**3GPP TSG-RAN WG2 Meeting #116bis-e *R2-22xxxx***

**Electronic, 17 – 25 Jan, 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **CRNum** | **rev** | **-** | **Current version:** | **16.7.0** |  |
|  |
| *For* [***HELP***](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 | **X** | Core Network |  |

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| --- |
|  |
| ***Title:***  | Introduction of MINT |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | TEI17 [MINT] |  | ***Date:*** | 2022-01-20 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | CT1 is specifying a feature referred to as MINT. This feature is about PLMNs which experiencing outage during disasters. This feature allows UEs of PLMN which is experiencing so called "disaster conditions" to roam in other networks. Such type of roaming is called disaster roaming.Two aspects of this feature impacts RAN2 specifications and have been captured in this draft CR. Namely:1. **Provision of disaster roaming information**: A network should be able to indicate which PLMNs' UEs are allowed to do disaster roaming.
2. **UAC for disaster roaming UEs**: A network should be able to bar UEs doing disaster roaming more aggresively than non-disaster roaming UEs. A UE that is doing disaster roaming will be applying Access Identity 3.
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|  |  |
| ***Summary of change:*** | 1. **Provision of disaster roaming information**: This is implemented in RRC by providing indications in [a new SIB]. The indications can either be a list of PLMNs, or a one-bit indication for which the semantics are still being discussed in CT1. Futher, in RAN sharing situations it should be possible that the network provides common disaster roaming information, and per-PLMN specific disaster roaming information.
2. **UAC for disaster roaming UEs**: This has been implemented by providing barring factors specific for Access Identity 3.
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|  |  |
| ***Consequences if not approved:*** | MINT is not supported in 36.331. |
|  |  |
| ***Clauses affected:*** | 5.2.2.X (new), 5.3.16.5, 6.2.2, 6.3.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **N** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **N** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR assumes that in a RAN sharing scenario, the operators sharing the RAN node can provide different disaster roaming information, including that one operator offers no disaster roaming, while another operator offers disaster roaming. This aspect is to be confirmed. |
|  |  |
| ***This CR's revision history:*** |  |

Beginning of changes

##### 5.2.2.X Actions upon reception of *SystemInformationBlockTypeX*

Upon receiving *SystemInformationBlockTypeX*, the UE shall:

1> forward the applicable disaster PLMNs for each PLMN to upper layers.

Editor's note: The one-bit-approach described in the CT1 LS in R2-2109818 may require some modification of the above. The impact is pending further CT1 input.

Next change

#### 5.3.16.5 Access barring check

The UE shall:

1> if one or more Access Identities equal to 1, 2, 11, 12, 13, 14, or 15 are indicated according to TS 24.501 [95], and

1> if for at least one of these Access Identities the corresponding bit in the *uac-BarringForAccessIdentity* contained in "UAC barring parameter" is set to *zero*:

2> consider the access attempt as allowed;

1> else:

2> if the establishment of the RRC connection is the result of relase with redirect with *mpsPriorityIndication* (either in NR or E-UTRAN); and

2> if the bit corresponding to Access Identity 1 in the *uac-BarringForAccessIdentity* contained in the "UAC barring parameter" is set to *zero*:

3> consider the access attempt as allowed;

2> else if Access Identity 3 is indicated:

3> draw a random number '*rand*' uniformly distributed in the range: 0 ≤ rand < 1;

3> if '*rand*' is lower than the value indicated by *uac-BarringFactorForAI3* included in "UAC barring parameter":

4> consider the access attempt as allowed;

3> else:

4> consider the access attempt as barred;

2> else:

3> draw a random number '*rand*' uniformly distributed in the range: 0 ≤ *rand* < 1;

3> if '*rand*' is lower than the value indicated by *uac-BarringFactor* included in "UAC barring parameter":

4> consider the access attempt as allowed;

3> else:

4> consider the access attempt as barred;

1> if the access attempt is considered as barred:

2> draw a random number '*rand*' that is uniformly distributed in the range 0 ≤ *rand* < 1;

