3GPP TR 31.890 V16.0.0 (2020-07)

Technical Report

3rd Generation Partnership Project;

Technical Specification Group Core Network and Terminals;

CT WG6 aspects of 5G System Phase 1

(Release 16)

 

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 Report 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.

Keywords

<keyword[, keyword]>

***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.

© 2020, 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 [5](#__RefHeading___Toc517478110)

1 Scope [6](#__RefHeading___Toc517478111)

2 References [6](#__RefHeading___Toc517478112)

3 Definitions, symbols and abbreviations [7](#__RefHeading___Toc517478113)

3.1 Definitions [7](#__RefHeading___Toc517478114)

3.2 Abbreviations [7](#__RefHeading___Toc517478115)

4 Platform [7](#__RefHeading___Toc517478116)

4.1 UICC [7](#__RefHeading___Toc517478117)

4.2 SSP [7](#__RefHeading___Toc517478118)

5 Security aspects [8](#__RefHeading___Toc517478119)

5.1 Extension of the AUTHENTICATE command [8](#__RefHeading___Toc517478120)

5.1.1 Introduction [8](#__RefHeading___Toc517478121)

5.1.2 Keys in the USIM [8](#__RefHeading___Toc517478122)

5.1.3 Input parameters [8](#__RefHeading___Toc517478123)

5.1.4 Output parameters [8](#__RefHeading___Toc517478124)

5.2 5G NAS security context [8](#__RefHeading___Toc517478125)

5.2.2 Introduction [8](#__RefHeading___Toc517478126)

6 Storage capability to support 5G system [9](#__RefHeading___Toc517478127)

6.1 Existing EFs [9](#__RefHeading___Toc517478128)

6.1.1 Introduction [9](#__RefHeading___Toc517478129)

6.1.2 EFs related to PLMN selection [9](#__RefHeading___Toc517478130)

6.1.2.1 PLMN selection [9](#__RefHeading___Toc517478131)

6.1.2.2 EFHPPLMN (Higher Priority PLMN search period) [9](#__RefHeading___Toc517478132)

6.1.2.3 EFPLMNwAcT (User controlled PLMN selector with Access Technology) [9](#__RefHeading___Toc517478133)

6.1.2.4 EFOPLMNwACT (Operator controlled PLMN selector with Access Technology) [9](#__RefHeading___Toc517478134)

6.1.2.5 EFHPLMNwACT (HPLMN selector with Access Technology) [9](#__RefHeading___Toc517478135)

6.1.3 Other EFs [9](#__RefHeading___Toc517478136)

6.1.3.1 CSG Lists [9](#__RefHeading___Toc517478137)

6.2 New EFs [10](#__RefHeading___Toc517478138)

6.2.1 Forbidden areas [10](#__RefHeading___Toc517478139)

6.2.2 Network slices [10](#__RefHeading___Toc517478140)

6.2.3 Multimedia Priority Services [10](#__RefHeading___Toc517478141)

6.2.4 Subscriber Permanent Identifier [10](#__RefHeading___Toc517478142)

6.2.5 5G Globally Unique Temporary Identity [11](#__RefHeading___Toc517478143)

7 Other functionalities related to 5G system [11](#__RefHeading___Toc517478144)

7.1 Public warning system [11](#__RefHeading___Toc517478145)

7.2 eCall over IMS Emergency Services [11](#__RefHeading___Toc517478146)

8 Toolkit aspects [11](#__RefHeading___Toc517478147)

8.1 Introduction [11](#__RefHeading___Toc517478148)

8.2 Existing commands and objects [11](#__RefHeading___Toc517478149)

8.2.1 Access Technology [11](#__RefHeading___Toc517478150)

8.2.2 Location Information [11](#__RefHeading___Toc517478151)

8.2.3 Timing Advance [12](#__RefHeading___Toc517478152)

8.2.4 Network Measurament Results [12](#__RefHeading___Toc517478153)

8.2.5 Network Rejection event [12](#__RefHeading___Toc517478154)

8.2.6 Bearer Independent Protocol [12](#__RefHeading___Toc517478155)

8.2.7 Call control on PDU connection establishment by USIM [13](#__RefHeading___Toc517478156)

8.2.8 Data Connection Status Change Event [13](#__RefHeading___Toc517478157)

8.2.9 LAUNCH BROWSER [13](#__RefHeading___Toc517478158)

8.3 Backward compatibility [13](#__RefHeading___Toc517478159)

Annex A: Change history [13](#__RefHeading___Toc517478160)

# 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.

# 1 Scope

The present document discusses and describes the CT6 aspects of the 5G System phase 1. One objective of the document is to describe the impact of decisions taken in other 3GPP groups on the existing specifications maintained by CT6.

