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Contents

Foreword

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

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where:

x the first digit:

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

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1 Scope

The present document contains requirements and test cases that are specific to the PGW network product class. It refers to the Catalogue of General Security Assurance Requirements and formulates specific adaptions of the requirements and test cases given there, as well as specifying requirements and test cases unique to the PGW network product class.

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 TR 41.001: "GSM Release specifications".

[3] 3GPP TS 33.117: "Catalogue of General Security Assurance Requirements".

[4] 3GPP TR 33.916: "Security assurance scheme for 3GPP network products for 3GPP network product classes".

[5] 3GPP TS 33.401: "3GPP System Architecture Evolution (SAE); Security architecture".

[6] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[7] 3GPP TS 33.102: "3G security; Security architecture".

[8] 3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".

[9] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[10] 3GPP TR 33.926: "Security Assurance Specification (SCAS) threats and critical assets in 3GPP network product classes".

[11] 3GPP TS 33.402: "3GPP System Architecture Evolution (SAE); Security aspects of non-3GPP accesses".

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].

4 PGW-specific security requirements and related test cases

4.1 Introduction

The structure of the present document is aligned with TS 33.117[3] such that the PGW-specific adaptation of a generic requirement in 33.117[3], clause 4, can be always found in clause 4 of present document.

The text on pre-requisites for testing in clause 4.1.2 of TS 33.117 [3] applies also to the present document.

4.2 PGW-specific security functional adaptations of requirements and related test cases

4.2.1 Introduction

4.2.2 Security functional requirements on the PGW deriving from 3GPP specifications and related test cases

4.2.2.1 Security functional requirements on the PGW deriving from 3GPP specifications – General approach

In addition to the requirements and test cases in TS 33.117[3], clause 4.2.2, a PGW shall satisfy the following:

It is assumed for the purpose of the present SCAS that a PGW conforms to all mandatory security-related provisions pertaining to a PGW in:

- 3GPP TS 33.401[5]: "EPS security architecture";
- other 3GPP specifications that make reference to TS 33.401[5] or are referred to from TS 33.401[5] (e.g. TS 23.401 [6], TS 23.060[9], etc.);
- 3GPP TS 32.251[8]: " Packet Switched (PS) domain charging".

Since the PDN GW is the gateway which terminates the SGi interface, the security procedures pertaining to the PGW are typically related to gateway functions. For example:

- Per-user based packet filtering (by e.g. deep packet inspection).
- Every IP-CAN bearer shall be assigned a unique identity number for billing purposes. (i.e. the Charging Id).
- The TEID is a unique identifier within one IP address of a logical node.

4.2.2.2 Per-user based packet filtering

Requirement Name: Per-user based packet filtering

Requirement Reference: TS 23.401 [6], clause 4.4.3.3

Requirement Description: This requirement is identical to per-user based packet filtering (by e.g. deep packet inspection) as specified in TS 23.401, clause 4.4.3.3.

Threat References: TR 33.926 [10], clause B.2.3.1 Failure to assign unique TEID or Charging ID for a session.

Test Case:

Purpose:

Verify that PGW supports a Per-user based packet filtering.

Pre-Conditions:

- The tester has a privilege to configure the filtering policy on the PGW to make the PGW can filter the packets per-user
- Some UE (e.g. UE1 and UE2) are registered on the PGW.
- The PGW can receive the packets from the UE1 and UE2.
- A network traffic analyser on the PGW (e.g. tcpdump) is available.

Execution Steps

1) The tester configures the different filtering policy for the UE1and the UE2 on the PGW, e.g. the PGW forwards the packets from the UE1 to SGi and drops the packets from the UE2.
2) The tester sends the packets from the UE1 to the PGW.
3) The tester sends the packets from the UE2 to the PGW.
4) The tester checks the filtered packets using the network traffic analyser.

Expected Results:

The PGW can filter the packets per- user according the configured filtering policy, e.g. the PGW forwards the packets from the UE1 to SGi in the step 2 and drops the packets from the UE2 in the step 3.

