

Samsung view on Release 19

SA Rel-19 Workshop

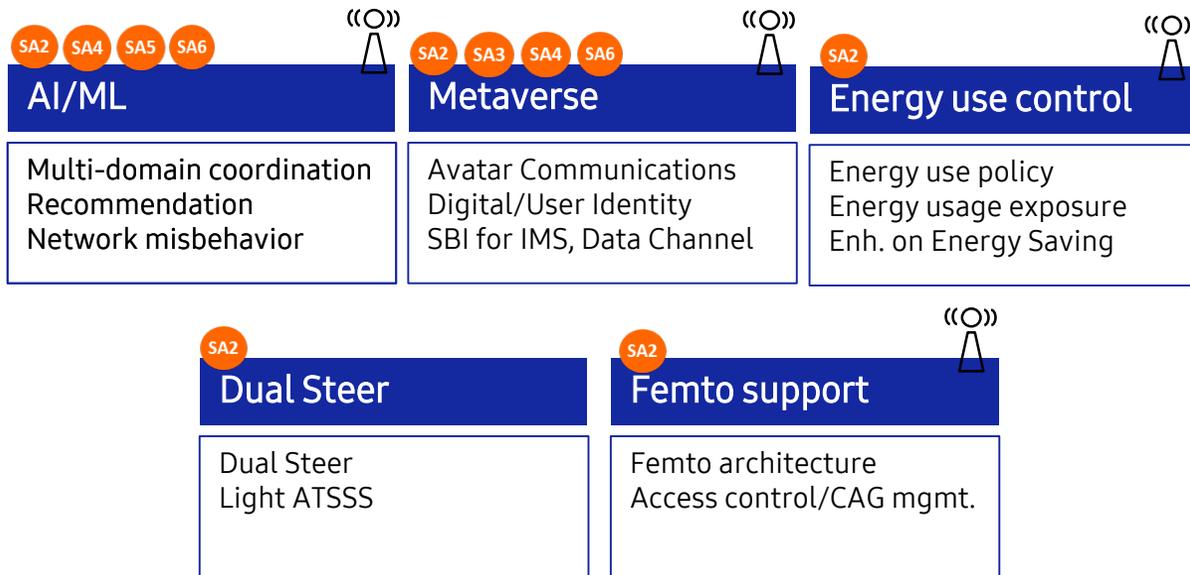
SAMSUNG

Samsung Principles for Rel-19 Content Definition

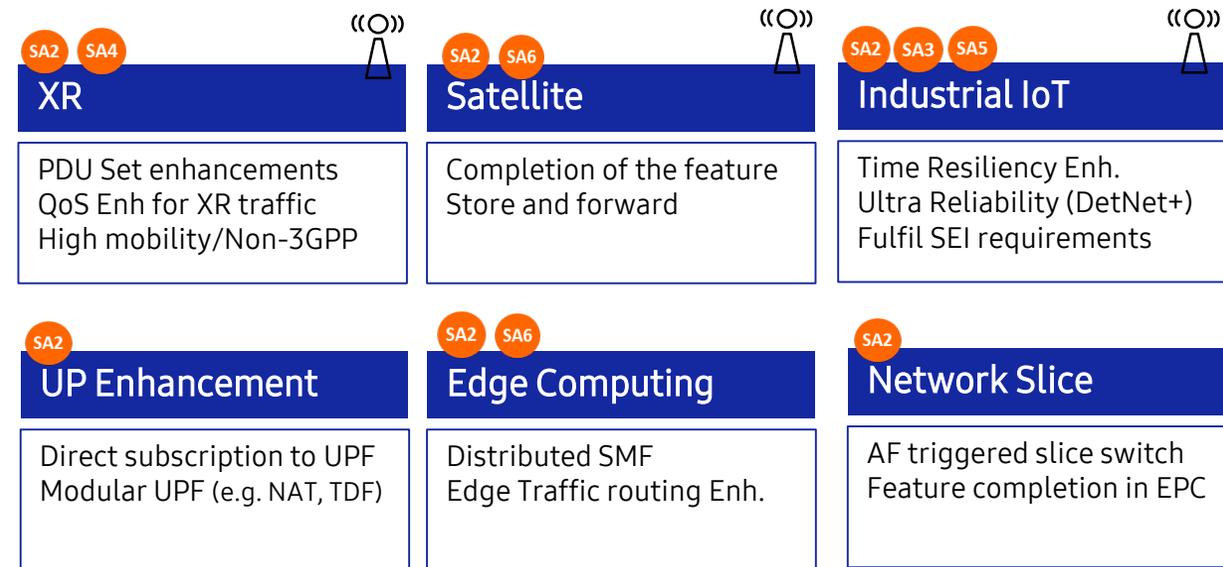
1. Release 19 should focus on completing the advanced 5G to accomplish end-to-end functionalities including Core and RAN support.
2. Advanced 5G should also address market requirements to create new 5G business opportunities.
3. SA should pursue 2 phase approval i.e. 1st package (SA#101), 2nd/final package (SA#102).
4. SA WGs should be willing to drop uncompleted components at the end of study and normative phase as need to avoid extension beyond the Stage 2 freeze date.
5. Rel-19 scope should be defined to have adequate TU buffer to ensure the completion of Rel-19 work on schedule.
6. The limitation of total numbers of items is useful for efficiency and meeting planning.
7. Small items driven by operator's industry requirements can progress as TEI-19 items, in addition to the agreed packages.

