**3GPP TSG-CT WG1 Meeting #141-eC1-232655**

**Online 17– 21 April 2023 was C1-232031**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **1066** | **rev** | **1** | **Current version:** | **18.2.0** |  |
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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:*** | Periodic PLMN searches when unavailability period is activated | | | | | | | | | |
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| ***Source to WG:*** | MediaTek Inc. | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SUECR | | | | |  | ***Date:*** | | | 2023-04-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | When MS is camped on VPLMN, then UE performs periodic search based on timer T for HPLMN or EHPLMN registration. Currently It it not clear whether events should be aborted in between for periodic search attempts or periodic search attempts can be postponed till event ends.  When event is started, then periodic search attempt can be postponed to avoid event aborting and again enter to unavailabiility period to execute an event. To aborting an event in between can corrupt some files.  To avoid such kind of problems, MS may postpone PLMN searches when unavailability period is activated. | | | | | | | | |
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| ***Summary of change:*** | | MS may postpone PLMN searches when unavailability period is activated. | | | | | | | | |
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| ***Consequences if not approved:*** | | Deactivating unavailability period, activating MS for periodic PLMN searches cause abnormal causes in MS like file corruption and power consumption. | | | | | | | | |
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| ***Clauses affected:*** | | 4.4.3.3.1.1, 4.4.3.3.1.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |

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

If

- the MS is in a VPLMN

- the MS is not registered for disaster roaming services,and

- if signal level enhanced network selection (see clause 3.x)

- is not applicable; or

- is applicable and the received signal quality of registered PLMN is equal to or greater than the "Operator controlled signal threshold per access technology"

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.

NOTE 1: If signal level enhanced network selection is applicable and the received signal quality of the registered PLMN is lower than the "Operator controlled signal threshold per access technology", the procedures defined in clause 4.4.3.x are applicable.

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]);

a) if the MS is in a VPLMN through satellite NG-RAN access or satellite E-UTRAN 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 or T indicates that no periodic attempts shall be made. If no value for M is stored in the SIM, a default value of M equal to one is used; or

b) otherwise, 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]),

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

a) 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

b) 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 or the satellite E-UTRAN 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.

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 does not stop timer T, as described in 3GPP TS 24.008 [23] and 3GPP TS 24.301 [23A], when the access stratum is de-activated due to discontinuous coverage (see 3GPP TS 23.401 [58] and 3GPP TS 24.301 [23A]).

The MS does not stop timer T when it activates unavailability period 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 the time configured for T:

- 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]) or when the access stratum is deactivated due to discontinuous coverage (see 3GPP TS 23.401 [58] and 3GPP TS 24.301 [23A]).

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 while the MS is receiving broadcast MBS service in idle mode (see 3GPP TS 23.247 [85]).

d4) Periodic attempts may be postponed till the next eDRX occasion while the MS is configured with eDRX.

d5) Periodic attempts may be postponed while the MS is in relaxed monitoring (see 3GPP TS 36.304 [43]).

d6) Periodic attempts may be postponed while the MS is in Mobile Initiated Connection Only mode (MICO).

d7) Periodic attempts may be postponed while the MS unavailability period is activated as described in 3GPP TS 24.501 [64].

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 or satellite E-UTRAN 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, the MS may attempt to access higher priority PLMNs with a shared MCC with satellite NG-RAN access technology or satellite E-UTRAN access technology irrespective of their MCC values.

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 or satellite E-UTRAN 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, 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 or satellite E-UTRAN 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".

j) In steps i), ii) and iii) of clause 4.4.3.1.1 if signal level enhanced network selection is applicable (see clause 3.x) the MS shall only select a PLMN, if the received signal quality of the candidate PLMN/access technology combination is equal to or greater than the "Operator controlled signal threshold per access technology".

NOTE 2: 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 3: As an MS implementation option, upon a transition in or out of international areas, a UE supporting satellite NG-RAN or satellite E-UTRAN can attempt to obtain service on a higher priority PLMN as defined in this clause. 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 services

If the MS is registered for disaster roaming services, 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 services, 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 MS does not stop timer T when it activates unavailability period 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 registered for disaster roaming services and does not have a PDU session for emergency services;

a1) The MS shall make the first attempt after a period of at least 2 minutes and at most the time configured for T upon selecting a VPLMN for disaster roaming;

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

c) The 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]);

d) The 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]);

- while the MS is receiving broadcast MBS service in idle mode (see 3GPP TS 23.247 [85]);

- 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);

- while the unavailability period is activated in MS as described in 3GPP TS 24.501 [64].

e) The MS shall limit its attempts to access allowable 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 or satellite E-UTRAN 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 or satellite E-UTRAN access technology.