The present document is intended as a placeholder for CT6 material until it stabilises sufficiently to be moved to appropriate 3GPP technical specifications.

# 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 TS 31.101: "UICC-terminal interface; UICC-terminal interface; Physical and logical characteristics".

[3] 3GPP TS 31.102: "Characteristics of the Universal Subscriber Identity Module (USIM) application".

[4] 3GPP TS 31.111: "Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)"

[5] ETSI TS 102 221 V13.1.0: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".

[6] 3GPP TR 33.899: "Technical Specification Group Services and System Aspects; Study on the security aspects of the next generation system".

[7] 3GPP TS 31.801: "Technical requirements for a secure platform for 3GPP applications".

[8] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".

[9] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[10] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[11] 3GPP TR 24.890: "5G System – Phase 1; CT WG1 Aspects".

[12] ETSI TS 102 223 V13.1.0: "Smart Cards; Card Application Toolkit".

[13] 3GPP TS 22.011: "Service accessibility".

[14] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

[15] 3GPP TS 22.153: "Technical Specification Group Services and System Aspects; Multimedia priority service"

[16] 3GPP TS 38.321: "NR Medium Access Control (MAC) protocol specification".

[17] 3GPP TS 38.211: "NR Physical channels and modulation"

[18] 3GPP TS 38.122: "NR; Requirements for support of radio resource management"

[19] 3GPP TS 38.213: "NR; Physical layer procedures for control"

[20] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3"

[21] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3"

# 3 Definitions, symbols 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], in 3GPP TS 31.102 [3] 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 Platform

## 4.1 UICC

The UICC platform defined by ETSI SCP in TS 102 221 [5] was adopted by 3GPP in TS 31.101 [2] and has been used to host the 3GPP applications, including the USIM and the ISIM, for many years, starting from Rel.99.

It is evident that the platform could be improved in many aspects, as described in the TR 31.801 [7]. Anyway, it remains a valid and appropriate solution to host the 3GPP applications also in a UE capable of registering on a 5G system.

The continued usage of the UICC platform helps avoiding issues for users when upgrading their device to a 5G capable one.

## 4.2 SSP

In the latest available version of TS 33.899 [6], SA3 has approved a requirement for the storage and processing of the subscription credentials in a 5G system, adding more flexibility in addition to the existing UICC platform, already in use within the 3GPP eco-system. This is reflected in the interim agreement described in clause E.5.1.1.2, indicating that solutions for the credential storage and processing in Phase 1 shall be the UICC and the new SSP (Smart Secure Platform) under discussion in ETSI SCP.

Editor's Note: The agreement depends on the availability of an SSP specification published by ETSI in time to be included in the Rel.15. ETSI SCP has indicated the intention to do its best to provide a solution in the Rel.15 timeframe, as documented in SCP(17)000061r1 (C6-170253).

Editor’s Note: The possibility to include the SSP needs to be reviewed in light of the progress done by ETSI SCP on the topic.

# 5 Security aspects

## 5.1 Extension of the AUTHENTICATE command

### 5.1.1 Introduction

The following clauses describe the impact of the 5G system on the existing AUTHENTICATE command, as defined in TS 31.102 [3].

### 5.1.2 Keys in the USIM

TS 33.501 [8] clause 6.1.1.3 describes the binding of the anchor key KSEAF to the serving network, to prevent one serving network from claiming to be a different serving network, and indicates that the anchor key provided to the serving network shall be specific to the authentication having taken place between the UE and a 5G core network.

As per TS 33.501 [8] clause 6.1.1.1, there is also another key KAUSF, that is left on the AUSF based on the home operator’s policy on using such key for authentication and key agreement procedures. As per TS 33.501 [8] clause 6.2.2.2, the ME shall generate the KAUSF from the CK, IK received from the USIM. The ME shall then generate the KSEAF from KAUSF. The ME shall then generate the KAMF. If the USIM supports 5G parameters storage, the KAUSF, KSEAF andKAMF shall be stored in the USIM.

New EF(s) need to be defined in the USIM for the storage of the keys listed above. A bit also needs to be reserved in the USIM Service Table to indicate the support for 5G parameters storage.

