**3GPP TSG-CT WG1 Meeting #126-eC1-205965r02**

**Electronic meeting, 15-23 October 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **2659** | **rev** | **1** | **Current version:** | **17.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  | Missing lower layer indications of barring and alleviation of barring |
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| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2020-10-21 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)* |
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| ***Reason for change:*** | 1st reason for change:In present subclauses for UAC, what is catered for when NAS makes an request for access, is that lower layers respond back with "*an indication that access barring is applicable for all access categories except categories 0 and 2*". Also presently in some subclause for UAC processing, there are text to cover that alleviation of access barring can be indicated for individually barred ACs.But one can see that in TS 38.331, RAN2 has factored in that individual AC can be barred and can also indicate access barring is applicable for all access categories except catgeory 0. – see extarcts here from TS 38.331 ….5.3.14.2 InitiationUpon initiation of the procedure, the UE shall:………………………………………..1> if the access barring check was requested by upper layers:2> if the access attempt is considered as barred:3> if timer T302 is running:4> if timer T390 is running for Access Category '2':5> inform the upper layer that access barring is applicable for all access categories except categories '0', upon which the procedure ends;4> else5> inform the upper layer that access barring is applicable for all access categories except categories '0' and '2', upon which the procedure ends;3> else:4> inform upper layers that the access attempt for the Access Category is barred, upon which the procedure ends;2> else:3> inform upper layers that the access attempt for the Access Category is allowed, upon which the procedure ends;1> else:2> the procedure ends.………………………………………...Thisindication of access barring is applicable for all access categories except catgeory 0 is missing in the handling to avoid double barring.2nd reason for change:At CT1#123E, agreed 24.501CR2184 (C1-202680) made it possible that NAS can indicate to upper layers that a requested access for emergency service is barred. This is to allow that upper layers can take subsequent action to attempt the emergency service elsewhere (in another domain or system).However, what is not provided in that CR is that if access barring for AC 2 is alleviated, the lower layers will inform NAS (see TS 38.331, and some of above). And when such an indication of alleviation of barring for AC 2 comes, the upper layers ought to be likewise informed. |
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| ***Summary of change:*** | The missing barring and allevaition indications from RRC are introduced. |
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| ***Consequences if not approved:*** | Missing RRC indications of barring and allevation of barring will remain not handled and can cause wrong checks for double barring. |
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| ***Clauses affected:*** | 4.5.4.1, 4.5.5 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* First Change \* \* \* \*

#### 4.5.4.1 Access control and checking in 5GMM-IDLE mode and in 5GMM-IDLE mode with suspend indication

When the UE is in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication, upon receiving a request from the upper layers for an access attempt, the NAS shall categorize the access attempt into access identities and an access category following:

a) subclause 4.5.2, table 4.5.2.1 and table 4.5.2.2, and subclause 4.5.3, if the UE is not operating in SNPN access mode; or

b) subclause 4.5.2A, table 4.5.2A.1 and table 4.5.2A.2, and subclause 4.5.3, if the UE is operating in SNPN access mode,

and provide the applicable access identities and the access category to the lower layers for the purpose of access control checking. In this request to the lower layer the NAS can also provide to the lower layer the RRC establishment cause determined as specified in subclause 4.5.6 of this specification.

NOTE 1: The access barring check is performed by the lower layers.

NOTE 2: As an implementation option, the NAS can provide the RRC establishment cause to the lower layers after being informed by the lower layers that the access attempt is allowed.

If the UE has uplink user data pending for one or more PDU sessions when it builds a REGISTRATION REQUEST or SERVICE REQUEST message as initial NAS message, the UE shall indicate the respective PDU sessions in the Uplink data status IE as specified in subclause 5.5.1.3.2 and 5.6.1.2.1, regardless of the access category for which the access barring check is performed.

