**3GPP TSG-CT WG1 Meeting #136-eC1-223769**

**E-meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.122** | **CR** | 0869 | **rev** | **2** | **Current version:** | **17.6.0** |  |
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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:*** | MINT and higher priority PLMN Selection | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Samsung, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MINT | | | | |  | ***Date:*** | | | 2022-05-04 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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)* | |
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| ***Reason for change:*** | | Generally when higher priority PLMN selection timer (T) expires, UE periodically scan for availability of HPLMN,EHPLMH, UPLMN or OPLMN lists PLMNs. UE will not select the other allowable random PLMNs as PLMN selection candidate during this procedure.  But for MINT UE is registered on FPLMN and UE should consider other random PLMNs which can provide it a normal service as PLMN selection candidate along with any other higher priority FPLMN configured by operator when timer T expires.  The current procedure requires the UE to only select a PLMN if it is of a higher priority than those of the same country as the current serving PLMN which are stored in the "Equivalent PLMNs" list, if the UE has a stored "Equivalent PLMNs" list. This restriction is not needed for disaster roaming  In last change it is clarified that only allowable PLMNs which are part of list of "PLMNs where registration was aborted due to SOR" should be considered as candidates. | | | | | | | | |
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| ***Summary of change:*** | | PLMNs in accordance with bullets iv), v) and vi) of automatic network selection also are considered as candidates when higher priority PLMN selection timer expires.  UE can select any PLMN which is higher priority then current VPLMN irrespective of EPLMN condition. | | | | | | | | |
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| ***Consequences if not approved:*** | | UE may remain registered on FPLMN even though a PLMN providing normal service is available in the area. | | | | | | | | |
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| ***Clauses affected:*** | | 4.4.3.3.1, 4.4.3.3.1.1(new), 4.4.3.3.1.2(new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\*\*\*\*\* changes \*\*\*\*\*

##### 4.4.3.3.1 Automatic and manual network selection modes

###### 4.4.3.3.1.1Automatic and manual network selection modes when not registered for disaster roaming

If the MS is in a VPLMN and not registered for disaster roaming, the MS shall periodically attempt to obtain service on its HPLMN (if the EHPLMN list is not present or is empty) or one of its EHPLMNs (if the EHPLMN list is present) or a higher priority PLMN/access technology combinations listed in "user controlled PLMN selector" or "operator controlled PLMN selector" by scanning in accordance with the requirements that are applicable to i), ii) and iii) as defined in the Automatic Network Selection Mode in clause 4.4.3.1.1. In the case that the mobile has a stored "Equivalent PLMNs" list the mobile shall only select a PLMN if it is of a higher priority than those of the same country as the current serving PLMN which are stored in the "Equivalent PLMNs" list. For this purpose, a value of timer T may be stored in the SIM. The interpretation of the stored value depends on the radio capabilities supported by the MS:

- For an MS that does not support any of the following: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]), if:

a) the MS is in a VPLMN through satellite NG-RAN access with a shared MCC, T is in the range 6 multiplied by integer M minutes to 8 multiplied by integer M hours in 6 multiplied by integer M minutes steps. If no value for M is stored in the SIM, a default value of M equal to one is used; otherwise

b) T is either in the range 6 minutes to 8 hours in 6 minutes steps or it indicates that no periodic attempts shall be made. If no value for T is stored in the SIM, a default value of 60 minutes is used for T.

- For an MS that only supports any of the following or a combination of: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]), T is either in the range 2 hours to 240 hours, using 2 hour steps from 2 hours to 80 hours and 4 hour steps from 84 hours to 240 hours, or it indicates that no periodic attempts shall be made. If no value for T is stored in the SIM, a default value of 72 hours is used.

- For an MS that supports both:

a) any of the following or a combination of: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]); and

b) any access technology other than the following: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]),

then T is interpreted depending on the access technology in use as specified below:

1) if the MS is using any of the following at the time of starting timer T: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]), T is either in the range 2 hours to 240 hours, using 2 hour steps from 2 hours to 80 hours and 4 hour steps from 84 hours to 240 hours, or it indicates that no periodic attempts shall be made. If no value for T is stored in the SIM, a default value of 72 hours is used; and

2) if the MS is not using any of the following at the time of starting timer T: EC-GSM-IoT, Category M1 or Category NB1 (as defined in 3GPP TS 36.306 [54]), T is either in the range 6 minutes to 8 hours in 6 minutes steps or it indicates that no periodic attempts shall be made. If the MS is using the satellite NG-RAN access technology with a shared MCC at the time of starting timer T: T is in the range 6 multiplied by integer M minutes to 8 multiplied by integer M hours in 6 multiplied by integer M minutes steps. If no value for M is stored in the SIM, a default value of M equal to one is used. If no value for T is stored in the SIM, a default value of 60 minutes is used for T.