Expected format of evidence:

Evidence suitable for the interface, e.g. screenshot contains the operation results, pcap file demonstrating that the UE2's packets are correctly received but unavailable on the SGi interface while the UE1's packets are correctly sent to SGi.

4.2.2.3 Charging ID Uniqueness

Requirement Name: Charging ID Uniqueness

Requirement Reference: TS 32.251 [8], clause 5.1.1

Requirement Description: "Every IP-CAN bearer shall be assigned a unique identity number for billing purposes. (i.e. the Charging Id)" as specified in 3GPP TS 32.251 [8], clause 5.1.1.

Note: A charging ID is not assigned to more than one active IP-CAN bearers at the same time. The reuse of Charging ID is possible after an IP-CAN session has been terminated and the Charging ID related to this IP-CAN session has been released.

Threat References: TR 33.926 [10], clause B.2.5.1 Failure to assign unique TEID or Charging ID for a session

Test Case:

Purpose:

Verify that the Charging ID value set in the Information Element Bearer Context within a CreateSessionResponse is unique.

Pre-Conditions:

Test environment with P-GW and S-GW, PCRF. PCRF and S-GW may be real nodes or simulated.

The tester is able to trace traffic between the P-GW and the S-GW (real or simulated)

Execution Step

1) The tester intercepts the traffic between the P-GW and the S-GW.
2) The tester trigger more than one (e.g. at least 10000) consecutive CreateSessionRequest for an Initial UE Attach towards the P-GW (using a real or a simulated S-GW) in order to setup a new IP-CAN bearer.
3) The P-GW creates a UE/S-GW context and communicates with the PCRF (real or simulated) for QOS and APN resolve. That procedures shall be successfully in order to permit to the P-GW to send back to the S-GW a CreateSessionResponse containing at least :
   a) A Success cause.
   b) The P-GW's F-TEID for control plane
   c) The PDN Address Allocation (PAA)
   d) A Bearer Contexts Created.
4) The tester verifies that the Charging ID within Bearer Contexts Created in each generated CreateSessionResponse are different.

Expected Results:

The Charging ID assigned to every IP-CAN bearer requested by different CreateSessionRequest is unique.

Expected format of evidence:

Files containing the triggered GTP messages (e.g. pcap trace).

4.2.2.4 TEID UNIQUENESS

Requirement Name: TEID Uniqueness

Requirement Reference: TS 23.060 [9], clause 14.6

Requirement Description: "The TEID is a unique identifier within one IP address of a logical node." as specified in TS 23.060 [9], clause 14.6.

Note: A TEID is not assigned to more than one active GTP tunnel at the same time.The reuse of TEID is possible after a GTP tunnel has been terminated and the TEID related to this GTP tunnel has been released.

Threat References: TR 33.926 [10], clause B.2.5.1 Failure to assign unique TEID or Charging ID for a session

Test Case:

Purpose:

Verify that the TEID generated for each new GTP tunnel is unique for both control and user plane.

Pre-Conditions:

Test environment with P-GW and S-GW, PCRF. PCRF and S-GW may be real nodes or simulated.

The tester is able to trace traffic between the P-GW and the S-GW (real or simulated)

Execution Step

1) The tester intercepts the traffic between the P-GW and the S-GW.

2) The tester triggers more than one (e.g. at least 10000) consecutives CreateSessionRequest e.g. for an Initial UE Attach towards the P-GW (using a real or a simulated S-GW) with GTP header TEID set to 0 and F-TEID set to different values.

3) The P-GW creates a UE/S-GW context and communicates with the PCRF (real or simulated) for QOS and APN resolve. That procedures shall be successfully in order to permit to the P-GW to send back to the S-GW a CreateSessionResponse containing at least :

   a) A Success cause.

   b) The P-GW's F-TEID for control plane

   c) The PDN Address Allocation (PAA).

   d) A Bearer Contexts Created.

4) The tester verifies that the F-TEID created for each generated CreateSessionResponse is unique.

Expected Results:

The F-TEID set into each different CreateSessionResponse is unique.

Expected format of evidence:

Files containing the triggered GTP messages (e.g. pcap trace).

