



# View on 3GPP SA Release 19

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# Outline

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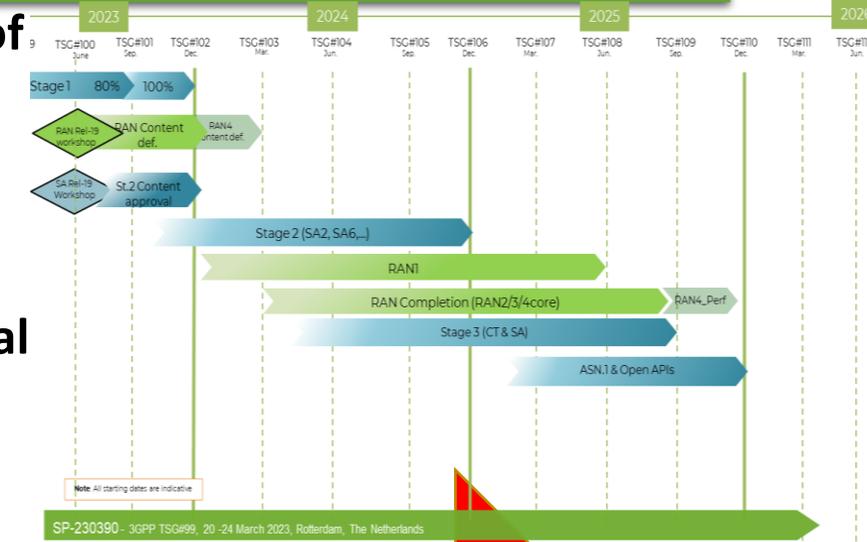


# Release 19 and 5G Advanced

## Release 19 as the second release of 5G Advanced to fulfil the promise of advanced features and capabilities

- Release 19 could possibly be the start of the 5G tail-end before the 6G studies commence in 3GPP
- Focus should be to make 5G Advanced more useful and commercially attractive

## A small number of major new/upgrading features with clear commercial targets are preferred over many continuing items



### PERFORMANCE IMPROVEMENTS

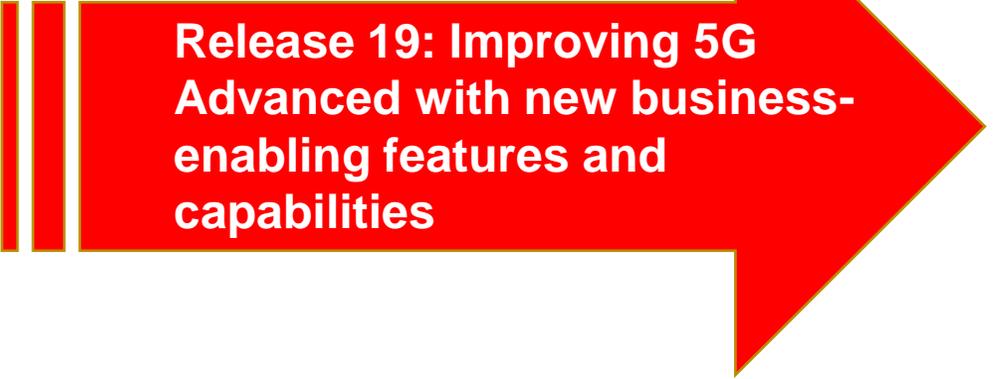
Advanced DL/UL MIMO	Enhanced multi-carrier operation & Enhanced mobility	Enhanced sidelink, sidelink relay enhancement and UE aggregation	Mobile integrated access/backhaul (IAB), network-controlled repeaters	Evolved duplexing	Time Sensitive Communication
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### BETTER MANAGEMENT AND GREATER EFFICIENCY

AI/ML data-driven designs	Operation & Maintenance Architecture and Management Functions	Autonomous Networks
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### ENHANCEMENT FOR SPECIFIC USE CASES

Edge computing	Expanded positioning	Extended Reality (XR)	RedCap Evolution	Drones & enhanced satellite connectivity	Multicast
NR<5MHz & Additional spectrum bands	Personal IoT Network	Vehicle mounted relay	Non public networks	Enhanced support for IoT, industrial IoT and URLLC	Mission-critical services





# Overall View on Rel-19 Content (Not in Prioritized Order) 1 of 2

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
	<b>Integrated Sensing &amp; Communications</b>	See slide 6 for details	Yes, TR22.837 / TS 22.xxx	SA2	Yes	SA3 for security, SA5 for charging
	<b>Ambient IoT</b>	See slide 7 for details	Yes, TR 22.840 / TX22.xxx	SA2	Yes	SA3 for security, SA5 for charging
	<b>XRM plus Metaverse</b>	See slide 8for details	Yes, TR 22.856 / TS 22.xxx	SA2	TBD	SA3 for security, SA5 for charging Coordination with SA4, SA6, SA6 for service enabler layer
	<b>AI/ML plus Analytics</b>	See slide 9 for details	Yes, TR 22.876 / TS22.261	SA2	Yes	SA3 for security, SA5 for charging
	<b>UAV</b>	See slide 10 for details	Yes, TR 22.843 / TS22. 125	SA2	Yes	SA3 for security, SA5 for charging, SA6 service enabler layer for UAS.