2> start timer T309 for the Access Category with the timer value calculated as follows, using the *uac-BarringTime* included in"UAC barring parameter":

"Tbarring" = (0.7+ 0.6 \* *rand*) \* *uac-BarringTime*;

Next change

### 6.2.2 Message definitions

<Omitted unchanged parts>

#### – *SystemInformation*

The *SystemInformation* message is used to convey one or more System Information Blocks or Positioning System Information Blocks. All the SIBs or posSIBs included are transmitted with the same periodicity. *SystemInformation-BR* and *SystemInformation-MBMS* use the same structure as *SystemInformation.*

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH and BR-BCCH

Direction: E‑UTRAN to UE

*SystemInformation message*

-- ASN1START

SystemInformation-BR-r13 ::= SystemInformation

SystemInformation-MBMS-r14 ::= SystemInformation

SystemInformation ::= SEQUENCE {

 criticalExtensions CHOICE {

 systemInformation-r8 SystemInformation-r8-IEs,

 criticalExtensionsFuture-r15 CHOICE {

 posSystemInformation-r15 PosSystemInformation-r15-IEs,

 criticalExtensionsFuture SEQUENCE {}

 }

 }

}

SystemInformation-r8-IEs ::= SEQUENCE {

 sib-TypeAndInfo SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {

 sib2 SystemInformationBlockType2,

 sib3 SystemInformationBlockType3,

 sib4 SystemInformationBlockType4,

 sib5 SystemInformationBlockType5,

 sib6 SystemInformationBlockType6,

 sib7 SystemInformationBlockType7,

 sib8 SystemInformationBlockType8,

 sib9 SystemInformationBlockType9,

 sib10 SystemInformationBlockType10,

 sib11 SystemInformationBlockType11,

 ...,

 sib12-v920 SystemInformationBlockType12-r9,

 sib13-v920 SystemInformationBlockType13-r9,

 sib14-v1130 SystemInformationBlockType14-r11,

 sib15-v1130 SystemInformationBlockType15-r11,

 sib16-v1130 SystemInformationBlockType16-r11,

 sib17-v1250 SystemInformationBlockType17-r12,

 sib18-v1250 SystemInformationBlockType18-r12,

 sib19-v1250 SystemInformationBlockType19-r12,

 sib20-v1310 SystemInformationBlockType20-r13,

 sib21-v1430 SystemInformationBlockType21-r14,

 sib24-v1530 SystemInformationBlockType24-r15,

 sib25-v1530 SystemInformationBlockType25-r15,

 sib26-v1530 SystemInformationBlockType26-r15,

 sib26a-v1610 SystemInformationBlockType26a-r16,

 sib27-v1610 SystemInformationBlockType27-r16,

 sib28-v1610 SystemInformationBlockType28-r16,

 sib29-v1610 SystemInformationBlockType29-r16,

 sibX-v17xy SystemInformationBlockTypeX-r17

 },

 nonCriticalExtension SystemInformation-v8a0-IEs OPTIONAL

}

SystemInformation-v8a0-IEs ::= SEQUENCE {

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

PosSystemInformation-r15-IEs ::= SEQUENCE {

 posSIB-TypeAndInfo-r15 SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {

 posSib1-1-r15 SystemInformationBlockPos-r15,

 posSib1-2-r15 SystemInformationBlockPos-r15,

 posSib1-3-r15 SystemInformationBlockPos-r15,

 posSib1-4-r15 SystemInformationBlockPos-r15,

 posSib1-5-r15 SystemInformationBlockPos-r15,

 posSib1-6-r15 SystemInformationBlockPos-r15,

 posSib1-7-r15 SystemInformationBlockPos-r15,

 posSib2-1-r15 SystemInformationBlockPos-r15,