Samsung SA Priorities for Rel-19

Features driven by new R19 requirements



Improvements of 5G-Adv features



↑ high
low ↓

- SA2 Architecture
- SA3 Security and privacy
- SA4 Media format and protocol
- SA5 OAM and charging
- SA6 Application enablement

((O))
RAN dependency

NOTE: Samsung's selection of top items are presented with re-arrangement of SA2 item proposals

- by selecting the original proposal or
- by merging the alternative proposals with similar motivation or
- by adding a few key objectives based on the industry and related SA1 requirements

Samsung Rel-19 Topics (SA2)

5G Core Support for AIML

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
1	Enhanced 5G Core Support for AI/ML [See slide A.1 for more details]	<p>It has now become essential to specify interworking and coordination of cross-domain AI/ML functionalities in the standard given the widespread support for AI/ML across 3GPP WG. In addition, extensions to 5GC recommendations leveraging the AI/ML framework are proposed along new capabilities to enhance the robustness and resilience of the 5GC by addressing potential network “misbehavior” use cases.</p> <p>Key Work Tasks includes defining -</p> <ol style="list-style-type: none"> 1. Architecture extensions for coordination of cross-domain AI/ML functionalities^{1,2,3,4,5}: i.e. support for 5GC-UE and 5GC-RAN AI/ML related exposure and collaboration, and MTLF-MDAS collaboration 2. Architectural and functional extensions to support AI/ML-based 5GC recommendation capabilities^{1,2} 3. Extensions for prediction, detection, prevention and mitigation of network misbehavior, e.g. abnormal NF behavior, performance degradation, signaling storm, operational conflict, etc.^{1,2,6} 	-	SA2	Yes, major for cross-domain AI/ML	SA4 for support of UE-based operation SA5 for AI/ML related to OAM SA6 for application aspects of AI/ML

References to new SIDs submitted to SA2#157 with contents overlapping with proposed Key Work Tasks:

¹S2-2306474, ²S2-2306462, ³S2-2306425, ⁴S2-2306633, ⁵S2-2306540, ⁶S2-2306550

Metaverse

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
2	Architecture enhancement for 5G Mobile Metaverse [See slide A.2 for more details]	<p>In SA1, Rel-19 FS_Metaverse (TR 22.856) has studied the feasible use cases of localized mobile metaverse services and its requirements. There are several use cases such as Localized Mobile Metaverse Service, Metaverse Conference with user's digital identity, Spatial Mapping and Localization Service Enabler, and Avatar Communications (see clause 5.1, 5.3, 5.5, and 5.11 of TR 22.856, 1.0.0) that requires system architecture enhancements for 5G system to support Mobile Metaverse services.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Enhancements for supporting avatar communications including Transition between video and avatar media considering UE capability, network condition and QoS management 2. Enhancements for supporting Digital Identity Authentication including User authentication and its exposure to AF. 3. Enhancements for supporting End-to-End QoS Control for Mobile Metaverse services in e2e manner 4. Architecture enhancement for supporting IMS Data Channel without accompanying audio/video media in an IMS session [S2-2306827]) 5. NRF support for IMS nodes the SBI between CSCF to AS and exposure service to 3rd party AF/AS [S2-2307275] and [S2-2306443] 	TR 22.856 - "Study on Localized Mobile Metaverse Services"	SA2	Yes	SA3 for security and privacy aspects SA4 for media aspects for avatar communications SA6 for application enabler aspects

