3GPP WG-SA2 Meeting #153E S2-220xxxx

E-meeting, 10-14 October 2022 (revision of S2-220xxxx)

**Source: OPPO, Samsung**

**Title: New WID on System support for AI/ML-based Services**

**Document for: Approval**

**Agenda Item: 10.3**

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:** System Support for AI/ML-based Services

**Acronym:** AIMLsys

**Unique identifier:** TBD

**Potential target Release:** Rel-18

# 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 |  |
| No | X |  |  |  |  |
| Don’t know |  |  | X |  | 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

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) |
| AMMT | SA WG1 | 920037 | [AI/ML model transfer in 5GS](https://www.3gpp.org/DynaReport/WiCr--920037.htm) |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 860009 | Study on traffic characteristics and performance requirements for AI/ML model transfer in 5GS | SA1 Release 18 study of use cases and potential performance requirements for 5G system support of Artificial Intelligence AI/ML model distribution and transfer (download, upload, updates, etc.), and identification of traffic characteristics of AI/ML model distribution, transfer and training for various applications, e.g. video/speech recognition, robot control, automotive, other verticals |
| 940071 | Study on System Support for AI/ML-based Services | Antecedent Stage 2 study item |

# 3 Justification

The AMMT study (AI/ML Model Transfer) in stage-1 has been completed and it is related to how the 5GS supports the transmissions of AI/ML-based services over the application layer. The study addresses use cases and potential performance requirements for 5G system support of application layer Artificial Intelligence (AI)/Machine Learning (ML) model distribution and transfer (download, upload, updates, etc.), and identifies traffic characteristics of AI/ML model distribution, transfer and training for various applications, e.g. video/speech recognition, robot control, automotive, other verticals. Crucially, many of these requirements assume application AI/ML service support at the application client running on the UE, which is currently not specified for the 5GS: while Rel-17 5GS plans to support AI/ML training and inference within the 5GC via NWDAF for network automation purposes, there is no 5GS transport solutions to support for device-based application AI/ML training or inference services. Hence, an evolution of the 5GS is required to provide intelligent transmission support for application AI/ML-based services as proposed in the AMMT study.

The intent of this work item is to complete the normative work based on the conclusions of the study on 5GS architectural and functional extensions so that service providers can leverage 5GS as the intelligent platform to assist the Application AI/ML service operation.

# 4 Objective

The intent of this work item is to implement the conclusions of the Rel-18 study on the 5GS architectural and functional extensions to enable 5GS as the intelligent platform to assist the Application AI/ML service operation. The conclusions of the study, as described in clause 8 of TR 23.700-80, that lead to the normative work are focusing on 7 key aspects of the 5GS extensions:

* Monitoring of network resource utilization to support the Application AI/ML operations
* Exposure of 5GC information to UE

NOTE: SA WG1 feedback on exposure of network information to the UE and security analysis by SA3 will be taken into account before the conclusion of this Key Issue.

* Expsoure of 5GC information to authorized 3rd party for Application AI/ML operations
* Enhancement of external parameter provisioning in 5GC to assist the Application AI/ML operations
* Enhancement in 5GC to enable Application AI/ML traffic transport
* Enhancement of QoS and Policy control to support Application AI/ML data transport over 5GS
* Enhancement to 5GS to assist the Application Federation Learning operation

# 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 |
| TS | 23.xxx | Architecture enhancements for 5G System to assist application AI/ML-based services | TSG#98 (Dec. 2022) | TSG#99 (Mar. 2023) | David Gutierrez Estevez, Samsung, d.estevez@samsung.com |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 23.501 | Improvements to 5G architecture | TSG#99(March 2023) | impacts tbc according to conclusions |
| 23.502 | Improvements to 5G procedures | TSG#99(March 2023) | impacts tbc according to conclusions |
| 23.503 | Improvements to 5G policies | TSG#99(March 2023) | impacts tbc according to conclusions |
| 23.288 | Improvements to 5G Network Analytics  | TSG#99(March 2023) | impacts tbc according to conclusions |

# 6 Work item Rapporteur(s)

Tricci So, OPPO, tricci.so@oppo.com, Primary Rapporteur

David Gutierrez Estevez, Samsung, d.estevez@samsung.com, Secondary Rapporteur

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Alignment with relevant requirements from SA1 normative work on traffic characteristics and performance requirements for AI/ML model transfer in 5GS, if any.

Coordination is expected with SA4 in the context of communication between AI/ML model user and provider.

Coordination is expected with SA3 to support security, privacy integrity and user consent issues.

Any Charging and OAM aspects are to be addressed in SA5.

Coordination may be required with SA6 for specific application aspects.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| OPPO |
| Samsung |
| Vivo (?) |
| Xiaomi (?) |
| Tencent (?) |
| Toyota (?) |
| Matrixx Software (?) |
| AT&T (?) |
| Convida Wireless (?) |
| China Unicom (?) |
| SK Telecom (?) |
| KT (?) |
| LG Uplus (?) |
| ETRI (?) |
| NTT DoCoMo (?) |
| China Telecom (?) |
| OnePlus (?) |
| Xidian University (?) |
| Shanghai Jiao tong University (?) |
| Interdigital (?) |
| LG Electronics (?) |
| CAICT (?) |
| DENSO (?) |
| Panasonic (?) |
| Rakuten (?) |
| ZTE (?) |
| Telefonica (?) |
| BT (?) |
| Intel (?) |
| China Mobile (?) |
| Alibaba (?) |
| Fujitsu (?) |
| Charter (?) |
| Inspur (?) |
| Harman (?) |
| Saankhya Labs (?) |
| Oracle  |
| TCL (?) |
| Tejas Networks(?) |
| Zhejiang Lab (?) |
| Verizon (?) |
| ZEKU (?) |
| IIT Bombay (?) |
| Purple Mountain Laboratories (?) |
| Reliance Jio (?) |
| DISH Network (?) |
| Nokia (?) |
| Nokia Shanghai Bell (?) |
| Telus (?) |
| Charter Communications (?) |
| Telcom Italia (?) |