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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	4
1 Scope	5
2 References	5
3 Definitions, symbols and abbreviations	5
3.1 Abbreviations	5
4 Mapping between 5GC interfaces causes and 5GMM Cause Codes by AMF.....	6
4.1 General	6
4.2 Mapping between Nausf services causes and 5GMM causes.....	6
4.2.1 General.....	6
4.3 Mapping between Nsmf services causes and 5GMM causes	7
4.3.1 General.....	7
4.3.2 Mapping between Nsmf_PDUSession service causes on N11 and 5GMM causes	7
4.3.2.1 General	7
4.3.2.2 Mapping from HTTP to 5GMM Cause Values.....	7
4.4 Mapping between Nudm services causes and 5GMM causes	8
4.4.1 General.....	8
4.4.2 Mapping between Nudm_UEContextManagement service causes on N8 and 5GMM causes.....	8
4.4.2.1 General	8
4.4.2.1 Mapping from HTTP to NAS cause values – Request rejected by UDM.....	8
4.5 Mapping between Neir services causes and 5GMM causes	8
4.5.1 General.....	8
4.5.2 Mapping between N5g-eir_EquipmentIdentityCheck Service causes on N17 and 5GMM causes	9
4.5.2.1 General	9
4.5.2.2 Mapping from HTTP to NAS cause values – Request accepted by EIR.....	9
4.6 Mapping between Nnssf services causes and 5GMM causes.....	9
4.6.1 General.....	9
4.6.2 Mapping between Nnssf_NSSelection service causes on N22 and 5GMM causes	9
4.6.2.1 General	9
4.6.2.2 Mapping from HTTP to 5GMM Cause Values.....	9
5 Mapping between 5GC interfaces causes and 5GSM Cause Codes by SMF.....	9
5.1 General	9
5.2 Mapping between Npcf service causes on N7 and 5GSM causes	10
5.2.1 General.....	10
5.2.2 Mapping between Npcf_SMPolicyControl Service causes on N7 and 5GSM causes	10
5.2.2.1 General	10
5.2.2.2 Mapping from HTTP to 5GSM cause values – Request rejected by PCF.....	10
5.3 Mapping between Nudm service causes on N10 and 5GSM causes	10
5.3.1 General.....	10
5.3.2 Mapping between Nudm_UEContextManagement service causes on N10 and 5GSM causes	10
5.3.2.1 General	10
5.3.2.2 Mapping from HTTP to 5GSM cause values – Request rejected by UDM due to N10 failures.....	11
5.4 Mapping between N4 causes and 5GSM causes	11
5.4.1 General.....	11
5.4.2 Mapping from N4 to 5GSM cause values.....	11
Annex A (informative): Change history	12
History	13

Foreword

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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 specifies the mapping between:

- 5GC NF HTTP Status Code and Application Error and 5GMM Cause Code;
- 5GC NF HTTP Status Code and Application Error and 5GSM Cause Code;
- N4 Cause Code and 5GSM Cause Code at the SMF.

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 29.244: "Interface between the Control Plane and the User Plane Nodes".
- [3] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [4] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".
- [5] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".
- [6] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [7] 3GPP TS 29.509: "5G System; Authentication Server Services; Stage 3".
- [8] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".
- [9] 3GPP TS 29.508: "5G System, Session Management Event Exposure Service; Stage 3".
- [10] 3GPP TS 29.540: "5G System; SMS Services; Stage3".
- [11] 3GPP TS 29.511: "5G System; Equipment Identity Register Services; Stage 3".

3 Definitions, symbols and abbreviations

3.1 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 format (EW)

<ACRONYM> <Explanation>

4 Mapping between 5GC interfaces causes and 5GMM Cause Codes by AMF

4.1 General

The following subclauses capture the mapping between HTTP status code and Application/Protocol Errors which are returned by NF services contacted by the AMF and their corresponding 5GMM cause values returned to the UE.

There is no mapping requested for the Nsmsf_SMSservice_Activate, Nsmsf_SMSservice_Deactivate and Nsmsf_SMSservice_UplinkSMS operations described in 3GPP TS 29.540 [x2].

Editor's Note: The current mapping towards 5GMM provided within this Technical Specification must be considered as FFS.

4.2 Mapping between Nausf services causes and 5GMM causes

4.2.1 General

The following subclauses describe the mapping for related Nausf services causes which result in a mapping towards 5GMM causes.

