3GPP TSG-CT WG1 Meeting #133-bis-e
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Discussion on search for highest priority PLMN for UE capable of terrestrial and satellite NG-RAN access

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1. Current requirements on search of *highest priority* PLMN for UE capable of terrestrial access only:

The UE already camped on the highest priority terrestrial VPLMN in that country, when the higher priority PLMN search timer T expires, the UE does not need to scan for the higher priority PLMN.

- *This UE behavior has to be kept unchanged for the sake of power saving.*

2. New SA1 requirements (TS22.011CR0326):

3.2.2.5 Periodic network selection attempts

A UE in Automatic Mode shall make periodic attempts to look for a higher priority PLMN including associated Access Technology of the same country as the currently received PLMN including associated Access Technology or for a higher priority PLMN including associated Access Technology that uses a Shared MCC (e.g. MCC=901). If the currently received PLMN including associated Access Technology uses a Shared MCC, also a higher priority PLMN including associated Access Technology using any non-shared MCC shall be considered.

Problems: with CR 0326:

a) this text is not specific to UEs capable of satellite NG-RAN access, but applies to ALL R17 UEs, and means a search of all the UE's frequency bands – typically every e.g., 12 minutes! (Note that the EU regulated inter-operator roaming fees are far from zero cost!)

b) "e.g." is non-specific. It seems that MCC=999 is also non-geographic, and ITU could convert others in the future.

c) this text would be reasonable if it was associated with a different timer value to the one normally used for background PLMN search.

Scenario no. 2a):

2a. *The UE camped on a highest priority terrestrial VPLMN in a country, when the higher priority PLMN search timer T expires, the UE now needs to scan for the higher priority PLMN (e.g., HPLMN) with non-geographic MCC (i.e., 901, 999, or whatever else ITU re-defines as non-geographic).*

Q2a-1: Will the Timer T and its values be kept unchanged? (Our current understanding is YES and no update of CT1 spec is needed).

Q2a-2: Upon Timer T expires, should the UE be limited to only search higher priority PLMN using satellite NG-RAN access? (Our current understanding is YES and hence CT1 spec has to be updated).

Scenario no. 2b):

2b. *The UE camped on a highest priority satellite NG-RAN VPLMN in a country and when the higher priority PLMN search timer expires, the UE needs to scan for the higher priority PLMN (e.g., HPLMN) with terrestrial access.*

Q2b-1: Will the Timer T and its values be reused? (our current understanding is NO, and new value(s) of Timer T is needed and hence the CT1 spec has to be updated)

Q2b-2: If a new value(s) of Timer T is introduced, what would be a practical and acceptable minimum value for this new Timer (considering the UE most likely cannot see and find the HPLMN cell with terrestrial access while camped on a highest priority satellite NG-RAN VPLMN cell broadcasting share MCC in an open sea area for instance)? Additionally, can any other criteria or conditions be used for the UE to decide whether or not to perform a HPLMN search in this case?

Conclusions (for UE capable of both terrestrial and satellite NG-RAN access):

1. When a UE camps on a terrestrial VPLMN in a country, the existing *higher priority PLMN search Timer T* applies to the periodic network selection. Upon Timer T expiring, if the UE already *camped on the highest priority terrestrial VPLMN in that country,* the UE may optionally search for the higher priority PLMN using shared MCC with satellite NG-RAN access only.

2. When a UE camps on a satellite NG-RAN VPLMN using shared MCC , it is proposed to define a new *higher priority PLMN search timer value (range) for Timer T* for the periodic network selection (in a similar way done for NB-IoT in rel-13). CT1 needs to determine the value(s) range of the Timer T.

Upon Timer T expiring, the UE searches for the higher priority PLMN using shared MCC with satellite NG-RAN access unless the UE already *camped on the highest priority VPLMN* using shared MCC with satellite NG-RAN access. It is obvious that the UE need not *always* to search for the HPLMN with terrestrial access upon Timer T expiring. But it is unclear how can the UE make the decision by standard means.