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| 3GPP TR 33.883 V0.2.0 (2022-08) |
| Technical Report |
| 3rd Generation Partnership Project;Technical Specification Group Services and System Aspects;Study on security enhancements for 5G multicast-broadcast services 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

This clause is optional. If it exists, it shall be the second unnumbered clause.

# 1 Scope

The present document is to identify key issues, potential security and privacy requirements and solutions with respect to Rel-18 enhancement for 5G multicast-broadcast services. Specifically:

- Study the security enhancement enabling UE's receiving Multicast MBS Session data in RRC Inactive state. Analysis whether existing security mechanisms for UE in RRC connected state can be reused or new security enhancement are needed.

- Study the security impact and potential enhancement if supporting feasible and efficient resource utilization for the same broadcast content to be provided to 5G MOCN network sharing scenarios.

- Other security issues if identified in the enhancements made by other WGs in Rel-18.

# 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 23.700-47: "Study on architectural enhancements for 5G multicast-broadcast services ".

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

[4] 3GPP TS 23.003: "Numbering, addressing and identification".

[5] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[6] 3GPP TS 23.247: "5G multicast-broadcast services; Stage 2".

# 3 Definitions of terms, symbols and abbreviations

This clause and its three subclauses are mandatory. The contents shall be shown as "void" if the TS/TR does not define any terms, symbols, or 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].

Definition format (Normal)

**<defined term>:** <definition>.

**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 format (EW)

<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].

MOCN Multi-Operator Core Network

TMGI Temporary Mobile Group Identity

# 4 Assumptions

This clause contains assumptions for the study. If there are no assumptions at the end of the study, the clause will be removed before sending for approval.

# 5 Key issues

## 5.1 Key issue#1: security handling in MOCN network sharing scenario

### 5.1.1 Key issue details

In MOCN network sharing scenario, multiple CNs are connected to the same NG-RAN. As documented in TR 23.700-47 [2], the efficiency of resource utilization for the same broadcast content is studied. For the same broadcast content, the AF will set up multiple broadcast MBS sessions towards those CNs. Each CN will deliver the same content towards the same shared NG-RAN node. The NG-RAN node only delivers one copy of the broadcast content over the air.

As specified in clause W.4 of TS 33.501 [3], user-plane procedure is applicable for broadcast service. MBSTF may protect the traffic transmission with encryption and/or integrity. The security protection of MBS traffic is supported in service layer. In MOCN network sharing scenario, the multiple CNs may enable their own security towards the content. The UE will receive the MBS keys from their PLMN. However, the NR-RAN broadcasts only one copy of the content. The security impact needs analysis if security are activated for the same content to be provided to 5G MOCN network sharing scenarios. For example, UEs from PLMN1 may be unable to decipher the content if the NG-RAN node chooses to broadcast the ciphered content from the CN of PLMN2.

If the content is protected using different CN-specific keys, then UEs not having the key will fail to properly process the content, should the network send only one of the copies.

### 5.1.2 Security threats

TBA

### 5.1.3 Potential security requirements

TBA

## 5.2 Key issue#2: TMGI Protection

### 5.2.1 Key issue details

According to TS 23.003 [4] and TS 38.331 [5], TMGI is defined as Temporary Mobile Group Identity. Temporary Mobile Group Identity (TMGI) is used within MBMS to uniquely identify Multicast and Broadcast bearer services. The TMGI is composed of MBMS Service ID, Mobile Country Code (MCC), and Mobile Network Code (MNC).

TMGI is used by the Core Network (CN) of MBS UEs and by MBS UEs as a temporary identity for monitoring of the Paging channel for CN paging if configured by upper layers for MBS multicast reception (e.g., see clause 7.2.5.2 of TS 23.247 [6]).

TMGI is a temporary identity. However, since it is being utilized for MBS group paging and its value reused for paging different UEs, as well as being transmitted in cleartext, the privacy attack and DoS attack may be possible.

### 5.2.2 Security threats

An attacker eavesdrop over the paging channel for MBS UEs may be capable of the following privacy attacks:

- inferring members of the MBS group presence in the paging area.

### 5.2.3 Potential security requirements

TBA

## 5.X Key issue #X: <Title>

### 5.X.1 Key issue details

### 5.X.2 Threats

### 5.X.3 Potential security requirements

# 6 Proposed solutions

## 6.1 Mapping of solutions to key issues

Table 6.1-1: Mapping of solutions to key issues

|  |  |  |  |
| --- | --- | --- | --- |
| Solutions | KI#1 | KI#2 | KI#3 |
|  |  |  |  |
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## 6.A Solution #A: <Title>

### 6.A.1 Introduction

### 6.A.2 Solution details

### 6.A.3 System impact

### 6.A.4 Evaluation

# 7 Conclusions

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

Annex X:
Change history

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| --- |
| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-07 | SA3#107 Adhoc-e |  |  |  |  | S3-221394, S3-221395, S3-221666, S3-221667 | 0.1.0 |
| 2022-08 | SA3#108-e |  |  |  |  | S3-222070 | 0.2.0 |
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