4.2.2.5 Mobility binding

Requirement Name: MN-HA authentication extension validation for mobility binding during trusted non-3GPP access

Requirement Reference: TS 33.402 [11], clause 9.2.1.1

Requirement Description: "The PDN-GW shall validate the MN-HA authentication extension" as specified in TS 33.402, clause 9.2.1.1.

Threat References: TBA

Test Case:

Test Name: TC_PGW_MIP-AUTH_Non-3GPP

Purpose: To test whether the PGW validates the MN-HA authentication extension correctly.

Pre-Condition:

The UE and PGW are connected in the test environment. UE is simulated.

The tester has access to the S6b interface between the 3GPP AAA Server and the PDN GW.

The tester has access to the MIPv4 FACoA based S2a interface between the PGW and UE.

Execution Steps:

The PGW (home agent for the UE) is active in a 3GPP access network.

The tester captures packets over S6b and S2a interfaces using any packet analyser.

The tester filters the MN-HA Key transported in the authentication and authorization information from the 3GPP AAA server to PGW over S6b interface.

The UE sends a Registration Request message to PGW via the trusted non-3GPP IP access network.

The tester filters the Registration Request sent by UE to PGW and Registration Reply sent by PGW to UE over the S2a interface.

The tester uses the SPI value in Registration Request to identify the MN-HA key to compute the Authenticator value of the authentication extension.

The tester verifies that the computed Authenticator value is same as the Authenticator value in the Registration Request message.

The tester also checks the Reply Code in the Registration Reply message to verify the correctness of the validation at PGW.

Expected Results:

The Reply code is '0' in the Registration Reply message.

Expected format of evidence:

Evidence suitable for the interface, e.g. Screenshot contains the operation results.

4.2.2.6 Inactive emergency PDN connection release

Requirement Name: Emergency PDN connection release

Requirement Reference: TS 23.401 [6], clause 5.4.4.1

Requirement Description: "PGW shall initiate the deactivation of all bearers of the emergency PDN connection when it is inactive (i.e. not transferring any packets) for a configured period of time." as specified in TS 23.401, clause 5.4.4.1.

Threat References: TR 33.926[10], clause B.2.4.1 Inactive Emergency PDN Connection Release

Test Case:

Test Name: TC_PGW_EMRGENCY_CONNECTION-RELEASE

Purpose: To verify whether the PGW releases all emergency PDN connections which are inactive for a configured inactive time to prevent resource exhaustion.

Pre-Condition:

The UE, PGW and S-GW network products are connected in the test environment.

UE and S-GW may be simulated.

The tester has access to the PGW configuration file.

The tester has access to the GTP-based S5/S8 interface.

Execution Steps:

1) The tester checks the PGW configuration file to find the PDN connection's inactive timeout value.
2) The tester initiates an emergency attach procedure.
3) The tester captures the packet over S5/S8 interface between PGW and S-GW using any packet analyser.
4) The tester filters the PDN CONNECTIVITY REQUEST message with request type "emergency" during the attach procedure.
5) The tester filters the DELETE BEARER REQUEST messages (Procedure Transaction Identifier, EPS Bearer Identity, Causes) sent from PGW to Serving GW.
6) The tester also filters the corresponding DELETE BEARER RESPONSE messages (EPS Bearer Identity, User Location Information) sent from Serving GW to PGW.
7) The tester verifies whether the Cause value of the DELETE BEARER REQUEST message is "PDN connection inactivity timer expires". If yes proceed, otherwise go to step 5.
8) To confirm the emergency bearer release, the tester compares whether the EPS Bearer identity of the UE is the same in all three messages (PDN CONNECTIVITY REQUEST, DELETE BEARER REQUEST and DELETE BEARER

RESPONSE), otherwise it may be concluded that the inactive emergency PDN connection is not released even after the configured timeout.

Expected Results:

The PGW releases the inactive emergency bearers according to the configured timeout value.

Expected format of evidence:

Evidence suitable for the interface, e.g. Screenshot contains the operation results.

4.2.3 Technical baseline

4.2.3.1 Introduction

This clause provides baseline technical requirements.