The USIM shall store the same long-term key K that is stored in the ARPF.

### 5.1.3 Input parameters

No new input parameters are needed for AUTHENTICATE command as the AKA procedures leverage authentication procedure as in 3G Security Context procedure. RES\* calculation as part of 5G-AKA procedure is not performed on the USIM. SA3 has clarified with [S3-180796](http://www.3gpp.org/ftp/TSG_SA/WG3_Security/TSGS3_90Bis_SanDiego/Docs/S3-180796.zip) that RES\* is computed in the ME.

### 5.1.4 Output parameters

No new output parameters are needed for AUTHENTICATE as the AKA procedures leverage authentication procedure as in 3G Security Context procedure. RES\* calculation as part of 5G-AKA procedure is not performed on the USIM. SA3 has clarified with [S3-180796](http://www.3gpp.org/ftp/TSG_SA/WG3_Security/TSGS3_90Bis_SanDiego/Docs/S3-180796.zip) that RES\* is computed in the ME.

## 5.2 5G NAS security context

### 5.2.2 Introduction

As per TS 33.501 [8] clause 6.3.4.1, the ME shall store two different 5G security contexts on the USIM if the USIM supports the 5G parameters storage.

In order to implement this requirement, a new bit in the USIM Service Table and an EF for storing 5G NAS security context may be needed in the USIM.

# 6 Storage capability to support 5G system

## 6.1 Existing EFs

### 6.1.1 Introduction

The following clauses describe the impact of 5G system on existing EFs stored in the USIM application.

### 6.1.2 EFs related to PLMN selection

#### 6.1.2.1 PLMN selection

According to TR 24.890 [11] clause 5.2.2, the same procedures for PLMN selection applicable for the GSM, UTRAN and E-UTRAN access technologies as described in 3GPP TS 22.011 [13] and 3GPP TS 23.122 [14] also apply for 5G-RAN, with only few exceptions.

#### 6.1.2.2 EFHPPLMN (Higher Priority PLMN search period)

According to the text in TS 31.102 [3] clause 4.2.6, the EFHPPLMN contains the interval of time between searches for a higher priority PLMN. The coding of this EF varies depending on the device that reads it. In particular for those MEs that only support NB-IoT, GERAN EC-GSM-IoT and Category M1 of E-UTRAN enhanced-MTC, or a combination of those, the values calculated from the EFHPPLMN are much longer.

Based on existing text in TR 24.890 [11], no changes are anticipated due to the introduction of 5G.

#### 6.1.2.3 EFPLMNwAcT (User controlled PLMN selector with Access Technology)

According to the text in TS 31.102 [3] clause 4.2.5, the EFPLMNwAcT contains the list of PLMNs and access technologies controlled by the user to be used during PLMN selection procedure. This access technology of each PLMN is coded as a bitmask.

5G system needs to be added to the coding of the access technology, using one of the exising RFU bits. Based on the response from SA1 in S1-173550, the UE does not need to differentiate between NR connected to 5GC and E-UTRA connected to 5GC. The UE however does need to differentiate between E-UTRA connected to 5GC and E-UTRA connected to EPC. Hence, the existing E-UTRAN bits in TS 31.102 [3] clause 4.2.5 correspond to E-UTRAN over EPC. A new coding is required for EUTRAN/NR over 5GC.

### 6.1.2.4 EFOPLMNwACT (Operator controlled PLMN selector with Access Technology)

The file EFOPLMNwACT specified in TS 31.102 [3] clause 4.2.53 is coded in the same way as the EFPLMNwAcT described in clause 6.1.2.3 of this document. For this reason, the same conclusions and coding apply to this EF as well.

### 6.1.2.5 EFHPLMNwACT (HPLMN selector with Access Technology)

The file EFHPLMNwACT specified in TS 31.102 [3] clause 4.2.54 is coded in the same way as the EFPLMNwAcT described in clause 6.1.2.3 of this document. For this reason, the same conclusions and coding apply to this EF as well.

### 6.1.3 Other EFs

### 6.1.3.1 CSG Lists

TS 31.102 [3] clause 4.4.6 contains the description of several EFs related to the usage of CSG functionality.

Support of CSG is not included in Rel-15 and might be added in the future releases.

## 6.2 New EFs

### 6.2.1 Forbidden areas

According to TR 24.890 [11] clause 5.2.2, the UE maintains a list of "forbidden areas" where the UE shall not send any signalling or user data. Anyway, according to the current text, this list is deleted when the UE is switched off or the USIM is removed.

