|  |  |
| --- | --- |
| 3GPP TR 33.739 V0.1.0 (2022-05) | |
| Technical Specification|Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Services and System Aspects  Study on Security Enhancement of Support for Edge Computing — Phase 2  (Release 18) | |
|  | |
|  | 3GPP-logo_web |
|  | |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification. Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. | |

|  |
| --- |
|  |
| ***3GPP***  Postal address  3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
| ***Copyright Notification***  No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.  © 2021, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  GSM® and the GSM logo are registered and owned by the GSM Association |

Contents

Foreword 4

1 Scope 6

2 References 6

3 Definitions of terms, symbols and abbreviations 6

3.1 Terms 6

3.2 Symbols 6

3.3 Abbreviations 7

4 Overview of Edge Computing — Phase 2 7

5 Key issues 7

5.1 General 7

5.2 Key issues related with 5G System Enhancements for Edge Computing of SA WG2 7

5.2.1 Key issue #1.1: <Key issue name> 7

5.2.1.1 Key issue details 7

5.2.1.2 Threats 7

5.2.1.3 Potential security requirements 7

5.3 Key issues related with enhanced architecture for enabling Edge Applications of SA WG6 7

5.3.1 Key Issue #2.1: Authentication and authorization for the EEC hosted in the roaming UE 7

5.3.1.1 Key issue details 7

5.3.1.2 Security threats 8

5.3.1.3 Potential security requirements 8

5.3.2 Key issue #2.2: Authentication mechanism selection between EEC and ECS/EES 8

5.3.2.1 Key issue details 8

5.3.2.2 Security threats 8

5.3.2.3 Potential security requirement 8

6 Proposed solutions 9

6.0 Mapping of Solutions to Key Issues 9

6.1 Solution #1: <Solution name> 9

6.1.1 Solution overview 9

6.1.2 Solution details 9

6.1.3 Solution evaluation 9

6.X Solution #X: <Solution name> 9

6.X.1 Solution overview 9

6.X.2 Solution details 9

6.X.3 Solution evaluation 9

7 Conclusions 9

Annex <A>: <Informative annex title for a Technical Report> 10

Annex <X> (informative): Change history 11

# Foreword

This Technical Report 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.

# 1 Scope

The present document studies the security aspects related to the new features and procedures resulting from the continuation of the work on Edge Computing support in 5G Systems, a.k.a. phase 2, i.e. 5G System Enhancements for Edge Computing in TR 23.700-48 [2], and enhanced architecture for enabling Edge Applications in TR 23.700-98 [3]. The study bases on the work done in the TS 33.558 [4] and TR 33.839 [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 TR 23.700-48: "5G System Enhancements for Edge Computing; Phase 2".

[3] 3GPP TR 23.700-98: "Study on Enhanced architecture for enabling Edge Applications ".

[4] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications".

[5] 3GPP TS 33.839: "Study on security aspects of enhancement of support for edge computing in the 5G Core (5GC)".

…

[x] <doctype> <#>[ ([up to and including]{yyyy[-mm]|V<a[.b[.c]]>}[onwards])]: "<Title>".

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms 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].

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

## 3.3 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].

<ABBREVIATION> <Expansion>

# 4 Overview of Edge Computing — Phase 2

Editor’s Note: This clause will contain a brief overview on edge computing

# 5 Key issues

## 5.1 General

Clause 5 describes the security key issues related with 5G System Enhancements for Edge Computing of SA WG2 in Clause 5.1, and Enhanced Architecture for Enabling Edge Applications of SA WG6 in Clause 5.2.

## 5.2 Key issues related with 5G System Enhancements for Edge Computing of SA WG2

### 5.2.1 Key issue #1.1: <Key issue name>

#### 5.2.1.1 Key issue details

Editor’s Note: This clause provides details of the key issue

#### 5.2.1.2 Threats

Editor’s Note: This clause list the threats derived from the key issue details

#### 5.2.1.3 Potential security requirements

Editor’s Note: This clause list the potential security requirements derived from the threats

Editor’s Note: This below provides a generic set of headings for a new key issue and need to be deleted before the TR goes for approval

## 5.3 Key issues related with enhanced architecture for enabling Edge Applications of SA WG6

### 5.3.1 Key Issue #2.1: Authentication and authorization for the EEC hosted in the roaming UE

#### 5.3.1.1 Key issue details

This Key Issue aims at addressing authentication and authorization problem for the EEC hosted in the roaming UE.

