

# ETSI TS 129 549 V17.6.0 (2022-09)



**LTE;  
5G;  
Service Enabler Architecture Layer for Verticals (SEAL);  
Application Programming Interface (API) specification;  
Stage 3  
(3GPP TS 29.549 version 17.6.0 Release 17)**



---

**Reference**

RTS/TSGC-0329549vh60

---

**Keywords**

5G,LTE

**ETSI**

---

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° w061004871

---

**Important notice**

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at [www.etsi.org/deliver](http://www.etsi.org/deliver).

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://standards.etsi.org/standards-search> <https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our

Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

---

**Notice of disclaimer & limitation of liability**

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

---

**Copyright Notification**

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.

All rights reserved.

---

# Intellectual Property Rights

## Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

---

# Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

---

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Contents

Intellectual Property Rights .....	2
Legal Notice .....	2
Modal verbs terminology.....	2
Foreword.....	13
1 Scope .....	15
2 References .....	15
3 Definitions of terms and abbreviations.....	16
3.1 Terms.....	16
3.2 Abbreviations .....	16
4 Overview .....	17
5 Services offered by the SEAL servers.....	17
5.1 Introduction of SEAL services .....	17
5.2 Location management APIs .....	20
5.2.1 SS_LocationReporting API .....	20
5.2.1.1 Service Description .....	20
5.2.1.1.1 Overview .....	20
5.2.1.2 Service Operations .....	20
5.2.1.2.1 Introduction .....	20
5.2.1.2.2 Create_Trigger_Location_Reporting.....	21
5.2.1.2.2.1 General.....	21
5.2.1.2.2.2 VAL server providing trigger configuration using Create_Trigger_Location_Reporting service operation .....	21
5.2.1.2.3 Fetch_Location_Report_Trigger .....	21
5.2.1.2.3.1 General.....	21
5.2.1.2.3.2 VAL server fetching trigger configuration using Fetch_Location_Report_Trigger service operation .....	21
5.2.1.2.4 Update_Trigger_Location_Reporting.....	22
5.2.1.2.4.1 General.....	22
5.2.1.2.4.2 VAL server providing trigger configuration using Update_Trigger_Location_Reporting service operation .....	22
5.2.1.2.5 Cancel_Trigger_Location_Reporting .....	22
5.2.1.2.5.1 General.....	22
5.2.1.2.5.2 VAL server providing trigger configuration using Cancel_Trigger_Location_Reporting service operation .....	22
5.2.2 SS_LocationInfoEvent API .....	22
5.2.3 SS_LocationInfoRetrieval API .....	23
5.2.4 SS_LocationAreaInfoRetrieval API .....	23
5.2.4.1 Service Description .....	23
5.2.4.1.1 Overview .....	23
5.2.4.2 Service Operations .....	23
5.2.4.2.1 Introduction .....	23
5.2.4.2.2 Obtain_UEs_Info.....	23
5.2.4.2.2.1 General.....	23
5.2.4.2.2.2 VAL server obtains UE(s) information in an application defined proximity range of a location using Obtain_UEs_Info service operation .....	23
5.2.5 SS_LocationMonitoring API .....	24
5.2.6 SS_LocationAreaMonitoring API .....	24
5.3 Group management APIs .....	24
5.3.1 SS_GroupManagement API.....	24
5.3.1.1 Service Description .....	24
5.3.1.1.1 Overview .....	24
5.3.1.2 Service Operations .....	25
5.3.1.2.1 Introduction .....	25