Energy use control

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
3	Energy use control and efficiency (See slide A.3 for more details)	<p>Enhancement for enabling energy use control and improving efficiency will be an important issue for 5G advanced network. SA1 has identified requirements for energy use control and scenarios. The study is proposed to support supervision of services in the network in an energy-aware manner, with ensuring the services offered as per intended service requirement set by service providers, network operators or subscribers.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Investigate architectural impacts to support energy use control, e. g., introducing policies for energy use such as maximum energy rate control and credit management^{1,2} 2. Study functional extensions to enable energy as a service characteristic, e. g., support requesting and reporting of energy use, assistance information (e. g. analytics), energy use policy, etc.^{1,2} 3. Study necessary enhancement to support energy efficiency and/or savings functions defined in other groups (RAN3 and SA5)^{1,2,3} 	TR 22.882 - "Study on Energy Efficiency as service criteria"	SA2	Yes, - RAN3	Potential, - SA5 for OAM and charging aspect

References to new SIDs submitted to SA2#157 with contents overlapping with proposed Key Work Tasks:

¹S2-2307218, ²S2-2306500, ³S2-2306893

Satellite

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
4	Study on Satellite access Phase 3.	<p>Based on SA1 requirements, enhance the system architecture to support store and forward mechanism when the feeder link is unavailable. Further, study enhancements to improve performance of emergency service and disaster roaming for satellite access.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Study mechanisms to support disaster roaming and improve emergency service using satellite access 2. Study mechanisms to support store and forward mechanism in 5G system, mobility enhancements and power saving, when feeder link is unavailable. 3. Study mechanisms to support enforcement of mobility restrictions between different RAT types of satellite accesses. 4. Study standard mechanism to provide satellite coverage availability information (SCAI) to the AMF. 5. Study standard mechanism to provide satellite coverage availability information (SCAI) to the UE and determine further enhancements to accurately determine unavailability period for the UE. 	TR 22.865 - "Study on satellite access - Phase 3"	SA2	Yes	

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
5	Architecture enhancement for XR and media services phase 2.	<p>In R18, SA2 has started the normative work for architecture and technology enhancement for XR and media service. But time is limited so some aspects do not have enough time to be discussed. In Rel-19, there is a necessity to continue the work for further supporting the XR and media service, e.g. enhancement on multimodality support to user plane updates and XRM feature enhancement considering tethering situation.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Enhancement for PDU Set handling 2. QoS handling enhancement for XR and media service. 3. Further enhancement to support non-3GPP access (e.g. for supporting L4S). 4. Enhancement to support high mobility and large capacity of XR and media service. 	TR 22.847, TR 22.856	SA2	Yes,	SA4 for RTP enhancements

Dual Steer

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
6	Access Traffic Steering, Switching and Splitting support in the 5G system architecture; Phase 4	<p>The DualSteer work item in SA1 defines new scenarios where ATSSS supports traffic steering, splitting, and switching across two 3GPP accesses. These accesses could be of the same type, e.g., NR-NR or NTN-NTN via LEO/GEO or of different types, e.g., LTE-NR or TN-NTN.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Study how an MA PDU Session can be supported with two 3GPP accesses (e.g. LTE or NR) and one non-3GPP access. [S2-2307116 WT#1] 2. Study the architectural and procedural enhancements needed to support "Simultaneous registration to 5GC via Multiple NR accesses" for a UE. The UE can be registered to a single PLMN, to a single SNPN, to two different PLMNs or SNPNS, or to one PLMN and one SNPN. The UE may in addition be registered via one non-3GPP access to 5GC. [S2-2306838 WT#1] 3. Study how to support UE mobility between 5GS and EPS when 5GS supports "Simultaneous registration to 5GC via Multiple NR accesses" and EPS supports UE attach via only a single LTE access. [S2-2306838 WT#2] 4. Define new architecture for Lightweight Access Aggregation and Steering of Wi-Fi in 5GC not based on TNGF/N3IWF [S2-2306691] 	TR 22.841 - "Study on Upper layer traffic steering, switching and split over dual 3GPP access"	SA2	Don't Know	No