In 3GPP TS 23.700-98 v.0.6.0 [3], it is stated that "It is required to clarify how an EEC hosted in the roaming UE can be authenticated and authorized to access the edge computing services available in the VPLMN. The related requirement is described in GSMA OPG as follows: ‘Access of roaming subscribers to edge applications in the visited network shall be subject to authorisation by the subscriber's Home OP and the Visited OP’. ".

#### However, the edge computing authorization procedures for roaming scenarios, which may need the cooperation of home network and visiting network, are still unclear. Moreover, mechanisms which can be utilized to authenticate EEC hosted in the roaming UE and data protection are not defined. Therefore, the procedures and mechanisms about authenticating and authorizing EEC hosted in the roaming UE and data protection should be studied. 5.3.1.2 Security threats

#### EEC hosted in the UE may not be authenticated and authorized in the roaming scenarios. An attacker may manipulate the data communicated with edge computing servers in the VPLMN.5.3.1.3 Potential security requirements

Mutual authentication and authorization between EEC and edge servers in VPLMN in the roaming scenarios should be supported.

Communication between EEC and edge servers in VPLMN in the roaming scenarios should be securely protected.

### 5.3.2 Key issue #2.2: Authentication mechanism selection between EEC and ECS/EES

#### 5.3.2.1 Key issue details

In TS 33.558[4], Clause 6.2 and 6.3 introduce the authentication and authorization between EEC and ECS, EEC and EES. And it is concluded for authentication between EEC and ECS, EEC and EES, TLS authentication methods shall be used, and the details of TLS authentication method, (e.g., TLS with AKMA as specified in TS 33.535 [xx], TLS with GBA as specified in TS 33.222 [yy], other TLS authentication methods that uses other than 3GPP subscription credential(s) which is out of 3GPP) are out of scope of the current document.

However, with these multiple authentication methods, how to select which authentication mechanism to use between the EEC and EES, EEC and ECS is not addressed. Not knowing which authentication to use between EEC and EES, EEC and EES would lead to mis-synchronization between the EEC and EES, EEC and ECS.

For EDGE authentication mechanism selection, the roaming scenario needs to be taken into consideration.

For EDGE authentication mechanism selection, the authentication capability supported by the UE and the network entities needs to be taken into consideration.

This key issue is to study the selection of authentication mechanism for the authentication procedures between EEC and ECS, EEC and EES for Edge service.

#### 5.3.2.2 Security threats

If the authentication between the EEC and ECS or EEC and EES is done without the security method selection, it would cause mis-synchronization between the EEC and EES/ECS.

#### 5.3.2.3 Potential security requirement

Selection of authentication mechanism for the authentication procedures between EEC and EES and between EEC and ECS shall be supported.

# 6 Proposed solutions

Editor’s Note: This clause will contain the proposed solutions

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Solutions | Key Issues | | | |
| 1 | X |  |  |
| #1: <Key issue name> | X |  |  |  |
| #X: <Key issue name> |  |  |  |  |

Editor’s Note: This clause provides the mapping of Solutions to Key Issues.

## 6.1 Solution #1: <Solution name>

### 6.1.1 Solution overview

Editor’s Note: This clause starts with the (part of) the key issue(s) addressed and is followed with a brief overview of the solution

### 6.1.2 Solution details

Editor’s Note: This clause provides the details of the solution

### 6.1.3 Solution evaluation

Editor’s Note: This clause provides the evaluation of the solution

Editor’s Note: This below provides a generic set of headings for a new solution and need to be deleted before the TR goes for approval

## 6.X Solution #X: <Solution name>

### 6.X.1 Solution overview

### 6.X.2 Solution details

### 6.X.3 Solution evaluation

# 7 Conclusions

Editor’s Note: This clause will contain the conclusion of the TR

Annex <A>:  
<Informative annex title for a Technical Report>

Annex <X> (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022.05 | SA3 #107e | S3-221095 |  |  |  | TR Skeleton | 0.0.0 |
| 2022.05 | SA3 #107e | S3-221235 |  |  |  | Implemented S3-221094, S3-221095, S3-221186, and S3-221191. | 0.1.0 |

