**3GPP TSG- Meeting #**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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 |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  |  |
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| ***Source to WG:*** | , Vodafone |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | A |  | ***Release:*** |  |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The gNB(see TS 38.413) or the eNB (see TS 36.413) can pass to the AMF and MME respectively a UE Radio Capability for Paging IE as part of the UE Capability Info Indication message.The AMF and MME as part of normal operation would store this information and send it to the gNB and eNB respectively in the paging message.This information is extracted by the gNB and eNB respectively when the UE provides the UE Radio Capability Information via RRC.

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| See for instance TS 36.4138.9.2 Successful OperationFigure 8.9.2-1: UE Capability Info Indication procedure. Successful operation.The eNB controlling a UE-associated logical S1-connection initiates the procedure by sending a UE CAPABILITY INFO INDICATION message to the MME including the UE capability information. The UE CAPABILITY INFO INDICATION message may also include paging specific UE capability information within the *UE Radio Capability for Paging* IE. The UE capability information received by the MME shall replace previously stored corresponding UE capability information in the MME for the UE, as described in TS 23.401 [11]. -----------------------------------------------------------------------------9.2.1.98 UE Radio Capability for PagingThis IE contains paging specific UE Radio Capability information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| UE Radio Capability for Paging | M |  | OCTET STRING | Includes either the *UERadioPagingInformation* message as defined in 10.2.2 ofTS 36.331 [16], or the *UERadioPagingInformation-NB* message as defined in 10.6.2 of TS 36.331 [16]. |

=========================================================See TS 38.3138.14.1.2 Successful OperationFigure 8.14.1.2-1: UE radio capability info indicationThe NG-RAN node controlling a UE-associated logical NG connection initiates the procedure by sending a UE RADIO CAPABILITY INFO INDICATION message to the AMF including the UE radio capability information.The UE RADIO CAPABILITY INFO INDICATION message may also include paging specific UE radio capability information within the *UE Radio Capability for Paging* IE.-------------------------------------------------------------------9.3.1.68 UE Radio Capability for PagingThis IE contains paging specific UE Radio Capability information.

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| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| UE Radio Capability for Paging of NR | O |  | OCTET STRING | Includes the RRC *UERadioPagingInformation* message as defined in TS 38.331 [18]. |
| UE Radio Capability for Paging of E-UTRA | O |  | OCTET STRING | Includes the RRC *UERadioPagingInformation* message as defined in TS 36.331 [21]. |
| UE Radio Capability for Paging of NB-IoT | O |  | OCTET STRING | Includes the RRC *UERadioPagingInformation-NB* message as defined in TS 36.331 [21]. |

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However the UCMF only stores the UE radio capabilities and does not store the UE Radio Capability for Paging. This means that AMF would not receive this information from the UCMF (or have it locally stored as a mapped value of the UE Radio Capability ID in a local cache), if a UE registers indicating a UE Radio Capability ID (whether PLMN assigned or UE manufacturer assigned).This for instance is the case of a returning UE to a PLMN for which the UE has already in its cache a valid PLMN assigned ID for the current radio configuration, or where it can use a manufacfurer-assigned ID, if the UCMF cannot provide to the AMF the UE Radio Capability for Paging as per current specs, if the AMF does not have the UE context stored then the AMF would have to retrieve the UE Radio Capability for the UE from the RAN exaclty likwe it would for UEs that do not signal the UE Radio Capability ID.In other words, the only way for the RAN and AMF to obtain the UE Radio Capability for Paging would be to request the UE to upload the UE radio capability and this even if the UE has already provided these by means of a UE Radio Capability ID. So, the RACS feature would not eliminate the need to retrieve the UE capability information from the RAN so that the RAN provides the UE radio Capability for Paging, even after the UE has provided the UE Radio Capability ID in a registration message, and this is counter to the goals of the work item on " Optimisations on UE radio capability signalling" which was aiming at avoiding retrieval of radio capability information from the UE if the Ue provides the UE Radio Capabilities ID |
|  |  |
| ***Summary of change:*** | Clarified that the *UE Radio Capability Information for Paging* the AMF receives from the RAN is stored in the UCMF (i.e. this informaiton is passed to the UCMF). it is clarified that the UE manufacturer assigned ID mapped information provided by UE manufacturers needs to include the UE radio capability for paging information. |
|  |  |
| ***Consequences if not approved:*** | Reduced value of the RACS feature as the CN has still to retrieve the UE Radio capabilty for paging from the RAN as the information is not associated to the RACS UE Radio Capability ID. |
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| ***Clauses affected:*** | 5.2.6.17, 5.2.18 |
|  |  |
|  | **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:*** |  |

#### 5.2.6.17 Nnef\_UCMFProvisioning service

##### 5.2.6.17.1 General

This service is for allowing external party to provision the UCMF with UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs.