4.2.3.2 Protecting data and information

4.2.3.2.1 Protecting data and information – general

There are no PGW-specific additions to clause 4.2.3.2.1 of TS 33.117[3].

4.2.3.2.2 Protecting data and information – unauthorized viewing

There are no PGW-specific additions to clause 4.2.3.2.2 of TS 33.117[3].

4.2.3.2.3 Protecting data and information in storage

There are no PGW-specific additions to clause 4.2.3.2.3 of TS 33.117[3].

4.2.3.2.4 Protecting data and information in transfer

There are no PGW-specific additions to clause 4.2.3.2.4 of TS 33.117[3].

4.2.3.2.5 Logging access to personal data

There are no PGW-specific additions to clause 4.2.3.2.5 of TS 33.117[3].

4.2.3.3 Protecting availability and integrity

There are no PGW-specific additions to clause 4.2.3.3 of TS 33.117[3].

4.2.3.4 Authentication and authorization

There are no PGW-specific additions to clause 4.2.3.4 of TS 33.117[3].

4.2.3.5 Protecting sessions

There are no PGW-specific additions to clause 4.2.3.5 of TS 33.117[3].

4.2.3.5.1 Unpredictable GTP TEID

Requirement Name: Unpredictable GTP TEID

Requirement Description:

The TEID created for usage in the GTP-C messages as well as in the GTP-U messages shall be unpredictable in order to prevent a hacker to inject GTP-U packets with a spoofed TEID into a user's session (causing e.g. overbilling problems) or to send malicious GTP-C messages to delete an established session (and causing a DoS).

Threat References: TR 33.926 clause 5.3.7.2 Denial of service: Implementation Flaw and clause 5.3.4.x Tampering: User Traffic Tampering.

Security Objective references: tba

Test case:

Test Name: UNPRED_GTP_TEID

Purpose:

To verify that the GTP TEID is unpredictable

Procedure and execution steps:

Pre-Conditions:

Test environment with P-GW and S-GW, PCRF. PCRF and S-GW may be real nodes or simulated.

The tester is able to trace traffic between the P-GW and the S-GW (real or simulated).

Execution Steps

1. The tester intercepts the traffic between the P-GW and the S-GW.
2. The tester triggers 10 consecutives CreateSessionRequest e.g. for an Initial UE Attach towards the P-GW (using a real or a simulated S-GW) with GTP header TEID set to 0 and F-TEID set to different values.
3. The tester triggers one CreateSessionRequest, this request shall be for another UE and from another S-GW
4. The P-GW creates a UE/S-GW context and communicates with the PCRF (real or simulated) for QOS and APN resolve. That procedures shall be successful in order to permit to the P-GW to send back to the S-GW a CreateSessionResponse containing at least :
    a. A Success cause.
    b. The P-GW's F-TEID for control plane
    c. The PDN Address Allocation (PAA).
    d. A Bearer Contexts Created.
5. The tester tries to predict the F-TEID created for the final CreateSessionResponse from the initial 10 F-TEIDs.

Expected Results:

The tester cannot predict the F-TEID in the finalCreateSessionResponse.

Expected format of evidence:

Files containing the triggered GTP messages (e.g. pcap trace) and, if the F-TEID is predictable, a detailed description of how the F-TEID can be predicted.

4.2.3.6 Logging

There are no PGW-specific additions to clause 4.2.3.6 of TS 33.117[3].

4.2.4 Operating systems

There are no PGW-specific additions to clause 4.2.4 of TS 33.117.

4.2.5 Web servers

There are no PGW-specific additions to clause 4.2.4 of TS 33.117.

4.2.6 Network devices

4.2.6.1 Protection of Data and Information

There are no PGW-specific additions to clause 4.2.6.1of TS 33.117.

4.2.6.2 Protecting availability and integrity

There are no PGW-specific additions to clause 4.2.6.2 of TS 33.117.

4.2.6.3 IP Address reallocation interval

Requirement Name: IP Address Reallocation Interval

Requirement Description:

The PGW shall support a mechanism to set an interval between an IP address reallocation.

Security Objective references: tba.