Industrial IoT+

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
7	Advanced Industrial Internet of Things	<p>It is proposed to have a Rel-19 study item to continue resolving the existing challenges for industrial IoT including 5GS enhancement for industries.</p> <p>Key Objectives from SIDs [S2-2307093, Huawei] and [S2-2307358/6851, Nokia]</p> <ol style="list-style-type: none"> 1. How to improve efficiency of transmission capacity and the URLLC performance (lower latency and higher reliability) in the industry scenario 2. How to support time synchronization service for ad-hoc cooperative group and service assurance for high accuracy time synchronization service 3. How to support integration of 5G VN and legacy LAN, how to integrate 5GS and Ethernet configuration and IP routing support <p>Key Objectives from SA1 requirements and leftover from GMEC</p> <ol style="list-style-type: none"> 4. How to enable support for dynamic routing among multiple SMF domains 5. How to enable support for SEI requirements that are not implemented in Rel-18, specifically exposure of specific information regarding UE status, as per the SA1 requirements. 	TS 22.104, TS 22.261	SA2	Yes, Minor/Alignment	SA3 for security, SA5 for charging, RAN2/3 for synchronization and URLLC enhancement

User Plane Enhancement

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
8	UPF enhancement for Exposure and SBA Phase 2.	<p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Study enhanced UPF event exposure service(s) that would support QoS related information exposure to AF/NEF and NWDAF for XRM, AIML, direct subscription to UPF for a UE or PDU Session. 2. Study modular design and deployment of user plane, including <ul style="list-style-type: none"> - Supporting design of new modules/functions, e.g. data storage, and data processing. - Supporting splitting of existing UPF modules/functions e.g. NAT, application detection. 3. Study enhancing the interface between UPF and AF by using User Plane (UP) based SBI, e.g. in-band control signalling between UPF and AF via N6. 	-	SA2	No	-

Edge Computing

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
9	Enhancement of support for Edge Computing in 5G Core network phase 3	<p>Session management for edge computing can become more efficient to address the following issues: (i) When deploying/configuring edge computing networks, this may impose huge burdens to the centrally deployed NF such as SMF, (ii) the local traffic routing can be more sophisticated to prevent non-edge traffic from going through the local network.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Reduce the impact on the central NF in operator network (e.g., impact on SMF): localized control of edge computing (EAS discovery/local routing influence, local exposure) 2. Enhance the local traffic routing for edge computing: (i) preventing all the traffic (including non-edge traffic) from travelling the edge network, and (ii) supporting to access multiple edge networks within a single PDU Session 	-	SA2	No	-

5G Femto

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
10	5G support for Femto (HgNB)	<p>SA1 has defined normative requirements for Premises Radio Access Station (PRAS) as part of the PIRates WID.</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Define the overall architecture and required functional and procedural impacts for supporting 5G Femto deployments. 2. Define the 5G Femto access control mechanism based on the existing CAG concept 3. Study how to enable provisioning of subscribers allowed to access 5G Femto cells (such as using a function like CSG Subscriber Server (CSS) specified for EPS) and how to manage 5G Femto access control by the CAG owner or an authorized administrator 	PIRates (TS 22.261)	SA2	Yes - RAN2/3	Yes, SA3 for Security, SA5 for OAM/Charging

Network Slice

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
11	Improvement of Network Slicing	<p>Towards completion of 5G network slice feature considering the operator deployment (including EPC).</p> <p>Key Work Tasks includes the following:</p> <ol style="list-style-type: none"> 1. Study whether and how to support slice re-assignment based on AF request. 2. Study whether and how to enhance the network slice handling for PDN connection in EPC to support NSSRG constraints in EPC and Network Slice Replacement in EPC [S2-2307208 WT#1b,c] [S2-2306895 WT#2] 3. Study whether and how to enhance the NSSRG to support NSSRG restriction across different access types over different PLMNs [S2-2307208 WT#3] 4. Study whether and how to support per UE network slice priorities.[S2-2307208 WT#5] 	-	SA2	-	-

A.1 5G Core Support for AI/ML

Further details on proposed objectives

1. Architecture extensions for coordination of cross-domain AI/ML functionalities
 1. Support for 5GC – UE AI/ML collaboration
 - a) Extensions to UE data collection and exposure
 - b) Support for model delivery to the UE
 - c) Support for AI-based positioning
 2. Support for 5GC – RAN data collection/exposure and model sharing
 3. Support for model sharing between MTLF and MDAS
2. Architectural and functional extensions to support AI/ML-based 5GC recommendation capabilities
 1. Support for intra-5GC recommendations, i.e. NF as consumers
 2. Support for cross-domain recommendations, i.e. RAN, UE as consumers
 3. Extensions to the 5GC AIML support framework relevant to recommendations
3. Extensions for prediction, prevention, detection, and mitigation of network misbehavior.
 1. Investigation and selection of use cases: e.g. abnormal NF behavior, mobility management, signaling storm, energy savings, etc.
 2. Architecture support for selected use case(s) above