 posSib2-2-r15 SystemInformationBlockPos-r15,

 posSib2-3-r15 SystemInformationBlockPos-r15,

 posSib2-4-r15 SystemInformationBlockPos-r15,

 posSib2-5-r15 SystemInformationBlockPos-r15,

 posSib2-6-r15 SystemInformationBlockPos-r15,

 posSib2-7-r15 SystemInformationBlockPos-r15,

 posSib2-8-r15 SystemInformationBlockPos-r15,

 posSib2-9-r15 SystemInformationBlockPos-r15,

 posSib2-10-r15 SystemInformationBlockPos-r15,

 posSib2-11-r15 SystemInformationBlockPos-r15,

 posSib2-12-r15 SystemInformationBlockPos-r15,

 posSib2-13-r15 SystemInformationBlockPos-r15,

 posSib2-14-r15 SystemInformationBlockPos-r15,

 posSib2-15-r15 SystemInformationBlockPos-r15,

 posSib2-16-r15 SystemInformationBlockPos-r15,

 posSib2-17-r15 SystemInformationBlockPos-r15,

 posSib2-18-r15 SystemInformationBlockPos-r15,

 posSib2-19-r15 SystemInformationBlockPos-r15,

 posSib3-1-r15 SystemInformationBlockPos-r15,

 ...,

 [[

 posSib1-8-v1610 SystemInformationBlockPos-r15,

 posSib2-20-v1610 SystemInformationBlockPos-r15,

 posSib2-21-v1610 SystemInformationBlockPos-r15,

 posSib2-22-v1610 SystemInformationBlockPos-r15,

 posSib2-23-v1610 SystemInformationBlockPos-r15,

 posSib2-24-v1610 SystemInformationBlockPos-r15,

 posSib2-25-v1610 SystemInformationBlockPos-r15,

 posSib4-1-v1610 SystemInformationBlockPos-r15,

 posSib5-1-v1610 SystemInformationBlockPos-r15

 ]]

 },

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- ASN1STOP

Next change

### 6.3.1 System information blocks

<Omitted unchanged parts>

#### – *SystemInformationBlockType25*

The IE *SystemInformationBlockType25* contains the UAC parameters.

*SystemInformationBlockType25* information element

-- ASN1START

SystemInformationBlockType25-r15 ::= SEQUENCE {

 uac-BarringForCommon-r15 UAC-BarringPerCatList-r15 OPTIONAL, -- Need OP

 uac-BarringPerPLMN-List-r15 UAC-BarringPerPLMN-List-r15 OPTIONAL, -- Need OP

 uac-BarringInfoSetList-r15 UAC-BarringInfoSetList-r15,

 uac-AC1-SelectAssistInfo-r15 CHOICE {

 plmnCommon-r15 UAC-AC1-SelectAssistInfo-r15,

 individualPLMNList-r15 SEQUENCE (SIZE (2..maxPLMN-r11)) OF UAC-AC1-SelectAssistInfo-r15

 } OPTIONAL, -- Need OR

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[ ab-PerRSRP-r16 ENUMERATED {thresh0, thresh1, thresh2, thresh3} OPTIONAL -- Need OR

 ]],

 [[

 uac-AC1-SelectAssistInfo-r16 SEQUENCE (SIZE (2..maxPLMN-r11)) OF UAC-AC1-SelectAssistInfo-r16 OPTIONAL -- Need OR

 ]],

 [[

 uac-BarringInfo-v17xy SEQUENCE {

 uac-BarringInfoSetList-v17xy UAC-BarringInfoSetList-v17xy OPTIONAL -- Cond MINT

 } OPTIONAL, -- Need R

 ]]

}

UAC-BarringPerPLMN-List-r15::= SEQUENCE (SIZE (1.. maxPLMN-r11)) OF UAC-BarringPerPLMN-r15

UAC-BarringPerPLMN-r15 ::= SEQUENCE {

 plmn-IdentityIndex-r15 INTEGER (1.. maxPLMN-r11),

 uac-AC-BarringListType-r15 CHOICE{

 uac-ImplicitAC-BarringList-r15 SEQUENCE (SIZE(maxAccessCat-1-r15)) OF UAC-BarringInfoSetIndex-r15,

 uac-ExplicitAC-BarringList-r15 UAC-BarringPerCatList-r15

 } OPTIONAL -- Need OR

}

UAC-BarringPerCatList-r15 ::= SEQUENCE (SIZE (1..maxAccessCat-1-r15)) OF UAC-BarringPerCat-r15