##### 5.2.6.17.2 Nnef\_UCMFProvisioning\_Create operation

**Service operation name:** Nnef\_UCMFProvisioning\_Create

**Description:** The consumer creates a UCMF dictionary entry (or more entries) for a Manufacturer-assigned UE Radio Capability ID via the NEF. For each UE Radio Capability ID the following inputs are provided:

a) a UE radio access capability set with respective Coding format or the UE radio access capability set in both TS 36.331 [16] and TS 38.331 [12] coding formats and each RAT’s UE Radio Capability for Paging; and

b) the related UE model(s) IMEI/TAC value(s) the UE radio capability ID applies to.

**Inputs, Required:** (list of) [UE Radio Capability ID, set(s) of UE Radio Access Capability set and UE Radio Capability for Paging and respective Coding format(s), (List of) IMEI/TAC value(s)].

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

The Coding format(s) indicates the format of the respective UE radio access capabilities as defined in TS 36.331 [16] or TS 38.331 [12].

##### 5.2.6.17.3 Nnef\_UCMFProvisioning\_Delete operation

**Service operation name:** Nnef\_UCMFProvisioning\_Delete

**Description:** The consumer deletes a UCMF dictionary entry for a Manufacturer-assigned UE Radio Capability ID via the NEF. The consumer provides a (list of) UE radio capability ID value(s) to be deleted or it may provide the IMEI/TAC values for which the associated UE radio capability ID entries shall be no longer used.

**Inputs, Required:** UE Radio Capability ID(s) of the UCMF dictionary entry(ies) to be deleted or IMEI/TAC(s) that no longer use associated UE radio Capability ID(s).

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

##### 5.2.6.17.4 Nnef\_UCMFProvisioning\_Update operation

**Service operation name:** Nnef\_UCMFProvisioning\_Update

**Description:** The consumer updates the list of IMEI/TAC values a UCMF dictionary entry(or a list of entries) applies to for a Manufacturer-assigned UE Radio Capability ID via the NEF. For each UE Radio Capability ID provided, (a list of) UE model(s) IMEI/TAC value(s) to be added or removed to the related UCMF entry is provided.

**Inputs, Required:** Update Type (one of "Add IMEI/TAC Values" or "Remove IMEI/TAC Values") and:

- If Update Type is "Add IMEI/TAC Values", the (list of) UE Radio Capability ID(s) of the UCMF dictionary entry(ies) to be updated and the related additional (list of) IMEI/TAC(s); or

- If Update Type is "Remove IMEI/TAC Values", the (list of) UE Radio Capability ID(s) of the UCMF dictionary entry(ies) to be updated and the related (list of) IMEI/TAC(s) to be removed.

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

Next CHANGE

### 5.2.18 UCMF Services

#### 5.2.18.1 General

The following table illustrates the UCMF Services.

Table 5.2.18.1-1: NF services provided by UCMF

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | Operation Semantics | Example Consumer(s) |
| Nucmf\_Provisioning | Create | Request/Response | AF, NEF |
|  | Delete | Request/Response | AF, NEF |
|  | Update | Request/Response | AF, NEF |
| Nucmf\_UECapabilityManagement | Resolve | Request/Response | AMF |
|  | Assign | Request/Response | AMF |
|  | Subscribe | Subscribe/Notify | AMF |
|  | Unsubscribe | Subscribe/Notify | AMF |
|  | Notify | Subscribe/Notify | AMF |

#### 5.2.18.2 Nucmf\_Provisioning service

##### 5.2.18.2.1 Nucmf\_Provisioning\_Create service operation

**Service operation name:** Nucmf\_Provisioning\_Create

**Description:** The consumer creates a UCMF dictionary entry (or more entries) for a Manufacturer-assigned UE Radio Capability ID(s). For each UE Radio Capability ID the following inputs are provided:

a) a UE radio access capability set with respective coding format or the UE radio access capability set in both TS 36.331 [16] and TS 38.331 [12] coding formats and each RAT’s UE Radio Capability for Paging; and

b) the related UE model(s) IMEI/TAC value(s) the UE radio capability ID applies to.

**Inputs, Required:** (list of) [UE Radio Capability ID(s), set(s) of UE radio access capability set and UE Radio Capability for Paging and respective Coding format(s), (list of) IMEI/TAC value(s)].

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

The Coding format(s) indicates the format of the respective UE radio access capabilities as defined in TS 36.331 [16] or TS 38.331 [12]. The UCMF dictionary entry shall not contain UTRAN radio capabilities.

##### 5.2.18.2.2 Nucmf\_Provisioning\_Delete service operation

**Service operation name:** Nucmf\_Provisioning\_Delete

**Description:** The consumer deletes a UCMF dictionary entry(s) for a Manufacturer-assigned UE Radio Capability ID(s). The consumer provides a (list of) UE radio capability ID value(s) to be deleted or it may provide the IMEI/TAC values for which the associated UE radio capability ID entries shall be no longer used.

**Inputs, Required:** UE Radio Capability ID(s) of the UCMF dictionary entry(s) to be deleted or IMEI/TAC that no longer use associated UE radio Capability ID(s).

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

##### 5.2.18.2.3 Nucmf\_Provisioning\_Update service operation

**Service operation name:** Nucmf\_Provisioning\_Update

**Description:** The consumer updates the list of IMEI/TAC values a UCMF dictionary entry (or a list of entries) applies to for a Manufacturer-assigned UE Radio Capability ID. For each UE Radio Capability ID provided, (a list of) UE model(s) IMEI/TAC value(s) to be added or removed to the related UCMF entry is provided.