5.3.1.2.2	Query_Group_Info .....	25
5.3.1.2.2.1	General.....	25
5.3.1.2.2.2	VAL server fetching VAL group documents, group membership and configuration information using Query_Group_Info service operation .....	25
5.3.1.2.3	Update_Group_Info.....	26
5.3.1.2.3.1	General.....	26
5.3.1.2.3.2	VAL server modifying group membership and configuration using Update_Group_Info service operation .....	26
5.3.1.2.4	Create_Group .....	26
5.3.1.2.4.1	General.....	26
5.3.1.2.4.2	VAL server creating new group using Create_Group service operation .....	26
5.3.1.2.5	Delete_Group .....	27
5.3.1.2.5.1	General.....	27
5.3.1.2.5.2	VAL server deleting VAL group using Delete_Group service operation .....	27
5.3.2	SS_GroupManagementEvent API .....	27
5.4	Configuration management APIs .....	28
5.4.1	SS_UserProfileRetrieval API.....	28
5.4.1.1	Service Description .....	28
5.4.1.1.1	Overview .....	28
5.4.1.2	Service Operations .....	28
5.4.1.2.1	Introduction .....	28
5.4.1.2.2	Obtain_User_Profile.....	28
5.4.1.2.2.1	General.....	28
5.4.1.2.2.2	VAL server retrieving VAL user profile information using Obtain_User_Profile service operation .....	28
5.4.2	SS_UserProfileEvent API.....	28
5.5	Network resource management APIs .....	29
5.5.1	SS_NetworkResourceAdaptation API.....	29
5.5.1.1	Service Description .....	29
5.5.1.1.1	Overview .....	29
5.5.1.2	Service Operations .....	29
5.5.1.2.1	Introduction .....	29
5.5.1.2.2	Reserve_Network_Resource .....	29
5.5.1.2.2.1	General.....	29
5.5.1.2.2.2	VAL server requesting for network resource adaptation using Reserve_Network_Resource service operation.....	29
5.5.1.2.3	Request_Unicast_Resource .....	30
5.5.1.2.3.1	General.....	30
5.5.1.2.3.2	VAL server requesting for unicast resource using Request_Unicast_Resource service operation .....	30
5.5.1.2.4	Update_Unicast_Resource.....	30
5.5.1.2.4.1	General.....	30
5.5.1.2.4.2	VAL server requesting for updating the unicast resource using Update_Unicast_Resource service operation .....	30
5.5.1.2.5	Request_Multicast_Resource .....	30
5.5.1.2.5.1	General.....	30
5.5.1.2.5.2	VAL server requesting for multicast resource using Request_Multicast_Resource service operation .....	30
5.5.1.2.6	Notify_UP_Delivery_Mode .....	31
5.5.1.2.6.1	General.....	31
5.5.1.2.6.2	Notifying user plane events using Notify_UP_Delivery_Mode service operation .....	31
5.5.1.2.7	Create_TSC_Stream .....	31
5.5.1.2.7.1	General.....	31
5.5.1.2.7.2	VAL server requesting for create TSC stream using Create_TSC_Stream service operation .....	31
5.5.1.2.8	Delete_TSC_Stream .....	32
5.5.1.2.8.1	General.....	32
5.5.1.2.8.2	VAL server requesting to delete a TSC stream using Delete_TSC_Stream service operation .....	32
5.5.1.2.9	Discover_TSC_Stream_Availability .....	32
5.5.1.2.9.1	General.....	32

