**3GPP TSG SA WG4#115eS4-211174**

**E-meeting, 18th – 27th August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
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|  | **26.804** | **CR** |  | **rev** |  | **Current version:** | **0.4.1** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Network Slicing Extensions for 5G Media Streaming | | | | | | | | | |
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| ***Source to WG:*** | Samsung Electronics Co. Ltd, Qualcomm Incorporated, BBC | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_5GMS\_EXT | | | | |  | ***Date:*** | | | 10th August 2021 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | Add new topic on network slicing extensions for 5G media streaming | | | | | | | | |
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| ***Summary of change:*** | | Discussion about areas for specification concerning aspects related to network slicing in 5G media streaming | | | | | | | | |
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| ***Consequences if not approved:*** | |  | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Changes against TR 26.804 | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **First Change** |

[A] 3GPP TS 28.530: "Management and orchestration; Concepts, use cases and requirements".

[B] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[C] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[D] 3GPP TS 28.533: "Management and orchestration; Architecture framework".

[E] 3GPP TS 28.540: "Management and orchestration; 5G Network Resource Model (NRM); Stage 1".

[F] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[G] 3GPP TS 28.542: "Management and orchestration of networks and network slicing; 5G Core Network (5GC) Network Resource Model (NRM); Stage 1".

[H] 3GPP TS 28.543: "Management and orchestration of networks and network slicing; 5G Core Network (5GC) Network Resource Model (NRM); Stage 2 and stage 3".

[I] 3GPP TS 28.545: "Management and orchestration; Fault Supervision (FS)".

[J] 3GPP TS 28.546: "Management and orchestration of networks and network slicing; Fault Supervision (FS); Stage 2 and stage 3".

[K] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[L] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[M] 3GPP TS 23.434: " Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows ".

[N] 3GPP TS 23.700‑99: " Study in Network slice capability exposure for application layer enablement (NSCALE)".

[O] 3GPP TS 29.520: " 5G System; Network Data Analytics Services; Stage 3".

[P] 3GPP TR 23.700-40: "Study on enhancement of network slicing; Phase 2".

[Q] 3GPP TS 26.531: “Data Collection and Reporting; General Description and Architecture”.

[R] 3GPP TR 26.802: "Multicast Architecture Enhancement for 5G Media Streaming".

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| **Next Change** |

## 5.X Network Slicing Extensions for 5G Media Streaming

### 5.X.1 Description

#### 5.X.1.1 Overview

Network slicing standardization has progressed in 3GPP in sub working groups of both the SA and RAN groups. In particular, network slicing standardization that is relevant to our work in 3GPP SA4 has been specified in the SA2, SA5, SA6, and CT3 sub working groups.

3GPP SA2 specified network slicing related standardization in the following technical specifications:

- TS 23.501 [23]: In this TS, SA2 specified network slicing concepts such as identification and selection of network slice (S-NSSAI and NSSAI), standardized SST values, Network slicing subscription aspects, UE NSSAI configuration and NSSAI storage aspects, network slicing support for roaming, interworking with EPS, network slice-specific authentication and authorization, network slice admission control etc.

- TS 23.502 [24]: In this TS, SA2 specified procedures related to network slicing such as network slice-specific authentication and authorization procedure, network slice admission control function procedures, network slice admission control support for roaming, network slice admission control function (NSACF) services etc.

While 3GPP SA2 has specified architectural concepts about using network slices, 3GPP SA5 has specified the architecture, provisioning, and management (creation, modification, and termination) of network slices in addition to defining roles related to 5G networks and network slicing, and management models for network slicing. The network slicing related standardization specified by 3GPP SA5 can be found in the following technical specifications:

- TS 28.530 [A]: Describes general concepts such as management of 5G networks and network slicing, principles of network slicing management framework, slice profile and service profiles, and business level requirements

- TS 28.531 [B]: Describes requirements such as creation, modification, activation, deactivation of network slice instances. network slice subnet instances, and 3GPP NF instances. Operations for management of network slice instances and network slice subnet instances is also specified.

- TS 28.532 [C]: Describes management and orchestration concepts such as provisioning management services, fault supervision management services, and performance assurance management services. Corresponding stage-3 management service specification is also specified.

- TS 28.533 [D]: Describes the architecture framework for management of network slicing including the architecture reference model for management interactions with NFV MANO, ZSM framework, and NWDAF

- TS 28.540 [E]: Describes 5G Network Resource Model (NRM) for NR and NG-RAN specifying aspects related to requirements for management of network slice and network slice subnets.

- TS 28.541 [F]: Describes stage-2 and stage-3 specification of 5G NRM including the information model definitions for network slice NRM such as NetworkSlice, NetworkSliceSubnet, ServiceProfile, and SliceProfile.

- TS 28.542 [G]: Describes stage-1 NRM for 5G Core Network.

- TS 28.543 [H]: Describes stage-2 and stage-3 NRM for 5G Core Network.

- TS 28.545 [I]: Describes stage-1 fault supervision aspects about management and orchestration of networks and network slicing.

- TS 28.546 [J]: Describes stage-2 and stage-3 fault supervision aspects about management and orchestration of networks and network slicing.

- TS 28.552 [K]: Describes 5G performance measurements related to network slicing instances.

- TS 28.554 [L]: Describes 5G end to end key performance indicators (KPIs) related to network slicing.

In addition to the SA2 and SA5 groups, 3GPP SA6 has specified network slicing related standardization in the following technical specifications:

- TS 23.434 [M]: Specifies the functional architecture for service enabler architecture layer (SEAL) and the procedures, information flows, and APIs for each service within SEAL in order to support vertical applications over the 3GPP system. As part of this specification, aspects related to network slice capability management is specified including procedures and information flows for network slice capability management.