**Inputs, Required:** Update Type (one of "Add IMEI/TAC Values" or "Remove IMEI/TAC Values") and:

- If Update Type is "Add IMEI/TAC Values", the (list of) UE Radio Capability ID(s) of the UCMF dictionary entry(ies) to be updated and the related additional (list of) IMEI/TAC(s); or

- If Update Type is "Remove IMEI/TAC Values", the (list of) UE Radio Capability ID(s) of the UCMF dictionary entry(ies) to be updated and the related (list of) IMEI/TAC(s) to be removed.

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

#### 5.2.18.3 Nucmf\_UECapabilityManagement Service

##### 5.2.18.3.1 Nucmf\_UECapabilityManagement Resolve service operation

**Service Operation name:** Nucmf\_UECapabilityManagement\_Resolve

**Description: Consumer** NF gets the UE Radio Access Capability and one or more UE Radio Capability for Paging corresponding to a specific UE Radio Capability ID (either Manufacturer-assigned or PLMN-assigned) and Coding Format.

**Inputs, Required:** UE Radio Capability ID, Coding format, one or more UE Radio Capability for Paging.

**Inputs, Optional:** None.

**Outputs, Required:** UE Radio Access Capability, UE Radio Capability for Paging.

**Outputs, Optional:** None.

The Coding format indicates the format as defined in TS 36.331 [16] or TS 38.331 [12] of the UE Radio Access Capability expected by the NF in output. When the Coding Format is TS 36.331 [16], the UCMF shall provide the UE Radio Capability for Paging for E-UTRA. When the Coding Format is TS 38.331 [12], the UCMF shall provide the UE Radio Capability for Paging for NR and, if the PLMN supports E-UTRA connected to 5GC, shall provide the UE Radio Capability for Paging for E-UTRA.

##### 5.2.18.3.2 Nucmf\_UECapabilityManagement\_Assign service operation

**Service or service operation name:** Nucmf\_UECapabilityManagement\_Assign

**Description:** The NF consumer sends:

- the UE Radio Access Capability (and its Coding Format); or

- the UE Radio Access Capability and UE Radio Capability for Paging in both TS 36.331 [16] and TS 38.331 [12] coding formats

to the UCMF and obtains a PLMN-assigned UE Radio Capability ID in return.

**Inputs, Required:** UE Radio Access Capability(s), UE Radio Capability for Paging(s), Coding format(s), IMEI/TAC.

**Inputs, Optional:** One or moreUE Radio Capability for Paging.

**Outputs, Required:** UE Radio Capability ID.

**Outputs, Optional:** None.

The AMF does not send NB-IoT Radio Access Capability to the UCMF.

The Coding format indicates the format of the UE Radio Access Capability as defined in TS 36.331 [16] or TS 38.331 [12].

##### 5.2.18.3.3 Nucmf\_UECapabilityManagement\_Subscribe service operation

**Service operation name:** Nucmf\_UECapabilityManagement\_Subscribe

**Description:** The NF consumer subscribes for updates to UCMF dictionary entries and provides the coding format in which UE Radio Access Capability is expected by NF. The UCMF shall check the requested consumer is authorized to subscribe to requested updates.

**Inputs, Required:** Coding format.

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

The Coding format indicates the format of the UE Radio Access Capability as defined in TS 36.331 [16] or TS 38.331 [12].

##### 5.2.18.3.4 Nucmf\_UECapabilityManagement\_Unsubscribe service operation

**Service operation name:** Nucmf\_UECapabilityManagement\_Unsubscribe

**Description:** The NF consumer unsubscribes from updates to UCMF dictionary entries.

**Inputs, Required:** None.

**Inputs, Optional:** None.

**Outputs, Required:** None.

**Outputs, Optional:** None.

##### 5.2.18.3.5 Nucmf\_UECapabilityManagement\_Notify service operation

**Service Operation name:** Nucmf\_UECapabilityManagement\_Notify

**Description:** Producer NF provides notifications about changes in UCMF to subscribed consumer NF.

**Inputs, Required:** Notification Type ("creation", "deletion", "Added IMEI/TAC in Manufacturer Assigned operation requested list", "Removed IMEI/TAC from Manufacturer Assigned operation requested list", "Removed UE Radio Capability ID from Manufacturer Assigned operation requuested list").

**Inputs, Optional:** If Notification Type is set to "creation": One or more UCMF dictionary entries, each UCMF dictionary entry consisting of a UE Radio Capability ID and the corresponding UE Radio Access Capability. If Notification Type is set to "deletion": One or more UE Radio Capability IDs. If Notification Type is set to "Added IMEI/TAC in Manufacturer Assigned operation requested list" or "Removed IMEI/TAC from Manufacturer Assigned operation requested list", one or more IMEI/TACs, if Notification type is "Removed UE Radio Capability ID from Manufacturer Assigned operation requested list, one or more PLMN assigned UE radio Capability IDs.

**Outputs, Required:** None.

**Outputs, Optional:** None.

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