5.5.1.2.9.2	VAL server discovering TSC stream availability using Discover_TSC_Stream_Availability service operation .....	32
5.5.2	SS_EventsMonitoring API .....	33
5.5.3	SS_NetworkResourceMonitoring API .....	33
5.5.3.1	Service Description .....	33
5.5.3.1.1	Overview .....	33
5.5.3.2	Service Operations .....	33
5.5.3.2.1	Introduction .....	33
5.5.3.2.2	Subscribe_Unicast_QoS_Monitoring .....	34
5.5.3.2.2.1	General .....	34
5.5.3.2.2.2	VAL server subscribes for Unicast QoS Monitoring using Subscribe_Unicast_QoS_Monitoring .....	34
5.5.3.2.3	Unsubscribe_Unicast_QoS_Monitoring .....	35
5.5.3.2.3.1	General .....	35
5.5.3.2.3.2	VAL server unsubscribes for Unicast QoS Monitoring using Unsubscribe_Unicast_QoS_Monitoring .....	35
5.5.3.2.4	Notify_Unicast_QoS_Monitoring .....	35
5.5.3.2.4.1	General .....	35
5.5.3.2.4.2	NRM server notifies for Unicast QoS Monitoring using Notify_Unicast_QoS_Monitoring .....	35
5.5.3.2.5	Obtain_Unicast_QoS_Monitoring_Data .....	36
5.5.3.2.5.1	General .....	36
5.6	Events APIs .....	36
5.6.1	SS_Events API .....	36
5.6.1.1	Service Description .....	36
5.6.1.1.1	Overview .....	36
5.6.1.2	Service Operations .....	36
5.6.1.2.1	Introduction .....	36
5.6.1.2.2	Subscribe_Event .....	36
5.6.1.2.2.1	General .....	36
5.6.1.2.2.2	Subscribing to SEAL events using Subscribe_Event service operation .....	37
5.6.1.2.3	Notify_Event .....	37
5.6.1.2.3.1	General .....	37
5.6.1.2.3.2	Notifying SEAL events using Notify_Event service operation .....	37
5.6.1.2.4	Unsubscribe_Event .....	37
5.6.1.2.4.1	General .....	37
5.6.1.2.4.2	Unsubscribing from SEAL events using Unsubscribe_Event service operation .....	37
5.6.1.2.5	Update_Subscription .....	37
5.6.1.2.5.1	General .....	37
5.6.1.2.5.2	Updating the SEAL events subscription using Update_Subscription service operation .....	37
5.7	Key management APIs .....	38
5.7.1	SS_KeyInfoRetrieval API .....	38
5.7.1.1	Service Description .....	38
5.7.1.1.1	Overview .....	38
5.7.1.2	Service Operations .....	38
5.7.1.2.1	Introduction .....	38
5.7.1.2.2	Obtain_Key_Info .....	38
5.7.1.2.2.1	General .....	38
5.7.1.2.2.2	VAL server obtaining VAL service specific key material using Obtain_Key_Info service operation .....	38
5.8	Network slice capability Enablement APIs .....	39
5.8.1	SS_NetworkSliceAdaptation API .....	39
5.8.1.1	Service Description .....	39
5.8.1.1.1	Overview .....	39
5.8.1.2	Service Operations .....	39
5.8.1.2.1	Introduction .....	39
5.8.1.2.2	Network_slice_adaptation .....	39
5.8.1.2.2.1	General .....	39
5.8.1.2.2.2	VAL server requesting network slice adaptation using Network_slice_adaptation service operation .....	39
6	SEAL Design Aspects Common for All APIs .....	40
6.1	General .....	40