Editor's note: Whether the existing timer T duration can be reused if the UE has selected a PLMN offering disaster roaming service as VPLMN or a new timer duration needs to be defined is FFS.

If the MS is configured with the MinimumPeriodicSearchTimer as specified in 3GPP TS 24.368 [50] or 3GPP TS 31.102 [40], the MS shall not use a value for T that is less than the MinimumPeriodicSearchTimer. If the value stored in the SIM, or the default value for T (when no value is stored in the SIM), is less than the MinimumPeriodicSearchTimer, then T shall be set to the MinimumPeriodicSearchTimer.

The MS does not stop timer T, as described in 3GPP TS 24.008 [23] and 3GPP TS 24.301 [23A], when it activates power saving mode (PSM) (see 3GPP TS 23.682 [27A]) or mobile initiated connection only mode (MICO) as described in 3GPP TS 24.501 [64].

The MS can be configured for Fast First Higher Priority PLMN search as specified in 3GPP TS 31.102 [40] or 3GPP TS 24.368 [50]. Fast First Higher Priority PLMN search is enabled if the corresponding configuration parameter is present and set to enabled. Otherwise, Fast First Higher Priority PLMN search is disabled.

The attempts to access the HPLMN or an EHPLMN or higher priority PLMN shall be as specified below:

a) The periodic attempts shall only be performed in automatic mode when the MS is roaming, and not while the MS is attached for emergency bearer services, is registered for emergency services, has a PDU session for emergency services or has a PDN connection for emergency bearer services;

b) The MS shall make the first attempt after a period of at least 2 minutes and at most T minutes:

- only after switch on if Fast First Higher Priority PLMN search is disabled; or

- after switch on or upon selecting a VPLMN if Fast First Higher Priority PLMN search is enabled.

c) The MS shall make the following attempts if the MS is on the VPLMN at time T after the last attempt;

d) Periodic attempts shall only be performed by the MS while in idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]);

d1) Periodic attempts may be postponed while the MS is in power saving mode (PSM) (see 3GPP TS 23.682 [27A]).

d2) Periodic attempts may be postponed while the MS is receiving eMBMS transport service in idle mode (see 3GPP TS 23.246 [68]).

d3) Periodic attempts may be postponed till the next eDRX occasion while the MS is configured with eDRX.

d4) Periodic attempts may be postponed while the MS is in relaxed monitoring (see 3GPP TS 36.304 [43]).

d5) Periodic attempts may be postponed while the MS is in Mobile Initiated Connection Only mode (MICO).

e) If the HPLMN (if the EHPLMN list is not present or is empty) or a EHPLMN (if the list is present) or a higher priority PLMN is not found, the MS shall remain on the VPLMN.

f) In steps i), ii) and iii) of clause 4.4.3.1.1 the MS shall limit its attempts to access higher priority PLMN/access technology combinations to PLMN/access technology combinations of the same country as the current serving VPLMN, as defined in Annex B.

EXCEPTION: If the MS is in a VPLMN through satellite NG-RAN access with a shared MCC, the MS may attempt to access higher priority PLMN/access technology combinations irrespective of their MCC values.

EXCEPTION: If the MS is in a VPLMN through non-satellite access, the MS may attempt to access higher priority PLMNs with a shared MCC with satellite NG-RAN access technology.

f1) In the case that the MS has a stored "Equivalent PLMNs" list the MS shall only select a PLMN if it is of a higher priority than those of the same country as the current serving PLMN which are stored in the "Equivalent PLMNs" list.

EXCEPTION: If the MS is in a VPLMN through satellite NG-RAN access with a shared MCC, the MS shall only select a PLMN if it is of a higher priority than those which are stored in the "Equivalent PLMNs" list.