If the UE is registered for 5GS services with control plane CIoT 5GS optimization has uplink user data pending for one or more PDU sessions when it builds a CONTROL PLANE SERVICE REQUEST message as initial NAS message, the UE shall indicate the respective PDU sessions as specified in subclause 5.6.1.2.2, regardless of the access category for which the access barring check is performed.

NOTE 3: The UE indicates pending user data for all the respective PDU sessions, even if barring timers are running for some of the corresponding access categories.

If the lower layers indicate that the access attempt is allowed, the NAS shall initiate the procedure to send the initial NAS message for the access attempt.

If the lower layers indicate that the access attempt is barred, the NAS shall not initiate the procedure to send the initial NAS message for the access attempt. Additionally:

a) if the event which triggered the access attempt was an MO-MMTEL-voice-call-started indication or an MO-MMTEL-video-call-started indication:

1) if the UE is operating in the single-registration mode, the UE's usage setting is "voice centric" and the UE has not disabled its E-UTRA capability as specified in 3GPP TS 24.301 [15], the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15];

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15]; or

3) otherwise, the NAS shall notify the upper layers that the access attempt is barred. In this case, upon receiving an indication from the lower layers that the barring is alleviated for the access category with which the access attempt was associated, the NAS shall notify the upper layers that the barring is alleviated for the access category and may initiate the procedure to send the initial NAS message, if still needed;

b) if the event which triggered the access attempt was an MO-SMSoIP-attempt-started indication or an MO-IMS-registration-related-signalling-started indication:

1) if the UE is operating in the single-registration mode, the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15];

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15]; or

3) otherwise, the NAS shall notify the upper layers that the access attempt is barred. In this case, upon receiving an indication from the lower layers that the barring is alleviated for the access category with which the access attempt was associated, the NAS shall notify the upper layers that the barring is alleviated for the access category and may initiate the procedure to send the initial NAS message, if still needed; and

c) if the access attempt is for emergency:

1) the NAS shall notify the upper layers that the access attempt is barred. In this case, upon receiving an indication from the lower layers that the barring is alleviated for the access category with which the access attempt was associated, the NAS shall notify the upper layers of that the barring is alleviated for the access category and may initiate the procedure to send the initial NAS message, if still needed.

NOTE 4: This can result in the upper layers requesting another emergency call attempt using domain selection as specified in 3GPP TS 23.167 [6] and 3GPP TS 24.229 [14].

NOTE 5: Barring timers, on a per access category basis, are run by the lower layers. At expiry of barring timers, the indication of alleviation of access barring is indicated to the NAS on a per access category basis.

\* \* \* Next Change \* \* \* \*

### 4.5.5 Exception handling and avoiding double barring

Access attempts are allowed to proceed without further access control checking in order to avoid double barring for any service request or registration procedure initiated for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4). For any service request or registration procedure of this kind the UE determines an access category as specified in subclause 4.5.1 and 4.5.2 or 4.5.2A, unless a different access category is specified in the rest of the present subclause.

NOTE 1: Although the access control checking is skipped, the access category is determined for the specific access attempt in order to derive an RRC establishment cause.

There are several services or an MO IMS registration related signalling for which the NAS needs to be informed when the service starts and stops,

- because, while the service is ongoing or the MO IMS registration related signalling is ongoing, the mapping of other access attempts to a specific access category can be affected; and

- in order to avoid double barring at the start of these services or at the start of the MO IMS registration related signalling.

These services are:

a) emergency service;

b) MMTEL voice;

c) MMTEL video;

d) SMSoIP;

e) SMS over NAS;

f) 5GC-MO-LR procedure;

g) UE triggered V2X policy provisioning procedure; and

h) CIoT user data transfer over the control plane.

The UE considers an emergency service a) as started when 5GMM receives a request from upper layers to register for emergency services or to establish a PDU session with request type = "initial emergency request" or "existing emergency PDU session". It considers the emergency service as stopped when this PDU session is released.