In order to properly implement the last requirement, such list cannot be stored in the USIM, and in general, there would not be any advantage in storing it inside the USIM application.

### 6.2.2 Network slices

According to TR 24.890 [11] clause 13.2, a network slice is identified by an S-NSSAI, which is comprised of a slice/service type (SST) and an optional slice differentiator (SD). A set of S-NSSAI is called NSSAI and there are multiple types of NSSAI, that may be provided by the HPLMN to the UE per PLMN.

Section 13.2.2 further clarifies the details for the storage of the NSSAI, indicating that the configured NSSAI(s) and/or allowed NSSAI(s) shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM per PLMN, and that the configured NSSAI(s) and/or allowed NSSAI(s) can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete them.

### 6.2.3 Multimedia Priority Services

TS 22.153 [15] specifies the service requirements for Multimedia Priority Service (MPS). MPS allows certain subscribers priority access to system resources in situations such as during congestion, creating the ability to deliver or complete sessions of a high priority nature.

According to TS 24.890 [11] clause 12.1.5.2, an MPS-subscribed UE is configured with at least one access class in the range 11-15 on the USIM. Since Access Control Classes 11-15 are already defined in TS 31.102 [3], no new requirement is present for USIM for Multimedia Priority Services.

### 6.2.4 Subscriber Permanent Identifier

According to TS 23.501 [9] clause 5.9.1, each subscriber in the 5G system shall be allocated one 5G Subscription Permanent Identifier (SUPI). As per TS 24.501 [yy] clause 5.3.2, the SUPI can be the IMSI or a Network Access Identifier (NAI). Though non-IMSI based SUPIs are possible by using NAI, the IMSI can be contained within the NAI for the SUPI.

A new USIM service table bit may be needed to indicate if the USIM supports SUPI types other than IMSI. If the USIM supports SUPI types other than IMSI, CT6 needs to create a new EF for that.

According to TR 33.899 [6] clause E.7.2.1.2, SA3 agreed that privacy for the 5G permanent subscription identifier is part of 5G system Phase 1. Furthermore, SA3 also agreed that subscription identifier privacy shall be based upon HN asymmetric key solution, as indicated in TR 33.899 [6] clause E.7.2.6.2. SA3 has also agreed in TS 33.501 [8] clause 5.1.5 that the home network public key shall be stored on the tamper resistant secure hardware component. Anyway, SA3 has not concluded in which entities (e.g. ME, USIM) the calculation of SUCI is done.

CT6 needs to expand the USIM capabilities depending on the SA3 decision about the calculation of SUCI:

* if the calculation is done on the USIMUICC, then a new mechanism to calculate the SUCI is required, either extending one of the existing commands or with the introduction of a new command. Moreover, CT6 may decide to create a new EF that is not accessible by the ME to store the home network public key, in order to allow a standardized way to manage it;
* if the calculation is performed in the ME, then CT6 needs to add a new EF for the storage of the home network public key.

Editor’s Note: This section needs to be revised considering the SA3 decisions made in TS 33.501 [8].

### 6.2.5 5G Globally Unique Temporary Identity

In all previous access technologies, the temporary identities, in the form of TMSI, P-TMSI or GUTI, was stored in the USIM. TS 23.501 [9] clause 5.9.4 defines a new 5G-GUTI, that is allocated by the AMF and is common to both 3GPP and non-3GPP access. As mentioned in TS 24.501 [xx] Annex C, 5G-GUTI shall be stored in the USIM, if the corresponding file is present on the USIM.

So, a new USIM service table bit needs to be introduced for 5G mobility management parameters. A new EF also needs to be introduced to store the 5G mobility management parameters, including 5G-GUTI.

# 7 Other functionalities related to 5G system

## 7.1 Public warning system

According to TS 24.890 [11] clause 12.1.1, 5G PWS will have the same functionality as E-UTRAN PWS for 4G. It is expected that the same technology framework is used for the realization of PWS in 5GS and for this reason no additional impact is expected on the USIM.

## 7.2 eCall over IMS Emergency Services

TS 31.102 [3] clause 5.3.40 describes the usage of EFFDN, EFFDNURI, EFSDN and EFSDNURI to store the eCall test number/URI and the eCall reconfiguration number/URI to be used in case of eCall over IMS Emergency Services using the PS domain in E-UTRAN.