UAC-BarringPerCat-r15 ::= SEQUENCE {

 accessCategory-r15 INTEGER (1..maxAccessCat-1-r15),

 uac-barringInfoSetIndex-r15 UAC-BarringInfoSetIndex-r15

}

UAC-BarringInfoSetIndex-r15 ::= INTEGER (1..maxBarringInfoSet-r15)

UAC-BarringInfoSetList-r15 ::= SEQUENCE (SIZE (1..maxBarringInfoSet-r15)) OF UAC-BarringInfoSet-r15

UAC-BarringInfoSetList-v17xy ::= SEQUENCE (SIZE(1..maxBarringInfoSet-r15)) OF UAC-BarringInfoSet-v17xy

UAC-BarringInfoSet-r15 ::= SEQUENCE {

 uac-BarringFactor-r15 ENUMERATED {

 p00, p05, p10, p15, p20, p25, p30, p40,

 p50, p60, p70, p75, p80, p85, p90, p95},

 uac-BarringTime-r15 ENUMERATED {s4, s8, s16, s32, s64, s128, s256, s512},

 uac-BarringForAccessIdentity-r15 BIT STRING (SIZE(7))

}

UAC-BarringInfoSet-v17xy ::= SEQUENCE {

 uac-BarringFactorForAI3-r17 ENUMERATED {p00, p05, p10, p15, p20, p25, p30, p40,

 p50, p60, p70, p75, p80, p85, p90, p95} OPTIONAL -- Need S

}

UAC-AC1-SelectAssistInfo-r15::= ENUMERATED {a, b, c}

UAC-AC1-SelectAssistInfo-r16::= ENUMERATED {a, b, c, notConfigured}

-- ASN1STOP

| *SystemInformationBlockType25* field descriptions |
| --- |
| ***accessCategory***The Access Category according to TS 22.261 [96]. |
| ***ab-PerRSRP***Access barring per RSRP. Value *thresh0* means access to the cell is barred when UE is in enhanced coverage as specified in TS 36.304 [4] and does not apply to UEs satisfying S criteria for normal coverage. Value *thresh1* is compared to the first entry configured in *rsrp-ThresholdsPrachInfoList*, value thresh2 is compared to the second entry configured in *rsrp-ThresholdsPrachInfoList* and so on. E-UTRA/5GC includes this field only in the BR version of *SystemInformationBlockType25.* |
| ***uac-AC-BarringListType***Access control parameters for each access category valid only for a specific PLMN. UE behaviour upon absence of this field is specified in clause 5.3.16.2. |
| ***uac-AC1-SelectAssistInfo***Information used to determine whether Access Category 1 applies to the UE, as defined in TS 22.261 [96]. If *plmnCommon* is chosen, the *UAC-AC1-SelectAssistInfo* is applicable to all the PLMNs in *cellAccessRelatedInfoList-5GC*. If *individualPLMNList* is chosen, the 1st entry in the list corresponds to the first PLMN in *cellAccessRelatedInfoList-5GC*, the 2nd entry in the list corresponds to the second PLMN in *cellAccessRelatedInfoList-5GC* and so on. If *uac-AC1-SelectAssistInfo-r16* is present, the UE shall ignore the *uac-AC1-SelectAssistInfo-r15*. Value *notConfigured* indicates that Access Category1 is not configured for the corresponding PLMN. The corresponding *UAC-AC1-SelectAssistInfo* for the selected PLMN is forwarded to upper layers, if present and set to *a*, *b* or *c*. |
| ***uac-BarringFactor***Represents the probability that access attempt would be allowed during access barring check. |
| ***uac-BarringFactorForAI3***Barring factor applicable for Access Identity 3. Represents the probability that access attempt would be allowed during access barring check. If absent, the UE considers the access attempt as allowed. |
| ***uac-BarringForAccessIdentity***Indicates whether access attempt is allowed for each Access Identity. The leftmost bit, bit 0 in the bit string corresponds to Access Identity 1, bit 1 in the bit string corresponds to Access Identity 2, bit 2 in the bit string corresponds to Access Identity 11, bit 3 in the bit string corresponds to Access Identity 12 and so on. Value 0 means that access attempt is allowed for the corresponding access identity. |
| ***uac-BarringForCommon***Common access control parameters for each access category. Common values are used for all PLMNs, unless overwritten by the PLMN specific configuration provided in *uac-BarringPerPLMN-List.* The parameters are specified by providing an index to the set of configurations (*uac-BarringInfoSetList*). UE behaviour upon absence of this field is specified in clause 5.3.16.2. |
| ***uac-barringInfoSetIndex***Index of the entry in field *uac-BarringInfoSetList*. Value 1 corresponds to the first entry in *uac-BarringInfoSetList,* value 2 corresponds to the second entry in this list and so on. An index value referring to an entry not included in *uac-BarringInfoSetList* indicates no barring. |
| ***uac-BarringInfoSetList***List of access control parameter sets. Each access category can be configured with access parameters corresponding to a particular set by *uac-barringInfoSetIndex*. Association of an access category with an index that has no corresponding entry in the *uac-BarringInfoSetList* is valid configuration and indicates no barring. |
| ***uac-BarringPerPLMN-List***Access control parameters for each access category valid only for a specific PLMN. |
| ***uac-BarringTime***The average time in seconds before a new access attempt is to be performed after an access attempt was barred at access barring check for the same access category, see 5.3.16.5. |