NOTES:

- All objectives are proposed to be led by SA2
- Objectives 1.1, 1.2 and 2.2 have major dependencies with RAN WG and require corresponding RAN WG agreements
- Objectives 1.3, 2.1, 2.3 and 3 may exhibit minor dependencies with other WGs and can be agreed in SA2 without need for other WG agreements
- Objective 1.1a should consider ongoing Rel-18 work in SA4 within FS_AI4Media

A.2 Metaverse

Further details on the proposed objectives

1. Enhancements for supporting avatar communications:

- Transition between video and avatar media considering UE capability, network condition, and user preference
- QoS management for interactive avatar communication in both IMS/non IMS

2. Enhancements for supporting Digital Identity Authentication

- User authentication (e.g. biometric using UE)
- Exposure digital identity service to AF for 3rd party services

3. Enhancements for supporting End-to-End QoS Control for Mobile Metaverse services

- End to End QoS and congestion control and enforcement over various scenario (including Non-3GPP technologies)
- UE App (e.g. traffic triggered dynamic QoS Flow control)
- Traffic handling/monitoring/analytics enhancements for metaverse

4. Architecture enhancement for supporting IMS Data Channel without accompanying audio/video media in an IMS session [S2-2306827, “NG-RTC Ph2”]

5. Study of using SBA principle for IMS modes for discovery and selection of IMS nodes using NRF and interface between CSCF to AS and exposure service to 3rd party AF/AS [S2-2307275, S2-2306443]

A.3 Energy use control

The study, following the SA1 study 'FS_EnergyServ', aims to enable efficient energy use control as per the energy requirement of the services for a particular UE(s), network operators' policies and third party service providers' requests without degrading the QoS or experienced performance of the provided service.

※ NOTE: Previous studies on energy efficiency in RAN WGs focused on reduction of transmission (energy) cost per bit, while the proposed study is to consider requirement for a service that are consumed by a particular UE or a group of UEs. (e.g., Transmission of non-critical notification messages for a UE at a cell edge may be regulated based on the agreed energy use policy with service providers or subscribers)

Further details on proposed objectives

1. Investigate architectural impacts to support energy use control

- a) Identify scenarios for energy use control in relation to the requests from the service providers, network operators, subscribers or etc., that can be based on different granularities, for example: for a particular UE or a group of UEs, at the granularity of a network slice, a PDU session, or a QoS flow
- b) Investigate architectural impacts to support energy use control, e. g., introducing policies for energy use such as maximum energy rate control and credit management.

2. Study functional extensions to enable energy as a service characteristic

- a) Define enhancements to facilitate efficient energy use control, based on, e. g., UE energy profiles, assistance information (e.g. analytics), etc.
- b) Specify enhancement on the existing network information exposure capabilities to support requesting and reporting of energy use at the granularities above to a subscriber or to a (third party) service provider.
- c) Define functional extensions to support enforcement of policies for energy use, e.g. maximum/minimum energy use rate, total energy consumption.

3. Study necessary enhancement to support energy efficiency and/or savings functions defined in other groups (RAN3 and SA5)

Samsung Rel-19 Topics (SA6)

METAAPP

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
1	Study on Application enablement for Localized Mobile Metaverse Services	<p>Study requirements (from SA1 and possible other SDO) for overall application framework/enabling layer platform architecture to support localized mobile metaverse services in 3GPP specified networks, including the interactions between UE and application enablement layer including (non-exhaustive):</p> <p>Key Work Tasks includes defining the following:</p> <ol style="list-style-type: none"> 1. Application enablement and management of avatars/alter egos; 2. Application enablement and management of spatial anchors; 3. Support for Spatial mapping and localization service 4. Enhancements to application discovery for metaverse applications; 5. Enhancements to service continuity for metaverse application; 6. Support for communication for users with disabilities; 	SA1 TR 22.856 - "Study on Localized Mobile Metaverse Services"	SA6	No	SA2 – for system aspects SA3 – for security aspects SA4 – for media aspects SA5 – for management aspects