Based on the text in TS 23.501 [9] clause 5.16.4.10, eCall over IMS Emergency Services needs to be supported also on 5GS.

# 8 Toolkit aspects

## 8.1 Introduction

The following clauses describe the impact of the 5G system on the existing USIM Application Toolkit, as defined in TS 31.111 [4].

## 8.2 Existing commands and objects

### 8.2.1 Access Technology

TS 31.111 [4] lists all possible access technologies communicated to the UICC in clause 8.62, which points to a clause of ETSI TS 102 223 [12]. The introduction of 5G system requires the addition of a new item in that list.

Such addition needs to be done using one of the bits reserved by ETSI SCP for 3GPP for the definition of new access technologies.

### 8.2.2 Location Information

The TLV containing the Location Information is defined in TS 31.111 [4] clause 8.19. This is used in several USAT messages sent from the ME to the UICC. The content of this object is populated by the terminal with the identification (MCC, MNC, LAC/TAC, Cell Identity) of the current serving cell of the UE, when the UE is on GERAN, UTRAN or E-UTRAN.

The existing text defines the coding of the TAC and the Cell Identity with reference to E-UTRAN specifications, and a new definition of the coding for 5G System is required.

The cell identity for NR is specified as 36 bits long in TS 38.413 clause 9.3.1.7. This change would require an extension of the Location Information data object in TS 31.111, that is currently defined with only 32 bits for the Cell Identity value.

### 8.2.3 Timing Advance

According to TS 31.111 [4], the UICC can retrieve the Timing Advance (TA) information from the terminal. This information can be used by the UICC for a rough estimate of the location of the user. This mechanism is currently defined for GERAN and E-UTRAN.

As per TS 38.321 [16], the Timing Advance feature is applicable to NR as well. As per frame structure in TS 38.211 [17] clause 4.3, the definitions of Random Access Response TA and MAC-CE TA in TS 38.213 [18] clause 4.2 and the TA offset values defined in TS 38.133 [19], the maximum value of Timing Advance (NTA) may be derived. That derived value will require 21 bits for NTA. TS 31.111 [4] clause 8.46 currently reserves 1 byte for Timing Advance. That needs to be expanded to 3 bytes to accommodate maximum Timing Advance value in 5GS.

### 8.2.4 Network Measurament Results

According to TS 31.111 [4], the UICC can request the Network Measurament Results (NMR) from the terminal. The UICC can request both intra-RAT and inter-RAT measuraments, that might be available for the terminal.

The type of measurament requested by the UICC is specified in TS 31.111 [4] clause 8.73 that lists all possible requests. This list needs to be expanded to include new possible inter-RAT and intra-RAT measurament requests due to the new 5G RAT.

The results of the requested measurament is returned by the terminal to the UICC using the Network Measurement Results object, defined in clause 8.22. The definition of this object needs to be expanded to include the new network measurement results related to 5G RAT.

### 8.2.5 Network Rejection event

According to TS 31.111 [4] clause 7.5.2.1, the ME informs the UICC about a network reject event when it receives an ATTACH REJECT message or TRACKING AREA UPDATE REJECT message in E-UTRAN and if the UICC has requested this information using the SET UP EVENT LIST proactive command.

The event contains several items that can potentially be impacted by the 5G System:

* the Tracking Area indentification of the rejecting network (see also clause 8.2.2 above)
* the Access technology (see clause 8.2.1 above)
* the (Extended) Rejection Cause Code with the EMM Cause
* Update/Attach Type indicating the specific message that was rejected by the network

Editor’s Note: The impact of the 5G System for each of the items listed above needs to be determined, based on the protocol defined by CT1.

### 8.2.6 Bearer Independent Protocol

According to TS 31.111 [4], the UICC can provide a Bearer description object, as specified in TS 31.111 [4] clause 8.52, when it opens a BIP channel using OPEN CHANNEL, in order to request a specific QoS. In case of E-UTRAN, this object includes the "EPS quality of service" information element and the resource type (GBR or non-GBR).

The need for the QoS parameter in OPEN CHANNEL for BIP in 5GS is to be further evaluated in CT6, taking into consideration the adoption of the feature on the existing Radio Access Technologies.

### 8.2.7 Call control on PDU connection establishment by USIM

When the UICC supports it, the ME passes the PDN Connectivity Request message to the UICC for all EPS PDN connection activations (including those resulting from a OPEN CHANNEL proactive UICC command) using the ENVELOPE (CALL CONTROL) command. The UICC can modify some of the fields in the message (Access Point Name and Protocol configuration options) before the terminal sends the request to the network, as specified in TS 31.111 [4] clause 7.3.1.6.