EXCEPTION: If the MS is in a VPLMN through non-satellite access, the MS shall only select a PLMN if it is of a higher priority than those of the same country as the current serving PLMN or those with a shared MCC with satellite NG-RAN access technology which are stored in the "Equivalent PLMNs" list.

g) Only the priority levels of Equivalent PLMNs of the same country as the current serving VPLMN, as defined in Annex B, and which are not in the list of "PLMNs where registration was aborted due to SOR" if the UE has a list of "PLMNs where registration was aborted due to SOR" shall be taken into account to compare with the priority level of a selected PLMN.

h) If the PLMN of the highest priority PLMN/access technology combination available is the current VPLMN, or one of the PLMNs in the "Equivalent PLMNs" list and is not in the list of "PLMNs where registration was aborted due to SOR" if the UE has a list of "PLMNs where registration was aborted due to SOR", the MS shall remain on the current PLMN/access technology combination.

i) In step iii) of clause 4.4.3.1.1 the MS shall consider PLMNs which are in the list of "PLMNs where registration was aborted due to SOR" as lowest priority, if the UE has a list of "PLMNs where registration was aborted due to SOR".

NOTE 1: As an MS implementation option, the MS can make an attempt when the timer TD, TE, TF, TG or TH expires and there is a PLMN/access technology combination which the MS could not select while the timer was running (e.g. the PLMN was in the list of PLMNs where voice service was not possible in E-UTRAN) that is higher priority than the current serving PLMN and belongs to the same country as the current serving PLMN, as defined in Annex B.

NOTE 2: As an MS implementation option, upon a transition in or out of international areas, a UE supporting satellite NG-RAN can attempt to obtain service on a higher priority PLMN as defined in this subclause. It is up to the UE implementation to determine when it is transitioning in and out of international areas. What constitutes an international area is out of scope of this specification and not the responsibility of 3GPP.

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

###### 4.4.3.3.1.2 Automatic and manual network selection modes when registered for disaster roaming

If the MS is registered for disaster roaming, the MS shall periodically attempt to obtain service on an allowable PLMN of the same country as the current serving PLMN in accordance with the requirements as defined in the Automatic Network Selection Mode in clause 4.4.3.1.1.

If the MS is registered for disaster roaming service, timer T is either in the range 30 minutes to 40 hours in 30 minute steps, or it indicates that no periodic attempts shall be made. If no value for T is stored in the SIM, a default value of 60 minutes is used for T.

If the MS is configured with the MinimumPeriodicSearchTimer as specified in 3GPP TS 24.368 [50] or 3GPP TS 31.102 [40], the MS shall not use a value for T that is less than the MinimumPeriodicSearchTimer. If the value stored in the SIM, or the default value for T (when no value is stored in the SIM), is less than the MinimumPeriodicSearchTimer, then T shall be set to the MinimumPeriodicSearchTimer.

The MS does not stop timer T, as described in 3GPP TS 24.008 [23] and 3GPP TS 24.301 [23A], when it activates power saving mode (PSM) (see 3GPP TS 23.682 [27A]) or mobile initiated connection only mode (MICO) as described in 3GPP TS 24.501 [64].

The attempts to obtain service on an allowable PLMN shall be as specified below:

a) The periodic attempts shall only be performed in automatic mode when the MS is roaming, and not while the MS is attached for emergency bearer services, is registered for emergency services, has a PDU session for emergency services or has a PDN connection for emergency bearer services;

b) The MS shall make the following attempts if the MS is registered for disaster roaming at time T after the last attempt;

d) Periodic attempts shall only be performed by the MS while in idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]);

e) Periodic attempts may be postponed:

- while the MS is in power saving mode (PSM) (see 3GPP TS 23.682 [27A]);

- while the MS is receiving eMBMS transport service in idle mode (see 3GPP TS 23.246 [68]);

- till the next eDRX occasion while the MS is configured with eDRX;

- while the MS is in relaxed monitoring (see 3GPP TS 36.304 [43]);

- while the MS is in Mobile Initiated Connection Only mode (MICO).

f) the MS shall limit its attempts to access allowable sPLMN/access technology combinations to PLMN/access technology combinations of the same country as the current serving VPLMN, as defined in Annex B.

EXCEPTION: If the MS is in a VPLMN through satellite NG-RAN access with a shared MCC, the MS may attempt to access higher priority PLMN/access technology combinations irrespective of their MCC values.

EXCEPTION: If the MS is in a VPLMN through non-satellite access, the MS may attempt to access higher priority PLMNs with a shared MCC with satellite NG-RAN access technology.

\*\*\*\*\* End of changes \*\*\*\*\*