| Conditional presence | Explanation |
| --- | --- |
| *MINT* | The field is optionally present, Need OR, in a cell that provides a configuration for disaster roaming, otherwise it is absent. |

<Omitted unchanged parts>

– *SystemInformationBlockTypeX*

The IE *SystemInformationBlockTypeX* contains configurations of disaster roaming information.

***SystemInformationBlockTypeX* information element**

-- ASN1START

SystemInformationBlockTypeX-r17 ::= SEQUENCE {

 commonPLMNsWithDisasterCondition-r17 SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity OPTIONAL, -- Need R

 applicableDisasterInfoList-r17 SEQUENCE (SIZE (1..maxPLMN)) OF ApplicableDisasterInfo-r17 OPTIONAL, -- Need R

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...

}

ApplicableDisasterPLMNs-r17 ::= CHOICE {

 noDisasterRoaming-r17 NULL,

 oneBitApproach-r17 NULL, -- The semantics for this approach is pending CT1 progress

 commonPLMNs-r17 NULL,

 dedicatedPLMNs-r17 SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity

}

-- ASN1STOP

| ***SystemInformationBlockTypeX* field descriptions** |
| --- |
| ***commonPLMNsWithDisasterCondition***A list of PLMN(s) with disaster condition which can be commonly applicable to the PLMNs sharing the cell. |
| ***applicableDisasterInfoList***A list indicating the applicable disaster information for the networks indicated in *plmn-IdentityList*. The first entry in this list indicates the disaster information applicable for the network(s) in the first entry of *plmn-IdentityList*, the second entry in this list indicates the disaster information applicable for the network(s) in the second entry on *plmn-IdentityList*, and so on. Each entry in this list can either be having the value *noDisasterRoaming*, *oneBitApproach*, *commonPLMNs*, or can contain a list of *dedicatedPLMNs*. If an entry in this list takes the value *noDisasterRoaming*, disaster roaming is not allowed for this network(s). If an entry in this list takes the value *oneBitApproach*, [TBD what happens]. If an entry in this list takes the value *commonPLMNs*, the PLMN(s) with disaster conditions indicated in the field *commonPLMNsWithDisasterCondition* apply for this entry. If an entry in this list contains the list *dedicatedPLMNs*, the listed PLMN(s) are the PLMN(s) with disaster conditions that apply to the network(s) corresponding to this entry. |