**3GPP TSG-CT WG1 Meeting #125-eC1-20xxxx**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3415** | **rev** | **1** | **Current version:** | **16.5.1** |  |
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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:***  | Clarification on the scope of a UE radio capability ID in EPS |
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| ***Source to WG:*** | MediaTek Inc. |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | RACS |  | ***Date:*** | 2020-08-25 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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:*** | In Annex C (normative): Storage of EMM information*Each network-assigned UE radio capability ID is stored together with a PLMN identity of the PLMN that provided it as well as a mapping to the* ***corresponding*** *UE radio configuration, and is valid in that PLMN…*In 5.3.20 UE radio capability signalling optimisation*upon receiving a network-assigned UE radio capability ID in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message, the UE shall store the network-assigned UE radio capability ID and the PLMN ID of the serving network along with a mapping to the* ***current*** *UE radio configuration in its non-volatile memory as specified in annex C…*The ***current*** *UE radio configuration* is ambuigious:When the network queries the capability of an UE, it is possible (and commonly seen) that the network only query partial UE ***current*** capability, e.g., by using a filter.Thus It is impossible for the network to **be able to always** map the ID to full ***current*** *UE* side *radio configuration.*Besides, TR 37.873 states “*the ID is associated to* ***whatever*** *capabilities it has* ***transferred earlier***”, TS23.401 and TS23.501 state “*an identifier to represent* ***a set of*** *UE radio capabilities*”, this needs to be reflected in the stage3 SPEC in a more precise way. |
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| ***Summary of change:*** | UE radio capability ID refers to whatever capabilities it has transferred earlier |
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| ***Consequences if not approved:*** | Wrong interpretation of the meaning of an UE radio capability ID. |
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| ***Clauses affected:*** | 5.3.20, Annex C |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* change \*\*\*

### 5.3.20 UE radio capability signalling optimisation

UE radio capability signalling optimisation (RACS) is a feature that is optional at both the UE and the network and which aims to optimise the transmission of UE radio capability over the radio interface (see 3GPP TS 23.401 [10]). RACS works by assigning an identifier to represent a set of UE radio capabilities. This identifier is called the UE radio capability ID. A UE radio capability ID can be either manufacturer-assigned or network-assigned. The UE radio capability ID is an alternative to the signalling of the radio capabilities container over the radio interface.

In this release of the specification, RACS is not applicable to NB-S1 mode.

If the UE supports RACS:

- the UE shall indicate support for RACS by setting the RACS bit to "RACS supported" in the UE network capability IE of the ATTACH REQUEST and TRACKING AREA UPDATE REQUEST messages;

- if the UE performs an attach procedure and the UE has an applicable UE radio capability ID for the current UE radio configuration in the selected network, the UE shall include the UE radio capability ID availability IE in the ATTACH REQUEST message and set the IE to "UE radio capability ID available";

- if the UE performs a tracking area updating procedure and the UE has an applicable UE radio capability ID for the current UE radio configuration in the selected network, the UE shall include the UE radio capability ID availability IE in the TRACKING AREA UPDATE REQUEST message and set the IE to "UE radio capability ID available";

- If the UE is requested to provide its UE radio capability ID by the network during a security mode control procedure, the UE shall include its UE radio capability ID in the UE radio capability ID IE of the SECURITY MODE COMPLETE message. If both a network-assigned UE radio capability ID and a manufacturer-assigned UE radio capability ID are applicable, the UE shall include the network-assigned UE radio capability ID in the SECURITY MODE COMPLETE message;

- if the radio configuration at the UE changes (for instance because the UE has disabled a specific radio capability) then:

a) if the UE has an applicable UE radio capability ID for the new UE radio configuration, the UE shall initiate a tracking area updating procedure, include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message and include a UE radio capability ID availability IE set to "UE radio capability ID available" in the TRACKING AREA UPDATE REQUEST message. If both a network-assigned UE radio capability ID and a manufacturer-assigned UE Radio Capability ID are applicable, the UE shall include the network-assigned UE radio capability ID in the TRACKING AREA UPDATE REQUEST message; and

b) if the UE does not have an applicable UE radio capability ID for the new UE radio configuration, the UE shall initiate a tracking area updating procedure and shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message;

NOTE: Performing the tracking area updating procedure with the UE radio capability information update needed IE included in the TRACKING AREA UPDATE REQUEST message and without the UE radio capability ID availability IE set to "UE radio capability ID available" in the TRACKING AREA UPDATE REQUEST message as specified in b) above can trigger the network to assign a new UE radio capability ID to the UE.

- upon receiving a network-assigned UE radio capability ID in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message, the UE shall store the network-assigned UE radio capability ID and the PLMN ID of the serving network along with a mapping to the UE reported radio configuration in its non-volatile memory as specified in annex C. The UE shall be able to store at least the last 16 received network-assigned UE radio capability IDs with the associated PLMN ID and the mapping to the corresponding UE radio configuration;

- the UE shall not use a network-assigned UE radio capability ID in PLMNs equivalent to the PLMN which assigned it; and

- upon receiving a UE radio capability ID deletion indication IE set to "delete network-assigned UE radio capability IDs" in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message, the UE shall delete all network-assigned UE radio capability IDs stored at the UE for the serving network and initiate a tracking area updating procedure. If the UE has an applicable manufacturer-assigned UE radio capability ID for the current UE radio configuration in the selected network, the UE shall include a UE radio capability ID availability IE set to "UE radio capability ID available" in the TRACKING AREA UPDATE REQUEST message.