5GSAT_APP

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
2	Study on application enablement for Satellite access enabled 5G Services	<p>Based on SA1 Satellite access requirements in Rel-17 (TS 22.261) and SA2 specified architecture and solutions in Rel-17/18, SA6 needs to adapt and enhance 5G vertical application enablers (e.g. V2X, UAS), enabler frameworks (e.g. SEAL, EDGEAPP) and Mission Critical services to work over both terrestrial and Satellite 3GPP networks:</p> <p>Key Work Tasks includes –</p> <ol style="list-style-type: none"> 1. Identify the impacts and the necessary changes to the SA6 enabler specifications for supporting satellite access. 2. Identify key issues and solutions to support multiple services using satellite access for capabilities identified below (not exhaustive list): <ul style="list-style-type: none"> - i. Application Group spanning Users/UEs under terrestrial and non-terrestrial coverage i.e. with heterogeneous connectivity - ii. User/UE mobility across terrestrial and non-terrestrial coverage, impacting latency and QoE/QoS - iii. AF influence in selection and establishment of suitable satellite access 3. Potential new deployment models for SA6 enablers due to satellite access integrated 5G System. 4. Application Enablement enhancements from Rel-19 such as supporting store and forward, data transfer for IoT devices, UE-satellite-UE communication etc. 	<p>SA1 R17 TS 22.261 - Integration of Satellite Access in 5G (5GSAT)</p> <p>R19 TR 22.865 - "Study on satellite access - Phase 3"</p> <p>SA2 R17 Integration of satellite systems in the 5G architecture (5GSAT_ARCH)</p> <p>R18 5GC/EPC enhancement for satellite access Phase 2 (5GSAT_Ph2)</p>	SA6	No	<p>SA2 – for system aspects</p> <p>SA3 – for security aspects</p> <p>SA5 – for management aspects</p>

EDGEAPP

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
3	Architecture for enabling Edge Applications Phase 3	<p>3GPP SA6 within its Rel-17 work on TS 23.558 defined the overall application layer architecture to enable edge applications over 3GPP networks. In Rel-18, the Edge Enabler Layer (EEL) architecture enhanced to support industry requirements (e.g. GSMA OPG) and complete those functionalities that were not fully specified in Rel-17. It was also required to evaluate further alignment with ETSI MEC and GSMA OP architectures.</p> <p>Rel-19 Enhancements to architecture (and related procedures and IEs) for enabling Edge applications for the following (non-exhaustive):</p> <ol style="list-style-type: none"> 1. Multi-AC scenario for Common EAS 2. Discovery of a common EAS from federated partners 3. Dynamic EAS instantiation in ENS 4. Bundled EAS in federation and roaming 5. Additional scenarios in federation and roaming 6. Support exposure of EAS Service APIs across multiple EDNs 7. Service continuity for common EAS and Edge Node Sharing 	NA	SA6	No	<p>SA2 – for system aspects</p> <p>SA3 – for security aspects</p> <p>SA5 – for management aspects</p>

AIML_APP

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
4	Study on application layer support for AI/ML services	<p>SA1 Rel-18 identified requirements (in TS 22.261) for the support of AI/ML model distribution, transfer, training for various applications (e.g., video/speech recognition, robot control, automotive) and has ongoing Rel-19 study on the ph2 for supporting Distributed AI training/inference based on direct device connection. Such use cases and requirements have application layer impacts but were not tackled in Rel-18.</p> <p>Key Work Tasks includes defining the following:</p> <ol style="list-style-type: none"> 1. Study new or enhanced SA6 enablers for supporting AI/ML service enablement. ^{1,2} <ol style="list-style-type: none"> I. Support for federated learning, e.g. QoS mapping, Member assistance, Group management II. Support for various modes of split inferencing/learning, model distribution III. Investigate possible impacts of application layer support for AI/ML services for different deployments and business models, including also interworking with non-3gpp systems. IV. Study gaps in consuming the AIML capabilities enabled in 5GC. 2. Study to enable the AI/ML operations over Edge using EDGEAPP, e.g., assistance in model deployment in federated learning. 	<p>SA1 R18 (AIML_MT): TS 22.261, Rel-18 SA1 work on traffic characteristics and performance requirements for AI/ML model transfer in 5GS.</p> <p>R19 (FS_AIML_MT_Ph 2): Rel-19 SA1 study on performance requirements for AI/ML model transfer in 5GS for distributed scenarios (UE-to-UE).</p>	SA6	No	<p>SA2: Leverage 5GC support (Rel-18 and Rel-19) for AIML based services.</p> <p>SA3: For User privacy aspects in model transfer and training.</p>