4.2.2 Mapping between Nausf_UEAuthentication service causes on N12 and 5GMM causes

4.2.2.1 General

The following subclauses describe the mapping between HTTP status code and Protocol or Application Error returned by the AUSF for Nausf_UEAuthentication service to the AMF and the corresponding 5GMM which is then provided to the UE. It also contains the mapping in case of a 200 OK is returned but the Authentication has failed.

4.2.2.2 Mapping from HTTP to 5GMM causes values – Request rejected by AUSF

Table .4.2.2-1: Mapping from HTTP to 5GMM cause values – Request rejected by AUSF

HTTP status code on N12	Protocol or Application Error	5GMM cause to UE
403 Forbidden	SERVING_NETWORK_NOT_AUTHORIZED	Cause #11 – PLMN not allowed Cause #73 – Serving network not authorized Cause #12 – Tracking area not allowed Cause #15 – No suitable cells in tracking area (NOTE1)
404 Not Found	CONTEXT_NOT_FOUND	N/A (NOTE 2)
504 Gateway Timeout	UPSTREAM_SERVER_ERROR	N/A (NOTE 2)
	NETWORK_FAILURE	N/A (NOTE 2)
500 Internal Server Error	AV_GENERATION_PROBLEM	N/A (NOTE 2)
NOTE 1: .One of the following 5GMM cause can be used.		
NOTE 2: There is no corresponding mapping since the Authentication is rejected.		

Editor's Note: It has been identified that the CONTEXT_NOT_FOUND may not be suitable and should be replaced as USER_UNKNOWN within 3GPP TS 29.509 [7].

4.2.2.3 Mapping from HTTP to 5GMM cause values – Request accepted by AUSF

Table .4.2.2-1: Mapping from HTTP to 5GMM cause values – Request accepted by AUSF

HTTP status code on N12	Protocol or Application Error	5GMM cause to UE
200 OK	The "authResult" in "ConfirmationDataResponse" is set to "AUTHENTICATION_FAILURE" (see subclause 6.1.6.2.9 of 3GPP TS 29.509 [7]).	Cause #3 – Illegal UE
	The "authResult" in "EapSession" is set to "AUTHENTICATION_FAILURE" (see subclause 6.1.6.2.9 of 3GPP TS 29.509 [7]).	Cause #3 – Illegal UE

4.3 Mapping between Nsmf services causes and 5GMM causes

4.3.1 General

When there is a failure to process a request to an Nsmf service operation by the SMF, the 5GSM cause of towards the UE cannot be generated by the SMF. In such cases, the Nsmf service operation status code shall be mapped by the AMF to a 5GMM cause code. This clause specifies the mapping of Nsmf service operation status code to a 5GMM cause code by the AMF.

4.3.2 Mapping between Nsmf_PDUSession service causes on N11 and 5GMM causes

4.3.2.1 General

The mapping of the HTTP status code and application level cause code returned by Nsmf_PDUSession service (see 3GPP TS 29.502 [8]) to 5GMM cause values by the AMF, for the cases where the SM message processing failed at SMF is specified in the following subclauses.

4.3.2.2 Mapping from HTTP to 5GMM Cause Values

Table 4.3.2.2-1: Mapping from HTTP to 5GMM cause values – Request rejected by SMF

HTTP status code on N11	Protocol or Application Error	5GMM cause to UE
403 Forbidden	OUT_OF_LADN_SERVICE_AREA	#43 - LADN not available
404 Not Found	CONTEXT_NOT_FOUND	N/A (NOTE)
500 Internal Server Error	INSUFFICIENT_RESOURCES_SLICE	N/A (NOTE)
	INSUFFICIENT_RESOURCES_SLICE_DNN	N/A (NOTE)
503 Service Unavailable	DNN_CONGESTION	N/A (NOTE)
	S-NSSAI_CONGESTION	N/A (NOTE)
504 Gateway Timeout	NETWORK_FAILURE	N/A (NOTE)

NOTE: An N1 SM cause is included by the SMF in the HTTP error response in this case.

4.4 Mapping between Nudm services causes and 5GMM causes

4.4.1 General

4.4.2 Mapping between Nudm_UEContextManagement service causes on N8 and 5GMM causes

4.4.2.1 General

This subclause describes the mapping between HTTP status code returned by the UDM to the AMF and the 5GMM which is then provided to the UE. The Nudm_UEContextManagement service is described in 3GPP TS 29.503 [5].