Test case:

Test Name: TC_ IP-ADDRESS_REALLOCATION_INTERVAL

Purpose:

Verify that the PGW supports an IP address reallocation interval technique.

Procedure and execution steps:

Pre-Condition:

- Documentation describing how to configure an IP address reallocation interval.

Execution Steps

1. Configure the IP address reallocation interval to T according to the product documentation.
2. Allocate an IP address IP1 to UE1.
3. Make UE1 release the IP address IP1.
4. Within an interval of T after the release of IP1, make the PGW allocate the IP address IP1 to UE2.
5. Attempt the step 4 in more time than T after the release of IP1.

Expected Results:

1) In execution step 4, the reallocation attempt is rejected.
2) In execution step 5, the reallocation attempt is accepted.

Expected format of evidence:

A PASS or FAIL.

4.2.6.4 MS/UE-Mutual Access Prevention

Requirement Name: MS/UE-Mutual Access Prevention

Requirement Description:

The PGW shall support a mechanism to prevent MS/UE-mutual access attacks (e.g. configure a filtering rule to drop all mutual access packets).

Security Objective references: tba.

Test case:

Test Name: TC_ MS/UE-MUTUAL_ACCESS_PREVENTION

Purpose:

Verify that the Network Product supports a MS/UE-Mutual Access Prevention technique.

Procedure and execution steps:

Pre-Condition:

- The PGW has configured two (or more) IP address segments for UEs named IPSeg 1 and IPSeg 2 (e.g. 10.40.0.0/16、10.42.0.0/16).
- The PGW has 2 different logical or physical Ethernet ports and each port is connected to a host**.**
- A PGW analyser on the network product (e.g. tcpdump) is available.
- A packet analyzer on the UEs is available.

Execution Steps:

1) The tester configures the PGW to block direct UE to UE traffic according to product documentation.
2) The tester configures a filtering rule that UEs with IP address in IPSeg 1cannot access to servers with IP address in IPSeg 2 and vice versa.
3) The PGW allocate the IP1 within the IPSeg 1 to UE 1.
4) The PGW allocate the IP2 within the IPSeg 2 to UE 2.
5) The UE1 sends a packet with destination IP Address set to IP3 different from IP1 within the IPSeg 1.
6) The UE1 sends a packet with destination IP Address set to IP2.
7) The UE2 sends a packet with destination IP Address set to IP4 different from IP2 within the IPSeg 2.
8) The UE2 sends a packet with destination IP Address set to IP1.

Expected Results:

Using the network analyser the tester verifies that the packets are correctly received and discarded by the PGW. The tester verifies that the packets are correctly sent by the UE through the packet analyzer on the UEs.

NOTE: The IP address segments allocated to UEs are separate from the IP address segments of PDN servers.

Expected format of evidence:

A log from analyser to show the process.

4.3 PGW-specific adaptations of hardening requirements and related test cases

4.3.1 Introduction

4.3.2 Technical baseline

There are no PGW-specific additions to clause 4.3.2 of TS 33.117[3].

4.3.3 Operating systems

There are no PGW-specific additions to clause 4.3.3 of TS 33.117[3].

4.3.4 Web servers

There are no PGW-specific additions to clause 4.3.2 of TS 33.117[3].

4.3.5 Network devices

4.3.5.1 Traffic separation

Requirement Name: Traffic Separation

Requirement Description:

The PGW shall support physical or logical separation of O&M and control plane traffic, O&M and user plane traffic, control plane and user plane traffic respectively.

Note1: The security requirement in clause 4.3.5.1 of TS 33.117 (i.e. the physical or logical separation of O&M and control plane traffic) and related test case also applies to the PGW.

Note2: The requirement that is different from TS 33.117[3], clause 4.3.5.1 is that the traffic separation of user plane from O&M and control plane which is considered to be PGW-specific has been take into account in present document.

Security Objective references: tba.

Test case:

Test Name: TC_TRAFFIC_SEPARATION

Purpose:

To test whether O&M traffic is separated from user plane traffic, control plane traffic is separated from user plane traffic.