# Overall View on Rel-19 Content (Not in Prioritized Order) 2 of 2

S.NO.	Title	Brief Description and Key Objectives	Related Stage-1 Study/Work Item	Lead Stage-2 WG	RAN dependencies	Other WG dependencies
	<b>MEC enhancements</b>	Support enhanced traffic steering, edge discovery based on server affinity, improved network management and EC service management	No	SA2	No	SA3 for security, SA5 for charging
	<b>NTN support (Satellite)</b>	Support for the new uses cases and requirements as introduced in SA1	Yes, TR22.865 / TS22.261	SA2	Yes	SA3 for security, SA5 for charging
	<b>URLLC and Timing</b>	Continue work on Time Synchronization optimizations, and enhancements to support IIoT and applications with stringent latency, reliability or redundancy requirements	No	SA2	Yes	SA3 for security, SA5 for charging
	<b>ATSSS/DualSteer</b>	Enhance 5G system architecture to support two simultaneous access paths	Yes, TR22. 841 / TS22.261	SA2	No	SA3 for security, SA5 for charging
	<b>User Identifiers in the 5GS</b>	Enhance 5G system to enable support of user identities such that operators can provide improved user experience by utilizing the user identities	Yes, TR22.904	SA2	No	SA3 for security



# Integrated Sensing and Communication ( ISAC )

Key Areas	Potential Items to Study
ISAC system architecture	Enhance existing architecture to support new ISAC service.
Sensing service management	New procedure for ISAC Service creation, activation, authorization, configuration, modification, so on.
NEF extension for interaction with AF for ISAC	How sensing result and/or sensing analytics data are requested and/or provided to 3rd party applications?
ISAC QoS and its related resource management	New ISAC Policy and enhancement of network resource management to support ISAC.
Seamless Sensing service and mobility	How to support seamless sensing when tracked target moving between networks.
Sensing security and privacy consideration	



# Ambient IoT

Key Areas	Potential Items to Study
5G System architecture enhancement to support Ambient IoT	Architecture enhancement for Ambient IoT, alignment with RAN WG on different deploy models and topologies.
Evaluate and enhance some procedures for simplification and optimization for Ambient IoT	Are current procedures simplified and efficient enough to support no-power or ultra-low power Ambient IoT device?
Ambient IoT device provisioning and configuration	How to provision and configure Ambient IoT device?
LCS and ranging support for ambient IoT	How to positioning an or group of Ambient IoT device(s)
Ambient IoT device management	How to manage (activate/deactivate/discover) Ambient IoT Device, including group of Ambient IoT device efficiently?
Authentication, Security and privacy support	

# XRM and Metaverse

Key Areas	Potential of Items to Study
Classification of fully encrypted media packets	A significant portion of application traffic is E2E encrypted and even media/application headers are encrypted in some protocols like QUIC and RTP-cryptex. Classification in 5GC with no exposed application headers should be studied.
Multimodal Services	Multiple flows of a multimodal service are coordinated in time. Coordinated flow handling in the user plane can improve overall application experience with good performance and low configuration overhead and should be studied further.
Extended PDU set classification	Extend PDU set classification to support complex encoding of scenes (e.g., regions, viewpoints, static vs. dynamic images, etc.), consideration for FEC/compression/acceptable error rates and different prioritization based on other application preferences.
UE mobility and media stream QoS	XRM and mobility considerations have not been studied in Rel 18. Sustaining high throughput and low latency when a UE moves from one gNB to another needs to be studied.
Interaction of PDU Set handling and application feedback loop	Packet loss, ECN marks, jitter, timestamps are currently used to estimate RTT and packet pacing. However, PDU set drops may impact how server estimates packet pacing. Study how E2E feedback with PDU set drops can be used for optimal packet pacing.

# AI/ML and Network Analytics

Key Areas	Potential Items to Study
Towards AI-native 5G network with FL	FL techniques among NWDAFs to generate 5GC Analytics can be extended among NFs where FL server is an NWDAF instance on 5GC but FL clients are other NFs. How 5GC NFs can be enhanced with ML model training functionality such that they can participate in FL?
NWDAF-UEs FL	FL techniques among NWDAFs to generate 5GC Analytics can be extended among UEs where FL server is an NWDAF instance on 5GC but FL clients are other UEs. How FL client UEs to participate FL are selected by the 5GC?
Vertical FL	How Vertical FL techniques can be performed? The local data set in different FL client NFs/UEs/NWDAFs can have different feature space and different samples.
ISAC and eNA (if Rel-19 scope allows)	How NWDAF Analytics IDs can be enhanced based on sensing data? UE related and location accuracy Analytics IDs can be enhanced, and/or new Analytics IDs can be introduced based on the sensing information (UE based and Non-UE based) with parameters such as target's location, target's velocity, target's motion trajectory, UE's or base station Channel state information. How sensing data could be processed and translated to sensing data analytics such that ISAC services are enhanced with AIML capability?

# UAV/UAS

- Continue UAS work as market demand for connected UAS is increased and more 5G enhancements to meet the new demand and regulatory requirements are required.
- Potential study areas:
  - Multi-networks support for the reliability and performance assurance of UAS user and C2 traffic.
  - Further optimization of UAS identification, DAA and traffic management as identified by SA1 work.
  - Potentially leverage Integrated Sensing and Communication feature for UAS work.

# Summary

 **Rel-19 to make 5G Advanced more useful and commercially attractive**

## New 5G Advanced Use Cases

- Integrated Sensing and Communication
- Ambient IoT

## Enhanced 5G Advanced Features

- XRM plus Metaverse
- AI/ML plus Analytics

 **A small number of major new/upgrading features with clear commercial targets are preferred over many continuing items**

## Enriching 5G Features and Capabilities

- MEC enhancements
- NTN support (Satellite)
- UAV
- URLLC and Timing
- ATSSS/DualSteer
- User Identifiers in the 5GS
- Etc.