In addition, the UE considers an emergency service a) as started when the 5GMM receives a request from the upper layers to perform emergency service fallback and performs emergency services fallback as specified in subclause 4.13.4.2 of 3GPP TS 23.502 [9]. In this case, the UE considers the emergency service as stopped when:

- the emergency PDU session established during the emergency services fallback is released if the UE has moved to an E-UTRA cell connected to 5GCN; or

- the service request procedure involved in the emergency services fallback is completed otherwise.

While an emergency service a) is ongoing, any access attempt triggered by the initiation of a registration, de-registration or service request procedure or by an uplink user data packet to be sent for a PDU session with suspended user-plane resources is mapped to access category 2 = emergency.

Once the emergency service has successfully passed access control, then as long as the service is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

- any service request procedure related to the PDU session associated with request type = "initial emergency request" or "existing emergency PDU session"; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources associated with request type = "initial emergency request" or "existing emergency PDU session".

NOTE 2: Although the access control checking is skipped, the mapping is performed in order to derive an RRC establishment cause.

For services b) to h) the 5GMM receives explicit start and stop indications from the upper layers.

For the case of handover of ongoing services b) to d) from non-3GPP access, the 5GMM receives an additional explicit handover of ongoing service from non-3GPP access indication from the upper layer.Once the service has successfully passed access control, then as long as the service is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

- for services b), c) and d):

1) any service request procedure related to the PDU session established for DNN = "IMS" except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2 or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt;

- for service d), if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS":

1) any service request procedure related to the PDU session established for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for access category 6; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access category except category 0, and receiving from the lower layers an indication that the barring is alleviated for access category 6.

For the MO IMS registration related signalling, the 5GMM receives explicit start and stop indications from the upper layers.

Once the MO IMS registration related signalling has successfully passed access control, then as long as the MO IMS registration related signalling is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

1) any service request procedure related to the PDU session established for DNN = "IMS" and for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS", except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2 and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" and for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2 and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt;

While an MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established for DNN = "IMS" is mapped to access category 4;

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" is mapped to access category 4; and

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 4.

While an MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established for DNN = "IMS" is mapped to access category 5;

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" is mapped to access category 5; and

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 5.

While an SMSoIP is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established:

1) for DNN = "IMS"; or

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

 is mapped to access category 6; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established:

1) for DNN = "IMS"; or

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

 is mapped to access category 6; and

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 6.

While an MO IMS registration related signalling is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established:

1) for DNN = "IMS"; and

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

 is mapped to access category 9; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established:

1) for DNN = "IMS"; and

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

 is mapped to access category 9; and

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 9.

While an SMS over NAS is ongoing, no SMSoIP is ongoing, no MO IMS registration related signalling is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 6.

While a 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MO IMS registration related signalling is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4) is mapped to access category 3.

While a UE triggered V2X policy provisioning procedure is ongoing, no 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

 initiated in 5GMM-IDLE mode for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4) is mapped to access category 3.

While CIoT user data transfer over the control plane is ongoing, no 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing, any service request procedure initiated in 5GMM-IDLE mode following a fallback indication from the lower layers (see subclause 5.3.1.4) is mapped to access category 7.

NOTE 3: Although the access control checking is skipped, the mapping is performed in order to derive an RRC establishment cause.

If an access category is determined and the access control checking is skipped, the NAS shall determine the RRC establishment cause from one or more determined access identities and the access category as specified in subclause 4.5.6, the NAS shall initiate the procedure to send the initial NAS message for the access attempt and shall provide the RRC establishment cause to lower layers.

If the UE receives from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2:

a) if an MMTEL voice call or MMTEL video call is ongoing:

1) if the UE is operating in the single-registration mode and the UE's usage setting is "voice centric", the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15]; and

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15]; and

b) if SMSoIP is ongoing or an MO IMS registration related signalling is ongoing:

1) if the UE is operating in the single-registration mode, the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15]; and

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15].

\* \* \* End of Changes \* \* \* \*