6.2	Data Types.....	40
6.2.1	General.....	40
6.2.2	Referenced structured data types .....	40
6.2.3	Referenced Simple data types and enumerations.....	40
6.3	Usage of HTTP.....	41
6.4	Content type .....	41
6.5	URI structure .....	41
6.6	Notifications.....	42
6.7	Error Handling.....	42
6.8	Feature negotiation.....	42
6.9	HTTP headers.....	42
6.10	Conventions for Open API specification files .....	42
7	SEAL API Definitions.....	43
7.1	Location management APIs .....	43
7.1.1	SS_LocationReporting API .....	43
7.1.1.1	API URI .....	43
7.1.1.2	Resources .....	43
7.1.1.2.1	Overview .....	43
7.1.1.2.2	Resource: SEAL Location Reporting Configurations .....	44
7.1.1.2.2.1	Description.....	44
7.1.1.2.2.2	Resource Definition .....	44
7.1.1.2.2.3	Resource Standard Methods .....	44
7.1.1.2.2.3.1	POST.....	44
7.1.1.2.2.4	Resource Custom Operations.....	45
7.1.1.2.3	Resource: Individual SEAL Location Reporting Configuration.....	45
7.1.1.2.3.1	Description.....	45
7.1.1.2.3.2	Resource Definition.....	45
7.1.1.2.3.3	Resource Standard Methods .....	45
7.1.1.2.3.3.1	GET.....	45
7.1.1.2.3.3.2	PUT.....	46
7.1.1.2.3.3.3	DELETE.....	47
7.1.1.2.3.3.4	PATCH.....	48
7.1.1.2.3.4	Resource Custom Operations.....	49
7.1.1.3	Notifications.....	49
7.1.1.4	Data Model.....	49
7.1.1.4.1	General .....	49
7.1.1.4.2	Structured data types .....	50
7.1.1.4.2.1	Introduction.....	50
7.1.1.4.2.2	Type: LocationReportConfiguration.....	50
7.1.1.4.2.3	Type: LocationReportConfigurationPatch.....	51
7.1.1.4.3	Simple data types and enumerations.....	51
7.1.1.5	Error Handling .....	51
7.1.1.5.1	General .....	51
7.1.1.5.2	Protocol Errors .....	51
7.1.1.5.3	Application Errors .....	51
7.1.1.6	Feature negotiation.....	51
7.1.2	SS_LocationAreaInfoRetrieval API .....	51
7.1.2.1	API URI .....	51
7.1.2.2	Resources .....	52
7.1.2.2.1	Overview .....	52
7.1.2.2.2	Resource: Location Information.....	52
7.1.2.2.2.1	Description.....	52
7.1.2.2.2.2	Resource Definition .....	52
7.1.2.2.2.3	Resource Standard Methods .....	53
7.1.2.2.2.3.1	GET.....	53
7.1.2.2.2.4	Resource Custom Operations.....	54
7.1.2.3	Notifications.....	54
7.1.2.4	Data Model.....	54
7.1.2.4.1	General .....	54
7.1.2.4.2	Structured Data Types .....	54
7.1.2.4.3	Simple data types and enumerations.....	54

7.1.2.5	Error Handling .....	54
7.1.2.5.1	General .....	54
7.1.2.5.2	Protocol Errors .....	54
7.1.2.5.3	Application Errors .....	54
7.1.2.6	Feature Negotiation .....	55
7.2	Group management APIs .....	55
7.2.1	SS_GroupManagement API .....	55
7.2.1.1	API URI .....	55
7.2.1.2	Resources .....	55
7.2.1.2.1	Overview .....	55
7.2.1.2.2	Resource: VAL Group Documents .....	56
7.2.1.2.2.1	Description .....	56
7.2.1.2.2.2	Resource Definition .....	56
7.2.1.2.2.3	Resource Standard Methods .....	56
7.2.1.2.2.3.1	POST .....	56
7.2.1.2.2.3.2	GET .....	57
7.2.1.2.2.4	Resource Custom Operations .....	58
7.2.1.2.3	Resource: Individual VAL Group Document .....	58
7.2.1.2.3.1	Description .....	58
7.2.1.2.3.2	Resource Definition .....	58
7.2.1.2.3.3	Resource Standard Methods .....	59
7.2.1.2.3.3.1	GET .....	59
7.2.1.2.3.3.2	PUT .....	60
7.2.1.2.3.3.3	DELETE .....	61
7.2.1.2.3.3.4	PATCH .....	62
7.2.1.2.3.4	Resource Custom Operations .....	63
7.2.1.3	Notifications .....	63
7.2.1.4	Data Model .....	63
7.2.1.4.1	General .....	63
7.2.1.4.2	Structured data types .....	64
7.2.1.4.2.1	Introduction .....	64
7.2.1.4.2.2	Type: VALGroupDocument .....	64
7.2.1.4.2.3	Type: VALGroupDocumentPatch .....	65
7.2.1.4.3	Simple data types and enumerations .....	65
7.2.1.5	Error Handling .....	65
7.2.1.5.1	General .....	65
7.2.1.5.2	Protocol Errors .....	65
7.2.1.5.3	Application Errors .....	65
7.2.1.6	Feature negotiation .....	65
7.3	Configuration management APIs .....	66
7.3.1	SS_UserProfileRetrieval API .....	66
7.3.1.1	API URI .....	66
7.3.1.2	Resources .....	66
7.3.1.2.1	Overview .....	66
7.3.1.2.2	Resource: VAL Services .....	67
7.3.1.2.2.1	Description .....	67
7.3.1.2.2.2	Resource Definition .....	67
7.3.1.2.2.3	Resource Standard Methods .....	67
7.3.1.2.2.3.1	GET .....	67
7.3.1.2.2.4	Resource Custom Operations .....	68
7.3.1.3	Notifications .....	68
7.3.1.4	Data Model .....	68
7.3.1.4.1	General .....	68
7.3.1.4.2	Structured data types .....	69
7.3.1.4.2.1	Introduction .....	69
7.3.1.4.2.2	Type: ProfileDoc .....	69
7.3.1.4.2.3	Type: ValTargetUe .....	69
7.3.1.4.3	Simple data types and enumerations .....	69
7.3.1.5	Error Handling .....	69
7.3.1.5.1	General .....	69
7.3.1.5.2	Protocol Errors .....	69
7.3.1.5.3	Application Errors .....	70



