ETSI TS 129 540 V19.5.0 (2026-03)

TECHNICAL SPECIFICATION

5G;
5G System;
SMS Services;
Stage 3
(3GPP TS 29.540 version 19.5.0 Release 19)

Reference
RTS/TSGC-0429540vj50

Keywords
5G

ETSI

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the stage 3 protocol and data model for the Nsmsf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SMSF.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[7] IETF RFC 9113: "HTTP/2".

[8] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[9] IETF RFC 2387: "The MIME Multipart/Related Content-type".

[10] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

[11] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[12] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[13] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[14] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[15] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[16] 3GPP TR 21.900: "Technical Specification Group working methods".

[17] IETF RFC 9457: "Problem Details for HTTP APIs".

[18] Void.

[19] OpenAPI: "OpenAPI Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0.

[20] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[21] 3GPP TS 23.540: "5G System; Technical realization of Service Based Short Message Service Stage 2".

[22] 3GPP TS 29.577: "5G System; IP Short Message Gateway and SMS Router For Short Message Services Stage 3".

[23] IETF RFC 9110: "HTTP Semantics".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5GC 5G Core Network
AMF Access Management Function
JSON Javascript Object Notation
SMSF SMS Function

4 Overview

Within the 5GC, the SMSF offers services to the AMF, SMS-GMSC, IP-SM-GW and SMS Router via the Nsmsf service based interface (see 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.540 [21]).

Figures 4.1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SMSF and the scope of the present specification.

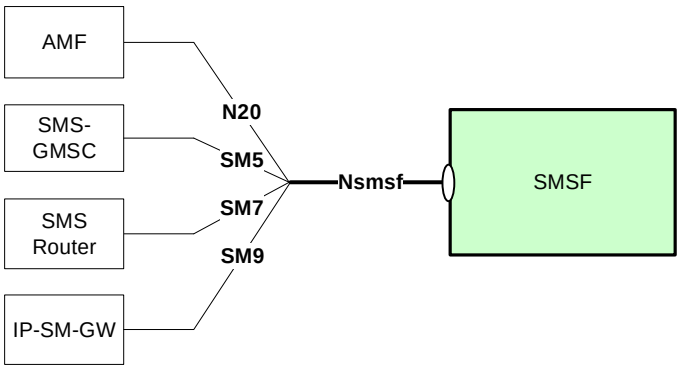

Figure 4-1: Reference model – SMSF

The functionalities supported by the SMSF are listed in clause 6.2.13 of 3GPP TS 23.501 [2].

The services and service operations provided by the Nsmsf interface are listed in clause 5.2.9 of 3GPP TS 23.502 [3] and clause 6.4 of 3GPP TS 23.540 [21].

5 Services offered by the SMSF

5.1 Introduction

The SMSF supports the following services.

Table 5.1-1: NF Services provided by SMSF

Service Name	Description	Example Consumer
Nsmsf_SMService	This service allows AMF to authorize SMS and activate SMS for the served user on SMSF. This service also allows the SMS-GMSC, SMS Router and IP-SM-GW to send the SMS payload in downlink direction to the SMSF.	AMF, SMS-GMSC, SMS Router, IP-SM-GW

Table 5.1-2 summarizes the corresponding APIs defined for this specification.

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Nsmsf_SMService	6.1	SMSF SMService	TS29540_Nsmsf_SMService.yaml	nsmsf-sms	A.2

5.2 Nsmsf_SMService Service

5.2.1 Service Description

The Nsmsf_SMService service provides the service capability for the NF Service Consumer (e.g. AMF) to authorize SMS and activate SMS for a service user on SMSF, for the NF Service Consumer (e.g. SMS GMSC, SMS Router and IP-SM-GW) to send the SMS payload in downlink direction to the SMSF. The following are the key functionalities of this NF service:

- Activation or deactivation of SMS service for a given service user, which results in creating/updating/deleting an UE Context for SMS in SMSF;
- Send SMS payload in uplink direction to SMSF;
- Send SMS payload in downlink direction to SMSF.

The Nsmsf_SMService service supports the following service operations.

Table 5.2.1-1: Service operations supported by the Nsmsf_SMService service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Activate	Activate SMS service for a given service user, which results in creating or updating a UE Context for SMS in SMSF.	Request/Response	AMF
Deactivate	Deactivate SMS service for a given service user, which results in deleting or updating a UE Context for SMS in SMSF.	Request/Response	AMF
UplinkSMS	Send SMS payload in uplink direction to SMSF.	Request/Response	AMF
MtForwardSm	Send SMS payload in downlink direction to SMSF.	Request/Response	SMS-GMSC, SMS Router, IP-SM-GW

5.2.2 Service Operations

5.2.2.1 Introduction

This clause introduces the related procedures using Nsmsf_SMService service operations for supporting SMS service.