The payload of the ENVELOPE (CALL CONTROL) needs to be expanded for the 5G System with a new data object called PDU connection establishment parameters. This new data object needs to be defined based on the PDU CONNECTION ESTABLISHMENT REQUEST message, defined in TS 24.890 [11] clause 9.6.

A new sub-clause 7.3.1.x needs to be added in TS 31.111 [4] with the procedure for call control for PDU connection establishment.

The need for a new bit in the USIM service table in TS 31.102 [3] for "call control on PDU connection for 5GS by USIM" is to be evaluated.

### 8.2.8 Data Connection Status Change Event

When the UICC has registered for the event, the ME notifies the UICC after each change in the data connection status, using the ENVELOPE (EVENT DOWNLOAD – Data Connection Status Change) command.

The description of the Data connection status object in TS 31.111 [4] clause 8.137 and the Data connection type object in TS 31.111 [4] clause 8.138 needs to be expanded to include the 5GS PDU connection establishment procedure.

The (E)SM cause data object in TS 31.111 [4] clause 8.129 needs to be expanded to include the 5GSM cause values as mentioned in TS 24.890 [11] clause 9.7.6.

Annex T of TS 31.111 [4] also needs to be updated to include PDU connection establishment scenarios related to 5GS as detailed in TS 24.890 [11].

### 8.2.9 LAUNCH BROWSER

When the UICC sends the LAUNCH BROWSER proactive command, it can optionally include a Bearer object. This is specified in TS 31.111 [4] clause 8.49. The value '03' indicates GPRS/UTRAN packet service/E-UTRAN.

It is recommended to add 5G system to the existing value '03' without further expanding the list.

## 8.3 Backward compatibility

It is expected that the UE might be able to access the 5G system with the existing UICC cards already in the market. For this reason, it is possible that the UE camps on a 5G system, while the card is not capable of recognizing it.

In order to handle this scenario, a new bit in the USIM Service Table is required to indicate support of 5G System, so that terminal can adjust its behaviour to what the UICC supports. Similarly, a new bit in the TERMINAL PROFILE is required, so that the ME can inform the card of the 5G support.

In order to provide a smooth transition, CT6 needs to study which fields defined in TS 31.111 [4] are impacted by the transition and if there is a possibility of conversion of 5G specific values into corresponding values that are already defined and that can be interpreted by an existing card. Such study needs to be performed on each of the fields listed in clause 8.2 and appropriate text needs to be added in TS 31.111 [4] as needed.

Annex A:  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-08 | CT6#85 | C6-170491 |  |  |  | Draft skeleton provided by the rapporteur. | 0.0.0 |
| 2017-08 | CT6#85 | C6-170492  C6-170493  C6-170508  C6-170498  C6-170433  C6-170500 |  |  |  | Implementing the p-CRs agreed by CT6 during CT6 #85 | 0.1.0 |
| 2017-08 | CT6#85 | C6-170516 |  |  |  | Draft for presentation to CT Plenary | 1.0.0 |
| 2017-11 | CT6#86 | C6-170665  C6-170710  C6-170711  C6-170712  C6-170713  C6-170714  C6-170718  C6-170719  C6-170720 |  |  |  | Draft for presentation to CT Plenary | 2.0.0 |
| 2017-11 | CT6#86 | C6-170665  C6-170710  C6-170711  C6-170712  C6-170713  C6-170714  C6-170718  C6-170719  C6-170720 |  |  |  |  | 15.0.0 |
| 2018-04 | CT#79 | C6-180036  C6-180055  C6-180076  C6-180056 | 0001  0002  0003  0004 | -  1  1  1 | C  B  C  C | Updates to 5G extension of AUTHENTICATE command  5G NAS Security Context on USIM  Updates to impact on Timing Advance in 5G Toolkit  Updates to impact on Location Information clause in 5G Toolkit | 15.1.0 |
| 2018-04 | CT#80 | C6-180125  C6-180151  C6-180150  C6-180149 | 0006  007  0008  0010 | -  1  1  - | B  B  B  B | Calculation of RES\* as part of 5G-AKA procedure  Updates to the section regarding calculation of SUCI  Updates to the section regarding 5G-GUTI storage on USIM  Updates to the section regarding usage of IMSI as SUPI | 15.2.0 |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | 16.0.0 |