4.4.2.1 Mapping from HTTP to NAS cause values – Request rejected by UDM

Table 4.4.2.1-1: Mapping from HTTP to 5GMM cause values – Request rejected by UDM

HTTP status code on N8	Protocol or Application Error	5GMM cause to UE
403 Forbidden	UNKNOWN_5GS_SUBSCRIPTION	#7 – 5GS services not allowed
	ACCESS_NOT_ALLOWED	#15 "No suitable cells in tracking area", or #12 "Tracking area not allowed" or #72 – Non-3GPP access to 5GCN not allowed (NOTE)
	RAT_NOT_ALLOWED	#15 "No suitable cells in tracking area", or #13 "Roaming not allowed in this tracking area", or #12 "Tracking area not allowed" (NOTE)
	NO_PS_SUBSCRIPTION	#15 "No suitable cells in tracking area" or #12 "Tracking area not allowed" or #11 "PLMN not allowed" (NOTE)
	ROAMING_NOT_ALLOWED	#11 "PLMN not allowed" or #13 "Roaming not allowed in this tracking area", (NOTE)
404 Not Found	CONTEXT_NOT_FOUND	#9 "UE identity cannot be derived by the network"
404 Not Found	USER_NOT_FOUND	#3 "Illegal UE"
422 Unprocessable Entity	UNPROCESSABLE_REQUEST	#111 protocol error unspecified
NOTE: Any of those NAS Cause Code values may be sent to the UE, depending on operator's choice.		

4.5 Mapping between Neir services causes and 5GMM causes

4.5.1 General

This subclause describes the mapping between HTTP status code returned by the EIR to the AMF and the 5GMM which is then provided to the UE. The Neir services are described in 3GPP TS 29.511 [11]

4.5.2 Mapping between N5g-eir_EquipmentIdentityCheck Service causes on N17 and 5GMM causes

4.5.2.1 General

The following subclauses describe the cause mapping for N5g-eir_EquipmentIdentityCheck Service

4.5.2.2 Mapping from HTTP to NAS cause values – Request accepted by EIR

Table 4.5.2.2-1: Mapping from HTTP to 5GMM cause values – Request accepted by EIR

HTTP Status on N17	Protocol or Application information	5GMM cause to UE
200 OK	Equipment Status is set to "BLACKLISTED"	#6 "Illegal ME"

4.6 Mapping between Nnssf services causes and 5GMM causes

4.6.1 General

When there is a failure to process a request to an Nnssf service operation by the NSSF, it may result in the AMF generating a 5GMM cause code towards the UE. This clause specifies the mapping of Nnssf service operation status code to a 5GMM cause code by the AMF.

4.6.2 Mapping between Nnssf_NSSelection service causes on N22 and 5GMM causes

4.6.2.1 General

The mapping of the HTTP status code and application level cause code returned by Nnssf_NSSelection service (see 3GPP TS 29.531 [4]) to 5GMM cause values by the AMF is specified in the following subclauses.

4.6.2.2 Mapping from HTTP to 5GMM Cause Values

Table 4.6.2.2-1: Mapping from HTTP to 5GMM cause values – Request rejected by NSSF

HTTP status code on N22	Protocol or Application Error	5GMM cause to UE
403 Forbidden	SNSSAI_NOT_SUPPORTED	#90 - Payload was not forwarded. (NOTE 1) #15 - No suitable cells in tracking area. (NOTE 2)
NOTE 1: This 5GMM cause to UE is sent when AMF received the error from the NSSF during PDU session establishment procedure.		
NOTE 2: This 5GMM cause to UE is sent when AMF received the error from NSSF during Registration procedure.		

5 Mapping between 5GC interfaces causes and 5GSM Cause Codes by SMF

5.1 General

This clause describes the mapping between the HTTP Status Code and Application Errors returned by NF services contacted by SMF and their corresponding 5GSM cause values. The 5GSM cause value is then carried in N1 SM information IE.

There is no mapping requested for the Nsmf_PDUSession service over N11 since the 5GSM cause is carried with N1 SM Information (see 3GPP TS 29.502 [5]).

There is no mapping requested for the Nsmf_PDUSession service over N16 since the 5GSM cause is generated at the H-SMF and provided to the V-SMF in N1 SM Information (see 3GPP TS 29.502 [9]).

There is no mapping requested for the Nsmf_EventExposure service described in 3GPP TS 29.508 [9]

Editor's Note: The current mapping towards 5GSM provided within this Technical Specification must be considered as FFS.

5.2 Mapping between Npcf service causes on N7 and 5GSM causes

5.2.1 General

The following subclauses describe the mapping between HTTP status code returned by the PCF to the SMF and the 5GSM which is then provided to the UE.