- TR 23700-99 [N]: Proposes application architecture aspects solutions and enhancements to SEAL using the NSCALE application layer enablement.

Finally, some work related to network slicing has been done by the 3GPP CT3 group in the following technical specifications:

- TS 29.520 [O]: Specifies the stage-3 definition of Network Data Analytics Function Services of the 5G system. Proposes the data model for network slice information that NWDAF can provide to authorized consumers.

#### 5.X.1.2 Network Slicing Extensions in SA4

Though the 3GPP SA4 technical specifications related to 5G Media Streaming have touched upon network slicing, the standards could be significantly enhanced with further study and specification related to network slicing aspects. Some of the items currently being worked in SA4 that can be enhanced to incorporate network slicing based specification are presented below. Table 5.X.1.2-1 lists the Release-16 architecture items that can benefit from further specification on network slicing.

Table 5.X.1.2-1: Release-16 Items for further Network Slicing related specification

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| Work Items | Aspects for study related to network slicing |
| 5G Media Streaming | TS 26.501 [15] and TS 26.512 [16] have added specification text for dynamic policy. However, aspects related to network slicing and dynamic policy are not adequately addressed. TS 26.501 [15] briefly discusses dynamic policy based on network slicing for downlink streaming. Dynamic policy aspects for other use cases (media processing, uplink streaming etc.) can be studied.  Provisioning aspects on M1d interface with respect to network slicing. Study integration/interworking of management API with provisioning aspects of media services with network slicing  Aspects related to management of QoS for network slices of media services. How does QoS work with network slicing?  Aspects related to realization of media services with multiple network slices, and multi-network slice scenarios.  Realization of use cases with network slicing. |

Table 5.X.1.2-2 lists candidate list of Release-17 items that can benefit with further specification on network slicing related aspects.

Table 5.X.1.2-2: Release-17 Items for further Network Slicing related specification

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| --- | --- |
| Work Items | Aspects for study related to network slicing |
| 5GMS\_EDGE | There is minimal specification in TR 26.803 [46] related to network slicing. The TR can greatly benefit from identifying and specifying network slicing aspects related to edge computing such as below:  Use cases: Realization of current edge use cases using network slicing keeping in view the control and management aspects of network slicing architecture as standardized in 3GPP SA2 and SA5.  EAS relocation in relation to network slicing impact, architecture, and procedures for supporting EAS relocation with network slicing. |
| EVEX | SA4 has started standardization of a reference architecture for data collection and reporting in TS 26.531 [Q]. The TR can benefit from incorporating network slicing related data collection:  Study information elements and procedures related to data collection about network slices e.g., from NWDAF as specified in TS 29.520 [O] and TS 28.541 [F].  Slice optimization: Study optimizing network slice parameters for SA4 media services using metrics (analytics) collected using above method.  Editor’s Note: Possible study directions include study of how slice related data from NWDAF could be useful, who is the customer of such data, and any required API support to retrieve such data. |
| 5MBUSA | TR 26.802 [R] describes aspects related to multicast. Study can be performed to identify the relationship between 5G multicast and network slicing and answer questions such as below:  5G multicast media service using network slicing: How to realize 5G multicast and broadcast services using network slicing.  Hybrid Services: Study network slicing impact on the hybrid services key issue described in TR 26.802 [R]. Investigate whether different network slices can be used with different delivery systems for hybrid services. |
| NOTE: The scope of the EVEX Work Item does not currently include consuming analytics data from the NWDAF. | |

Editor’s Note: Study to include aspects related to network slice usage e.g., how application/OS/UE can map different application traffic to network slices.

NOTE: In general, all the items in tables 5.X.1.2-1 and 5.X.1.2-2 are listed here to present areas for further study on aspects related to network slicing. The current scope of each of these work items may not include study of network slicing aspects.

The scope of the study proposed in the above tables is not exhaustive or final. More study topics can be identified in different work areas being discussed in SA4. The study can include how existing and new use cases can benefit with the network slicing specification. However, such a study in SA4 cannot be done in isolation. Multiple study/work items are currently underway in different SA groups. It is recommended that SA4 study consider such studies and work in other groups while specifying media service level network slicing standardization. The following are some of the study/work items in other groups that may be relevant to study in SA4:

- [3GPP SA2] TR 23.700-40 [P]: Study on enhancement of network slicing; Phase 2.

- [3GPP SA6] TS 23.434 [M]: Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows.

- [3GPP SA6] TR 23.700-99 [N]: Study in Network slice capability exposure for application layer enablement (NSCALE).

NOTE: For maintaining alignment with the specifications in other groups, it is recommended that correspondence with those groups is done using standard 3GPP liaison procedures.

### 5.X.2 Collaboration Scenarios

Editor’s Note: Study collaboration scenarios between the 5G System and Application Provider for each of the key topics.

### 5.X.3 Deployment Architectures

Editor’s Note: Based on the 5GMS Architecture, develop one or more deployment architectures that address the key topics and the collaboration models.

### 5.X.4 Mapping to 5G Media Streaming and High-Level Call Flows

Editor’s Note: Map the key topics to basic functions and develop high-level call flows.

### 5.X.5 Potential open issues

Editor’s Note: Identify the issues that need to be solved.

### 5.X.6 Candidate Solutions

Editor’s Note: Provide candidate solutions (including call flows) for each of the identified issues.

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| **End Change** |