph2 |
| 1020069 | Study on Phase 3 for UAS, UAV and UAM | Rel-19 Antecedent Stage 2 study item |

# 3 Justification

SA1 has studied how to further enhance the interaction between 5GS and UAV (Uncrewed Aerial Vehicle) system, including the UAV operations and management in Rel-19 (i.e. FS\_UAV\_Ph3: TR 22.843). The study addressed new requirements aspects in different scenarios such as pre-flight or in-flight network status monitoring, UAV DAA (Detect And Avoid), reliability of C2 (Command and Control) traffic for UAV and flexible control of UAV communication over the identified flight zone. Based on the conclusions of FS\_UAV\_Ph3, SA1 specified 5G service requirements to further support UAV application in 3GPP system in TS 22.125.

Network-assisted/ground-based mechanism for DAA for tactical deconfliction and collision avoidance as well as UTM control of UAV flight path can be considered as a complement for DAA based on PC5 reference point specified in Rel-18.

The CEPT (European Conference of Postal and Telecommunications) Decision 22(07) on harmonised technical conditions for the usage of aerial UEs for communications based on LTE and 5G NR in several bands harmonized for MFCN (Mobile/Fixed Communications Networks) includes the requirement related to operational restrictions in the form no-transmit zones (NTZs). Regarding this aspect, TSG RAN agreed that the NTZ requirement will be addressed and sent LS on support of no-transmit zones for UAVs (S2-2308327/RP-231485) to SA2. Therefore, support of no-transmit zones for UAVs needs to be considered.

SA2 has progressed study to investigate and identify potential architecture and system level enhancements to support additional scenarios and requirements for UAV (Uncrewed Aerial Vehicle) and UAM (Urban Air Mobility) in TR 23.700-59.

# 4 Objective

The aim of this work item is to specify architecture and system level enhancements to support additional scenarios and requirements for UAV (Uncrewed Aerial Vehicle) and UAM (Urban Air Mobility) as per conclusions reached within TR 23.700-59 (clause 8).

Specifically, the objectives include:

- **WT#1:** Enhance NEF services to support service exposure and interactions between MNOs and UTM functions for supporting the following:

- Pre-mission flight planning and in-mission flight monitoring for UAV UEs.

- Support enabling USS/UTM to request NEF assistance for pre-mission flight planning and in-mission flight monitoring by enhancing NEF services.

- Support enabling USS/UTM to request QoS Sustainability Analytics containing the UAV UE flight path information defined as 3D location waypoints.

- C2 communication reliability.

- Capture how to reuse the existing redundant transmission mechanisms such as redundant PDU Sessions, redundant user plane paths for C2 communication reliability as Informative Annex in TS 23.256.

- The scenario of multiple USS serving different geographical areas corresponding to the UAV UE flight path.

- Support a changeover from one USS to another USS for UAV UE assisted by 5GC.

- **WT#2:** Enable network-assisted/ground-based mechanism for DAA (Detect And Avoid).

- Support assistance information such as relative distance of UAV UEs, absolute location of a UAV UE for network-assisted DAA.

- **WT#3:** Support no-transmit zones for UAV UEs.

- Support configuring/provisioning NTZ assistance information to UAV UE and NTZ enforcement by UAV UE.

Editor's note: The objective for WT#3 can be updated based on final conclusions to be described in clause 8.3 of TR 23.700-59.

For WT#3, the normative work will be done in collaboration with RAN WGs.

# 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 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 23.256 | Support of Phase 3 for UAS, UAV and UAM | TSG#106 (December 2024) |  |
| TS 23.288 | Potential updates to the existing Analytics, e.g. QoS Sustainability Analytics | TSG#106 (December 2024) |  |
| TS 23.503 | Potential updates to add NTZ assistance information | TSG#106 (December 2024) |  |
| TS 23.502 | Potential updates to enhance NEF services | TSG#106 (December 2024) |  |
| TS 23.401 | Potential updates related to NTZ | TSG#106 (December 2024) |  |

# 6 Work item Rapporteur(s)

Primary Rapporteur: LaeYoung Kim (LG Electronics), laeyoung.kim@lge.com

Secondary Rapporteur: Shabnam Sultana (Ericsson), shabnam.sultana@ericsson.com

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

The following aspects involving other WGs may arise related to this WID:

- Security aspects

- RAN aspects

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| AT&T |
| Broadcom |
| BT |
| CATT |
| China Mobile |
| China Unicom |
| Ericsson |
| FirstNet |
| Futurewei |
| HiSilicon |
| Huawei |
| InterDigital |
| Lenovo |
| LG Electronics |
| LG Uplus |
| Lockheed Martin |
| Qualcomm Incorporated |
| SHARP |
| TNO |
| Verizon |
| vivo |
| ZTE |