7.3.1.6	Feature negotiation.....	70
7.4	Network resource management APIs .....	70
7.4.1	SS_NetworkResourceAdaptation API .....	70
7.4.1.1	API URI .....	70
7.4.1.2	Resources .....	70
7.4.1.2.1	Overview .....	70
7.4.1.2.2	Resource: Multicast Subscriptions .....	72
7.4.1.2.2.1	Description.....	72
7.4.1.2.2.2	Resource Definition .....	72
7.4.1.2.2.3	Resource Standard Methods .....	72
7.4.1.2.2.3.1	POST .....	72
7.4.1.2.2.4	Resource Custom Operations.....	72
7.4.1.2.3	Resource: Individual Multicast Subscription.....	73
7.4.1.2.3.1	Description.....	73
7.4.1.2.3.2	Resource Definition .....	73
7.4.1.2.3.3	Resource Standard Methods .....	73
7.4.1.2.3.3.1	GET .....	73
7.4.1.2.3.3.2	DELETE.....	74
7.4.1.2.3.4	Resource Custom Operations.....	75
7.4.1.2.4	Resource: Unicast Subscriptions .....	75
7.4.1.2.4.1	Description.....	75
7.4.1.2.4.2	Resource Definition .....	75
7.4.1.2.4.3	Resource Standard Methods .....	75
7.4.1.2.4.3.1	POST .....	75
7.4.1.2.4.4	Resource Custom Operations.....	76
7.4.1.2.5	Resource: Individual Unicast Subscription.....	76
7.4.1.2.5.1	Description.....	76
7.4.1.2.5.2	Resource Definition .....	76
7.4.1.2.5.3	Resource Standard Methods .....	76
7.4.1.2.5.3.1	GET .....	76
7.4.1.2.5.3.2	DELETE.....	77
7.4.1.2.5.4	Resource Custom Operations.....	78
7.4.1.2.6	Resource: TSC Stream Availability.....	78
7.4.1.2.6.1	Description.....	78
7.4.1.2.6.2	Resource Definition .....	78
7.4.1.2.6.3	Resource Standard Methods .....	79
7.4.1.2.6.3.1	GET .....	79
7.4.1.2.6.4	Resource Custom Operations.....	80
7.4.1.2.7	Resource: TSC streams.....	80
7.4.1.2.7.1	Description.....	80
7.4.1.2.7.2	Resource Definition .....	80
7.4.1.2.7.3	Resource Standard Methods .....	80
7.4.1.2.7.3.1	GET .....	80
7.4.1.2.7.4	Resource Custom Operations.....	81
7.4.1.2.8	Resource: Individual TSC Stream .....	81
7.4.1.2.8.1	Description.....	81
7.4.1.2.8.2	Resource Definition .....	81
7.4.1.2.8.3	Resource Standard Methods .....	82
7.4.1.2.8.3.1	GET .....	82
7.4.1.2.8.3.2	PUT .....	82
7.4.1.2.8.3.3	DELETE.....	83
7.4.1.2.8.4	Resource Custom Operations.....	84
7.4.1.3	Notifications.....	84
7.4.1.3.1	General .....	84
7.4.1.3.2	Notify_UP_Delivery_Mode .....	84
7.4.1.3.2.1	Description.....	84
7.4.1.3.2.2	Notification definition.....	84
7.4.1.4	Data Model.....	85
7.4.1.4.1	General .....	85
7.4.1.4.2	Structured data types .....	87
7.4.1.4.2.1	Introduction.....	87
7.4.1.4.2.2	Type: MulticastSubscription .....	87