If the network supports RACS:

- if the UE has included the UE radio capability ID availability IE in the ATTACH REQUEST message and set the IE to "UE radio capability ID available", the network shall initiate a security mode control procedure to retrieve the UE radio capability ID from the UE;

- if the UE has included the UE radio capability ID availability IE in the TRACKING AREA UPDATE REQUEST message and set the IE to "UE radio capability ID available", the network may initiate a security mode control procedure to retrieve the UE radio capability ID from the UE;

- if the UE has included the UE radio capability ID availability IE in the TRACKING AREA UPDATE REQUEST message, set the URCIDA bit to "UE radio capability ID available" in the UE radio capability ID availability IE and no UE radio capability ID is available in the UE context in the MME, the network shall initiate a security mode control procedure to retrieve the UE radio capability ID from the UE;

- the network may assign a network-assigned UE radio capability ID to a UE which supports RACS by including a UE radio capability ID IE in the ATTACH ACCEPT message, in the TRACKING AREA UPDATE ACCEPT message or in the GUTI REALLOCATION COMMAND message; and

- the network may trigger the UE to delete all network-assigned UE radio capability IDs stored at the UE for the serving network by including a UE radio capability ID deletion indication IE set to "delete network-assigned UE radio capability IDs" in the ATTACH ACCEPT message, in the TRACKING AREA UPDATE ACCEPT message or in the GUTI REALLOCATION COMMAND message.

\*\*\* change \*\*\*

Annex C (normative):
Storage of EMM information

The following EMM parameters shall be stored on the USIM if the corresponding file is present:

- GUTI;

- last visited registered TAI;

- EPS update status;

- Allowed CSG list;

- Operator CSG list; and

- EPS security context parameters from a full native EPS security context (see 3GPP TS 33.401 [19]).

The presence and format of corresponding files on the USIM is specified in 3GPP TS 31.102 [17].

If the corresponding file is not present on the USIM, these EMM parameters except allowed CSG list are stored in a non-volatile memory in the ME together with the IMSI from the USIM. The allowed CSG list is stored in a non-volatile memory in the ME if the UE supports CSG selection. These EMM parameters can only be used if the IMSI from the USIM matches the IMSI stored in the non-volatile memory; else the UE shall delete the EMM parameters.

The following EMM parameters shall be stored in a non-volatile memory in the ME together with the IMSI from the USIM:

- TIN;

- DCN-ID list; and

- network-assigned UE radio capability IDs.

The TIN parameter can only be used if the IMSI from the USIM matches the IMSI stored in the non-volatile memory of the ME; else the UE shall delete the TIN parameter.

The DCN-ID list consists of DCN-IDs stored together with a PLMN identity. The list can have zero or more entries and the maximum length shall be at least 32 entries. When the maximum length is reached any new entry shall replace the oldest entry in the list. There shall be no duplicated PLMN identities in the list and any existing DCN-ID shall be deleted when a new DCN-ID is added for the same PLMN.

The DCN-ID list can only be used if the IMSI from the USIM matches the IMSI stored in the non-volatile memory of the ME; else the UE shall delete the DCN-ID list. The UE shall delete the stored DCN-ID list if the default standardized DCN-ID in the UE is changed.

Each network-assigned UE radio capability ID is stored together with a PLMN identity of the PLMN that provided it as well as a mapping to the corresponding UE reported radio configuration, and is valid in that PLMN. A network-assigned UE radio capability ID can only be used if the IMSI from the USIM matches the IMSI stored in the non-volatile memory of the ME, else the UE shall delete the network-assigned UE radio capability ID. The UE shall be able to store at least the last 16 received network-assigned UE radio capability IDs. There shall be only one network-assigned UE radio capability ID stored for a given combination of PLMN identity and UE radio configuration and any existing UE radio capability ID shall be deleted when a new UE radio capability ID is added for the same combination of PLMN identity and UE radio configuration. If the UE receives a network-assigned UE radio capability ID with a Version ID value different from the value included in the network-assigned UE radio capability ID(s) stored at the UE for the serving PLMN, the UE may delete these stored network-assigned UE radio capability ID(s).

If the UE is attached for emergency bearer services, the UE shall not store the EMM parameters described in this annex on the USIM or in non-volatile memory. Instead the UE shall temporarily store these parameters locally in the ME and the UE shall delete these parameters when the UE is detached.

If the UE is configured for eCall only mode as specified in 3GPP TS 31.102 [17], the UE shall not store the EMM parameters described in this annex on the USIM or in non-volatile memory. Instead the UE shall temporarily store these parameters locally in the ME and the UE shall delete these parameters when the UE enters EMM-DEREGISTERED.eCALL-INACTIVE state, the UE is switched-off or the USIM is removed.

If the UE is attached for access to RLOS, the UE shall not store the EMM parameters described in this annex on the USIM or in non-volatile memory. Instead, the UE shall temporarily store these parameters locally in the ME and the UE shall delete these parameters after detach.

\*\*\* end of change \*\*\*