Change history of this template:

|  |  |  |
| --- | --- | --- |
| 2001-07 | Copyright date changed to 2001; space character added before TTC in copyright notification; space character before first reference deleted. | 1.3.3 |
| 2002-01 | Copyright date changed to 2002. | 1.3.4 |
| 2002-07 | Extra Releases added to title area. | 1.3.5 |
| *2002-12* | *"TM" added to 3GPP logo.* | *1.3.6* |
| *2003-02* | *Copyright date changed to 2003.* | *1.3.7* |
| *2003-12* | *Copyright date changed to 2004. Chinese OP changed from CWTS to CCSA* | *14.0* |
| *2004-04* | *North American OP changed from T1 to ATIS* | *1.5.0* |
| *2005-11* | *Stock text of clause 3 includes reference to 21.905.* | *1.6.0* |
| *2005-11* | *Caters for new TSG structure. Minor corrections.* | *1.6.1* |
| *2006-01* | *Revision marks removed.* | *1.6.2* |
| *2008-11* | *LTE logo line added, © date changed to 2008, guidance on keywords modified; acknowledgement of trade marks; sundry editorial corrections and cosmetic improvements* | *1.7.0* |
| *2010-02* | *3GPP logo changed for cleaner version, with tag line; LTE-Advanced logo line added;  © date changed to 2010; editorial change to cover page footnote text; trade marks acknowledgement text modified; additional Releases added on cover page; proforma copyright release text block modified* | *1.8.0* |
| *2010-02* | *Smaller 3GPP logo file used.* | *1.8.1* |
| *2010-07* | *Guidance note concerning use of LTE-Advanced logo added.* | *1.8.2* |
| *2011-04-01* | *Guidance of use of logos on cover page modified; copyright year modified.* | *1.8.3* |
| *2013-05-15* | *Changed File Properties to MCC macro default.*  *Removed R99, added Rel-12/13.*  *Modified Copyright year.*  *Guidance on annex X Change history.* | *1.8.4* |
| *2014-10-27* | *Updated Release selection on cover. In clause 3, added "3GPP" to TR 21.905.* | *1.8.5* |
| *2015-01-06* | *New Organizational Partner TSDSI added to copyright block. Old Releases removed.* | *1.9.0* |
| *2015-12-03* | *Provision for LTE Advanced Pro logo  Update copyright year to 2016* | *1.10.0* |
| *2016-03-08* | *Standarization of the layout of the Change History table in the last annex.(Unreleased)* | *1.11.0* |
| *2016-06-15* | *Minor adjustment to Change History table heading* | *1.11.1* |
| *2017-03-13* | *Adds option for 5G logo on cover* | *1.12.0* |
| *2017-05-03* | *Smaller 5G logo to reduce file size* | *1.12.1* |
| *2019-02-25* | *Replacement of frames on cover pages by in-line text.*  *Clarification of help text on when to use 5G logo. Removal of defunct keywords frame on page 2. Add Rel-16, Rel-17 options, eliminated earlier, frozen, Releases (cover page, below title) Corrections to some guidance text, addition of guidance text concerning automatic page headers under Word 2016 ff. Use of modal auxiliary verbs added to Foreword. More explicit guidance on Bibliography and Index annexes. Converted to .docx format.* | *1.13.0* |
| *2019-09-12* | *Cover page table outline shown dotted for ease of logo selection. (Author to hide outline after logo selection.) User now needs to delete whole table rows instead of individual cells, which proved to be tricky.*  *Change of style for "notes" in the Foreword to normal paragraphs.*  *Insertion of new bookmarks, correction of location of existing bookmarks. (To improve navigation.)*  *Improvements to guidance text.* | *1.13.1* |
| *2021-06-18* | *Provision for 5G Advanced logo  Update copyright year to 2021 Additional guidance on the use of Heading 8/9 in annexes C, D and X.* | *1.14.0* |