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| 3GPP TR 33.737 V0.1.0 (2022-05) | |
| Technical Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Services and System Aspects;  Study on Authentication and Key Management for Applications (AKMA) phase 2;  (Release 18) | |
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# 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.

# Introduction

Editor’s Note: This clause contains some background information for the study.

# 1 Scope

The present document studies key issues and potential solutions to support roaming aspects and the Authentication Proxy in AKMA, which is specified in TS 33.535[2]. Specifically, the present document:

- Investigates AKMA roaming architecture and requirements by taking regulatory compliance into account;

- Studies the architecture impact and procedures of introducing the Authentication Proxy (similar as the AP specified in GBA) into AKMA.

# 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 33.535: " Authentication and key management for applications based on 3GPP credential in 5G （AKMA）".[3] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA) ".

# 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 Architectural assumptions

The present document is based on the AKMA architecture and procedures specified in TS 33.535 [2]. The following figure shows the fundamental network model of AKMA, as well as the interfaces between them. Details of the AKMA requirements and procedures are documented in TS 33.535 [2].



Figure 4.1-1: Fundamental Network Model for AKMA

# 5 Key issues

Editor’s Note: This clause contains all the key issues identified during the study.

## 5.1 Key Issue #1: Support for AKMA roaming scenario

### 5.1.1 Issue details

The AKMA architecture, AKMA procedure and key generation are specified in 33.535[2]. The key issue is to study the following two scenarios in AKMA:

- If UE is in VPLMN and trying to access the VPLMN AF, then procedures to support such a usecase, with the LI requirement addressed.

- If UE is in VPLMN and trying to access the HPLMN AF, then procedures to support such a usecase, with the LI requirement addressed.

### 5.1.2 Security Threats

TBA

### 5.1.3 Potential security requirements

FFS.

## 5.2 Key Issue #2: Introducing the Application proxy into AKMA

### 5.2.1 Key issue details

TS 33.222 specifies the use of Authentication Proxy in GBA [2], where an Authentication Proxy (AP) is a proxy resides between the UE and ASs. It helps to reduce the consumption of authentication vectors and/or to minimize SQN synchronization failures, and relieves the AS of security tasks. Similarly, introducing such an authentication proxy in AKMA is beneficial where different application servers (or Application Functions in AKMA) reside in the same trust domain or in the same edge node. With the AP, these application servers can rely on the AP to execute AKMA procedures, which is more cost efficient than the case where each application servers execute AKMA procedures separately. AKMA is a potential solution in MEC, and it is possible that different application servers reside in the same edge cloud or belong to the same service vendor, it is beneficial to consider the feasibility of introducing a similar proxy in AKMA.

### 5.2.2 Security threats

Different Application servers reside in the same trust domain may execute AKMA procedures separately, leading to consumptions of AAnF generating AKMA keys and signalling resources.

### 5.2.3 Potential architectural and security requirements

The AKMA architecture may support an authentication proxy to perform the AF functionality residing between UE and AS(s), in order to save the consumption of signalling resources and AAnF computing resources.

The connection between AP and AS(s) should be secured.

# 6 Solutions

Editor’s Note: This clause contains the proposed solutions addressing the identified key issues.

## 6.Y Solution #Y: <Solution Name>

### 6.Y.1 Introduction

Editor’s Note: Each solution should list the key issues being addressed.

### 6.Y.2 Solution details

### 6.Y.3 Evaluation

Editor’s Note: Each solution should motivate how the potential security requirements of the key issues being addressed are fulfilled.

# 7 Conclusions

Editor’s Note: This clause contains the agreed conclusions that will form the basis for any normative work.

Annex A (informative):  
Change history

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| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-05 | SA3#107-e |  |  |  |  | TR Skeleton | 0.0.0 |
| 2022-05 | SA3#107-e | S3-221169 |  |  |  | S3-221288, S3-220812, S3-221289, S3-221218 | 0.1.0 |