7.4.1.4.2.3	Type: UnicastSubscription.....	88
7.4.1.4.2.4	Type: UserPlaneNotification.....	88
7.4.1.4.2.5	Type: NrmEventNotification.....	88
7.4.1.4.2.6	Type: TscStreamData.....	89
7.4.1.4.2.7	Type: TrafficSpecInformation.....	89
7.4.1.4.2.8	Type: TscStreamAvailability.....	89
7.4.1.4.2.9	Type: StreamSpecification.....	89
7.4.1.4.2.10	Type: TrafficSpecification.....	90
7.4.1.4.3	Simple data types and enumerations.....	90
7.4.1.4.3.1	Enumeration: ServiceAnnouncementMode.....	90
7.4.1.4.3.2	Enumeration: DeliveryMode.....	90
7.4.1.4.3.3	Enumeration: NrmEvent.....	90
7.4.1.5	Error Handling.....	90
7.4.1.5.1	General.....	90
7.4.1.5.2	Protocol Errors.....	90
7.4.1.5.3	Application Errors.....	90
7.4.1.6	Feature negotiation.....	91
7.4.2	SS_NetworkResourceMonitoring API.....	91
7.4.2.1	API URI.....	91
7.4.2.2	Resources.....	91
7.4.2.2.1	Overview.....	91
7.4.2.2.2	Resource: Unicast Monitoring Subscriptions.....	92
7.4.2.2.2.1	Description.....	92
7.4.2.2.2.2	Resource Definition.....	92
7.4.2.2.2.3	Resource Standard Methods.....	92
7.4.2.2.2.3.1	POST.....	92
7.4.2.2.2.4	Resource Custom Operations.....	93
7.4.2.2.3	Resource: Individual Unicast Monitoring Subscription.....	93
7.4.2.2.3.1	Description.....	93
7.4.2.2.3.2	Resource Definition.....	93
7.4.2.2.3.3	Resource Standard Methods.....	93
7.4.2.2.3.3.1	DELETE.....	93
7.4.2.2.3.3.2	GET.....	94
7.4.2.3.2	Individual Unicast Monitoring Notification.....	95
7.4.2.3.2.1	Description.....	95
7.4.2.3.2.2	Notification definition.....	95
7.4.2.4	Data Model.....	96
7.4.2.4.1	General.....	96
7.4.2.4.2	Structured data types.....	98
7.4.2.4.2.1	Introduction.....	98
7.4.2.4.2.2	Type: MonitoringReport.....	98
7.4.2.4.2.3	Type: MeasurementData.....	98
7.4.2.4.2.4	Type: MeasurementPeriod.....	98
7.4.2.4.2.5	Type: ReportingRequirements.....	99
7.4.2.4.2.6	Type: MeasurementRequirements.....	100
7.4.2.4.2.7	Type: MonitoringSubscription.....	101
7.4.2.4.2.9	Type: FailureReport.....	102
7.4.2.4.2.10	Type: ReportingThreshold.....	102
7.4.2.4.3	Simple data types and enumerations.....	102
7.4.2.4.3.1	Enumeration: MeasurementDataType.....	102
7.4.2.4.3.2	Enumeration: TerminationMode.....	103
7.4.2.4.3.3	Enumeration: FailureReason.....	103
7.4.2.4.3.4	Enumeration: ThresholdHandlingMode.....	103
7.4.2.5	Error Handling.....	103
7.4.2.5.1	General.....	103
7.4.2.5.2	Protocol Errors.....	103
7.4.2.5.3	Application Errors.....	103
7.4.2.6	Feature negotiation.....	104
7.5	Event APIs.....	104
7.5.1	SS_Events API.....	104
7.5.1.1	API URI.....	104
7.5.1.2	Resources.....	104