5.2.2 Mapping between Npcf_SMPolicyControl Service causes on N7 and 5GSM causes

5.2.2.1 General

The following subclauses describe the cause mapping for Npcf_SMPolicyControl described in 3GPPTS 29.512 [x]. The 5GSM cause code which is sent within N1 SM information in parallel with HTTP Status Code and protocol Error to the AMF. The 5GSM cause is then provided to the UE.

5.2.2.2 Mapping from HTTP to 5GSM cause values – Request rejected by PCF

Table 5.2.2.2-1: Mapping from HTTP to 5GSM cause values – Request rejected by PCF

HTTP status code on N7	Protocol or Application Error	5GSM cause to UE
400 Bad Request	USER_UNKNOWN	Cause #29 "User authentication or authorization failed"
	ERROR_INITIAL_PARAMETERS	Cause #45 – Syntactical error in packet filter(s)
	ERROR_TRIGGER_EVENT	Cause #45 – Syntactical error in packet filter(s)
403 Forbidden	TRAFFIC_MAPPING_INFO_REJECTED	Cause #44 – Semantic errors in packet filter(s)
	ERROR_CONFLICTING_REQUEST	Cause #26 "Insufficient resources"

Editor's Note: The above mapping needs final checking and confirmation.

5.3 Mapping between Nudm service causes on N10 and 5GSM causes

5.3.1 General

This subclause describes the mapping between HTTP status code returned by the UDM to the SMF and the 5GSM which is then provided to the UE.

5.3.2 Mapping between Nudm_UEContextManagement service causes on N10 and 5GSM causes

5.3.2.1 General

This subclause describes the mapping between HTTP status code returned by the UDM during Nudm_UEContextManagement service (see 3GPP TS 29.503 [x]) to the SMF and corresponding 5GSM cause value. The 5GSM cause code is sent within N1 SM information in parallel with HTTP Status Code and protocol Error to the AMF. The 5GSM cause is then provided to the UE.

5.3.2.2 Mapping from HTTP to 5GSM cause values – Request rejected by UDM due to N10 failures

Table 5.3.2.2-1: Mapping from HTTP to 5GSM cause values – Request rejected by UDM due to N10 failures

HTTP status code on N10	Protocol or Application Error	5GSM cause to UE
403 Forbidden	ROAMING_NOT_ALLOWED	#29 "User authentication or authorization failed"
	DNN_NOT_ALLOWED	#27 "Missing or unknown DNN" or #67 "Insufficient resources for specific slice and DNN" (NOTE)
404 Not Found	USER NOT FOUND	#29 "User authentication or authorization failed"
NOTE: Any of those NAS Cause Code values may be sent to the UE, depending on operator's choice.		

5.4 Mapping between N4 causes and 5GSM causes

5.4.1 General

The N4 error handling and cause codes are defined in 3GPP TS 29.244 [3].

The receipt of an N4 error may trigger error handling in SMF. The mapping table specifies causes mapping when an error received on N4 interface cannot be resolved by SMF and results in the SMF sending a 5GSM message to the UE.

5.4.2 Mapping from N4 to 5GSM cause values

Table 5.4.2-1: Mapping from N4 to 5GSM cause values – Request rejected by SMF due to N4 failures

N4 Cause Code		5GSM cause to UE	
Cause value Decimal	Error description	Cause value	Error description
64	Request rejected (reason not specified)	#31	Request rejected, unspecified
74	PFCP entity in congestion	#	Insufficient resources
77	System failure	#31	Request rejected, unspecified

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2018-10	CT4#86Bis					First version of this new TS including: C4-187375 (Skeleton) C4-187378 (N11 – 5GMM) C4-187391 (N8 – 5GMM – Request rejected) C4-187589 (Scope) C4-187390 (N4 – 5GMM)	0.1.0
2018-12	CT4#87					The following agreed documents are included: C4-188418 (NSSF) C4-188484 (Nsmf_PDUSession N11 and N16) C4-188486 (Cause 5GMM) C4-188609 (N4) C4-188637 (N8 and 5GMM) C4-188638 (EIR) C4-188640 (N10 and 5GSM) C4-188641 (N7) C4-188642 (Nausf) C4-188643 (N11 5GMM) C4-188647 (Clean-up) (Conclusion from C4-188384 was wrongly reported to be included in 5GSM General Clause while it applied to 5GMM – corrected by Rapporteur). C4-188648 (General 5GSM)	0.2.0
2018-12	CT#82	CP-183104				Sent for information and approval	1.0.0
2018-12	CT#82	CP-183104				Approved in CT#82	15.0.0

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