Procedure and execution steps:

Pre-Condition:

The PGW has at least one separate (logical) interface dedicated to O&M traffic and at least two (logical) interfaces for control plane traffic and user plane traffic respectively. The PGW for which the test applies and that fail to meet this precondition fail the test by definition.

Execution Steps

Execute the following steps:

1. The tester checks whether the PGW refuses O&M traffic on all interfaces meant for user plane traffic.
2. The tester checks whether the PGW refuses user plane traffic on all O&M interfaces.

3. The tester checks whether the PGW refuses control plane traffic on all interfaces meant for user plane traffic.

4. The tester checks whether the PGW refuses user plane traffic on all control plane interfaces.

Expected Results:

The six tests should be successful, i.e. the PGW refuses traffic in all of the four steps.

Expected format of evidence:

Evidence suitable for the interface, e.g. screenshot contains the operation results.

4.3.5.2 User Plane Traffic Differentiation

Requirement Name: User Plane Traffic Differentiation

Requirement Description:

"The EPS shall support simultaneous exchange of IP traffic to **multiple PDNs** through the use of separate PDN GWs or **single PDN GW**" as specified in 3GPP TS 23.401 [6], clause 5.10.1. According to this, the PGW shall support the user plane traffic differentiation (e.g. enterprise, internet, etc) by setting the specific APNs, and shall support the traffic isolation based on the APNs (e.g. using VPN).

Security Objective references: tba

Test case:

Test Name: TC_USER PLANE TRAFFIC_DIFFERENTIATION

Purpose:

1. To test whether the user plane traffics is differentiated by setting the specific APNs.

2. To test whether the traffic is isolated based on the APNs.

Procedure and execution steps:

Pre-Condition:

The PGW has configured several APNs for the testing, and every APN is configured to associate with specific VPN (e.g. the VPN can be GRE) for user plane traffic. For example, APN1's traffic is sent and received by VPN1, and APN2's traffic is sent and received by VPN2.

The PGW for which the test applies and that fail to meet this precondition fail the test by definition.

Execution Steps

Execute the following steps:

1. The tester intercepts the VPN packets between the P-GW and PDN, as well as the GTP-U packets between P-GW and S-GW/UE;

2. The tester checks triggers APN1's traffic with the P-GW, then the tester verifies that the tunnel id of the VPN packets sent by the P-GW indicates VPN1 as well as the TEID of the GTP-U packets sent by the P-GW indicates APN1;

3. The tester triggers APN2's traffic with the P-GW, then the tester verifies that the tunnel id of the VPN packets sent by the P-GW indicates VPN2 as well as the TEID of the GTP-U packets sent by the P-GW indicates APN2;;

4. The tester checks triggers APN1's traffic with the P-GW, then the tester verifies that the tunnel id of the VPN packets sent by the P-GW does not indicate VPN2 as well as the TEID of the GTP-U packets sent by the P-GW does not indicate APN2;

5. The tester triggers APN2's traffic with the P-GW, then the tester verifies that the tunnel id of the VPN packets sent by the P-GW does not indicate VPN1 as well as the TEID of the GTP-U packets sent by the P-GW does not indicate APN1.

Expected Results:

The four verification should be successful.

Expected format of evidence:

The APN traffic is sent and received by the right VPN.

4.4 PGW-specific adaptations of basic vulnerability testing requirements and related test cases

All text from TS 33.117[3], clause 4.4 also applies to the PGW. There are no PGW-specific adaptations or additions to this text.

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2017-06	SA#76					Upgrade to change control version	14.0.0
2017-09	SA#77	SP-170640	0001	1	F	Resolving two editor's notes about reuse of Charging ID and TEID	15.0.0
2017-09	SA#77	SP-170640	0002	1	B	Authentication Extension Validation	15.0.0
2017-09	SA#77	SP-170640	0003	1	B	Inactive Emergency PDN Connection Release	15.0.0
2019-09	SA#85	SP-190677	0004	1	A	Adding Threat References to PGW Test Cases	15.1.0

History

Document history		
V15.0.0	September 2018	Publication
V15.1.0	October 2019	Publication