7.5.1.2.1	Overview .....	104
7.5.1.2.2	Resource: SEAL Events Subscriptions.....	105
7.5.1.2.2.1	Description.....	105
7.5.1.2.2.2	Resource Definition .....	105
7.5.1.2.2.3	Resource Standard Methods .....	105
7.5.1.2.2.3.1	POST.....	105
7.5.1.2.2.4	Resource Custom Operations.....	106
7.5.1.2.3	Resource: Individual SEAL Events Subscription.....	106
7.5.1.2.3.1	Description.....	106
7.5.1.2.3.2	Resource Definition .....	106
7.5.1.2.3.3	Resource Standard Methods .....	106
7.5.1.2.3.3.1	DELETE.....	106
7.5.1.2.3.3.2	PATCH.....	107
7.5.1.2.3.3.3	PUT .....	108
7.5.1.2.3.4	Resource Custom Operations.....	109
7.5.1.3	Notifications.....	109
7.5.1.3.1	General .....	109
7.5.1.3.2	SEAL Event Notification.....	110
7.5.1.3.2.1	Description.....	110
7.5.1.3.2.2	Notification definition.....	110
7.5.1.4	Data Model.....	111
7.5.1.4.1	General .....	111
7.5.1.4.2	Structured data types .....	115
7.5.1.4.2.1	Introduction.....	115
7.5.1.4.2.2	SEALEventSubscription .....	115
7.5.1.4.2.3	SEALEventNotification .....	115
7.5.1.4.2.4	EventSubscription.....	116
7.5.1.4.2.5	SEALEventDetail .....	117
7.5.1.4.2.6	VALGroupFilter .....	118
7.5.1.4.2.7	IdentityFilter .....	118
7.5.1.4.2.8	LMInformation .....	118
7.5.1.4.2.9	MessageFilter.....	119
7.5.1.4.2.10	MonitorFilter.....	119
7.5.1.4.2.11	MonitorEvents .....	119
7.5.1.4.2.12	MonitorEventsReport.....	120
7.5.1.4.2.13	ValidityConditions.....	120
7.5.1.4.2.14	MonitorLocationInterestFilter.....	120
7.5.1.4.2.15	LocationDevMonReport .....	120
7.5.1.4.2.16	TempGroupInfo .....	121
7.5.1.4.2.17	MonLocAreaInterestFltr .....	121
7.5.1.4.2.18	LocationInfoCriteria .....	121
7.5.1.4.2.19	ReferenceUEDetail .....	121
7.5.1.4.2.20	LocationAreaMonReport .....	122
7.5.1.4.2.21	MoveInOutUEDetails .....	122
7.5.1.4.2.22	SEALEventSubscriptionPatch .....	122
7.5.1.4.3	Simple data types and enumerations.....	122
7.5.1.4.3.1	Introduction.....	122
7.5.1.4.3.2	Simple data types .....	122
7.5.1.4.3.3	Enumeration: SEALEvent .....	123
7.5.1.4.3.4	Enumeration: LocDevNotification.....	123
7.5.1.4.3.5	Enumeration: MonLocTriggerEvent.....	123
7.5.1.5	Error Handling .....	124
7.5.1.5.1	General .....	124
7.5.1.5.2	Protocol Errors .....	124
7.5.1.5.3	Application Errors .....	124
7.5.1.6	Feature Negotiation.....	124
7.6	Key management APIs.....	125
7.6.1	SS_KeyInfoRetrieval API.....	125
7.6.1.1	API URI .....	125
7.6.1.2	Resources .....	125
7.6.1.2.1	Overview .....	125
7.6.1.2.2	Resource: Key Records .....	125