5.2.2.2 Activate

5.2.2.2.1 General

The Activate service operation shall be used by the NF Service Consumer (e.g. AMF) to activate SMS service for a given service user, which results in creating or updating an individual UE Context for SMS in the SMSF, in the following procedures:

- Registration Procedure for SMS over NAS (see clause 4.13.3.1 of 3GPP TS 23.502 [3]);
- Registration Update Procedure for SMS over NAS due to AMF change (see clause 4.13.3.1 of 3GPP TS 23.502 [3]);
- Registration Update Procedure for SMS over NAS to add authorization for SMS over a new additional Access Type;
- AMF initiated modification to UE Context in SMSF, e.g. modify the backup AMF information.

There shall be only one individual UE Context for SMS per service user.

5.2.2.2.2 Registration procedure using Activate service operation

The NF Service Consumer (e.g. AMF) shall activate SMS service for a given service user by using the HTTP PUT method as shown in Figure 5.2.2.2.2-1.

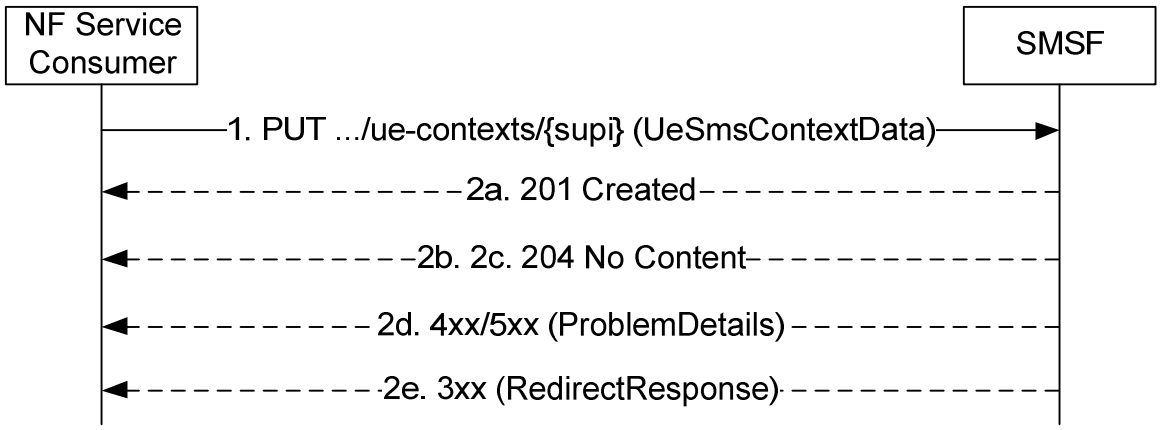

Figure 5.2.2.2.2-1: Activation of SMS service

1. The NF Service Consumer (e.g. AMF) shall send a PUT request to the resource representing the UE Context for SMS (i.e. …/ue-contexts/{supi}) in the SMSF to activate SMS service for a given service user. The content of the PUT request shall contain a representation of the individual UE Context resource to be created or updated.

Depending on whether the target UE Context for SMS has already been created, the SMSF performs 2a or 2b:

2a. If the target UE Context for SMS is not created in SMSF, the SMSF registers itself in UDM for the Access Type(s) provided, retrieves subscription data from the UDM, performs service authorization for the given UE, and create UE Context for SMS for this UE.

If successful, "201 Created" shall be returned, the content of the PUT response shall contain the representation of the created resource and the "Location" header shall contain the URI of the created resource.

2b. If the target UE Context for SMS has already been created, the SMSF updates the UE Context for SMS with the NF Service Consumer (e.g. AMF) provided parameters.

If successful, "204 No Content" shall be returned.

2c. If the target UE Context for SMS has already been created and the NF Service Consumer (e.g. AMF) provided parameters contains 2 access types (i.e. an additional Access Type), the SMSF registers itself in UDM for the new Access Type for the given UE, performs service authorization for the given UE for the new Access Type and updates the UE context for SMS for this UE with the new additional Access Type.

If successful, "204 No Content" shall be returned.

2d. On failure, the appropriate HTTP status code (e.g. "403 Forbidden") indicating the error shall be returned.

A ProblemDetails IE shall be included in the content of PUT response, with the "cause" attribute of ProblemDetails set to application error codes specified in table 6.1.7.3-1.

2e. On redirection, the appropriate HTTP status code (e.g. "307 Temporary Redirect") shall be returned.

A RedirectResponse IE may be included in the content of PUT response, as specified in table 6.1.3.3.3.1-3.

5.2.2.2.3 Modify UE Context in SMSF using HTTP PATCH Method

The NF Service Consumer (e.g. AMF) may update UE context in SMSF for a given service user by using the HTTP PATCH method as shown in Figure 5.2.2.2.3-1.