7.6.1.2.2.1	Description.....	125
7.6.1.2.2.2	Resource Definition .....	126
7.6.1.2.2.3	Resource Standard Methods .....	126
7.6.1.2.2.3.1	GET .....	126
7.6.1.2.2.4	Resource Custom Operations.....	127
7.6.1.3	Notifications.....	127
7.6.1.4	Data Model.....	127
7.6.1.4.1	General .....	127
7.6.1.4.2	Structured Data Types .....	128
7.6.1.4.2.1	Introduction.....	128
7.6.1.4.2.2	ValKeyInfo .....	128
7.6.1.4.3	Simple data types and enumerations.....	128
7.6.1.5	Error Handling .....	128
7.6.1.5.1	General .....	128
7.6.1.5.2	Protocol Errors .....	128
7.6.1.5.3	Application Errors .....	128
7.6.1.6	Feature Negotiation.....	128
7.7	Network slice capability Enablement APIs .....	129
7.7.1	SS_NetworkSliceAdaptation API.....	129
7.7.1.1	API URI .....	129
7.7.1.2	Resources .....	129
7.7.1.3	Custom Operations without associated resources .....	129
7.7.1.3.1	Overview .....	129
7.7.1.3.2	Operation: Request.....	129
7.7.1.3.2.1	Description.....	129
7.7.1.3.2.2	Operation Definition .....	129
7.7.1.4	Notifications.....	130
7.7.1.5	Data Model.....	130
7.7.1.5.1	General .....	130
7.7.1.5.2	Structured Data Types .....	131
7.7.1.5.2.1	Introduction.....	131
7.7.1.5.2.2	Type: NwSliceAdptInfo.....	131
7.7.1.5.3	Simple data types and enumerations.....	131
7.7.1.6	Error Handling .....	131
7.7.1.6.1	General .....	131
7.7.1.6.2	Protocol Errors .....	131
7.7.1.6.3	Application Errors .....	131
7.7.1.7	Feature Negotiation.....	132
8	Using Common API Framework.....	132
8.1	General .....	132
8.2	Security .....	132
9	Security.....	133
9.1	General .....	133
9.2	SEAL-S security.....	133
<b>Annex A (normative):</b>	<b>OpenAPI specification.....</b>	<b>134</b>
A.1	General .....	134
A.2	SS_LocationReporting API.....	134
A.3	SS_GroupManagement API.....	138
A.4	SS_UserProfileRetrieval API.....	143
A.5	SS_NetworkResourceAdaptation API.....	145
A.6	SS_Events API.....	156
A.7	SS_KeyInfoRetrieval API.....	166
A.8	SS_LocationAreaInfoRetrieval API.....	168
A.9	SS_NetworkSliceAdaptation API .....	169

A.10 SS_NetworkResourceMonitoring API .....	170
<b>Annex B (normative): SEAL NRM server support integration with TSN .....</b>	<b>178</b>
<b>Annex C (informative): Change history .....</b>	<b>179</b>
History .....	183

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ETSI TS 129 549 V17.6.0 \(2022-09\)](https://standards.iteh.ai/catalog/standards/sist/b71047a1-cf7a-45df-889d-b182b9250242/etsi-ts-129-549-v17-6-0-2022-09)

<https://standards.iteh.ai/catalog/standards/sist/b71047a1-cf7a-45df-889d-b182b9250242/etsi-ts-129-549-v17-6-0-2022-09>

---

# 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:

Version x.y.z

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.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ETSI TS 129 549 V17.6.0 \(2022-09\)](https://standards.iteh.ai/catalog/standards/sist/b71047a1-cf7a-45df-889d-b182b9250242/etsi-ts-129-549-v17-6-0-2022-09)

<https://standards.iteh.ai/catalog/standards/sist/b71047a1-cf7a-45df-889d-b182b9250242/etsi-ts-129-549-v17-6-0-2022-09>