**3GPP TSG-SA WG1 Meeting #99e S1-222048**

**Electronic Meeting, 22 Aug – 1 Sep 2022** *(revision of S1-22xxxx)*

**Source: China Unicom, vivo?**

**pCR Title: Pseudo-CR on use case of mobility scenarios and Requirements**

**Draft Spec: 3GPP TR 22.851v0.0.0**

**Agenda item: 7.5**

**Document for: Approval**

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*Abstract: introduce the mobility scenarios and potential requirements for the non-N2 shared network in TR22.851.*

**1. Introduction**

Study FS\_netshare aims to study use cases and potential requiremnts for the non-N2 shared network.

**2. Reason for Change**

Update the “Use Cases” section 5 of the TR 22.851V0.1.0.

This use case was provided in the last meeting, but not captured in the TR.

It is proposed to add new service flows and define new requirements.Mobility scenarios and potential requirements needs to be discussed and agreed for the indirect connection shared network.

**3. Conclusions**

none

**4. Proposal**

It is proposed to agree the following changes to 3GPP TR 22.851.

\* \* \* First Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

* References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.
* For a specific reference, subsequent revisions do not apply.
* For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[x1] 3GPP TS 22.101: "Service principles".

[x2] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode".

[x3] 3GPP TS 22.261: "Service requirements for the 5G system".

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

### 5.A.1 Description

It is worth mentioning that 5G networks have been designed to provide shared facilities at the beginning of the deployment. This means that if the 4G network has non-shared and shared E-UTRAN at the same time, there will be more than one operator's wireless access technology simultaneously supporting, including:

- Non-shared E-UTRA coverage,

- Shared E-UTRA coverage,

- Non-shared 5G NR coverage,

- Shared 5G NR coverage.

In order to fullfill various sharing scenarios, a new sharing method arises as without direct connection between shared NG-RAN and the core network of participating operators’ network. Therefore, interoperability needs to be considered when introducing the potential requirements of the new sharing method, e.g., mobility management with existing network.

### 5.A.2 Pre-conditions

1. It is assumed that, OP1, OP2 and OP3’s has deployed their own 4G and 5G networks.

NOTE: The home 4G and 5G network of OP1, OP2 and OP3 may be deployed with non-shared and shared wireless access technology.

- Both OP1 and OP3 are Hosting RAN Operators, which shared NG-RAN with Participating OP2.

- UE subscribe to OP2’s home PLMN.

- UEs may register successfully to OP1 and OP3’s shared 5G network.

2. Both operators (i.e., OP1 and OP3) agreed to share their network via indirect connection between the shared radio access network and the OP2’s core network.

3. Potential scenario1: The coverage of OP1 and OP3’s shared 5G network may overlap with OP2’s 4G network; may also overlap with OP2’s 5G network (i.e. at OP1 and OP2’s border, at OP3 and OP2’s border).

4. Potential scenario2: The coverage of OP1’s shared 5G network may overlap with OP3’s shared 5G network (i.e., at OP1’s and OP3’s border).

5. According to the mutual agreement of the sharing parties, UE access with one of the wireless technology, e.g, UE may access to shared 5G network, when the coverage of OP1’s shared 5G network may overlap with OP2’s 4G network.

### 5.A.3 Service Flows

1. Two mobility scenarios are shown in the following pictures of shared network, the mobility management needs to be supported if a user crosses the border between the shared network managed by Hosting operator and the Participating Operator’s network in the scenario 1 (As shown as ① in figure 5. A.3-1), and the mobility management need be supported if a user crosses the border between the two shared network managed by different Hosting operators in the scenario 2 (As shown as ② in figure 5. A.3-2) (corresponding to PR 5.A.6-001).



Figure 5. A.3-1: UE mobility scenario 1 in this shared network



Figure 5. A.3-2: UE mobility scenario 2 in this shared network

NOTE 1: OP1\_5G/OP3\_5G are OP1/OP3’s shared 5G network via indirect connection between the shared radio access network and the OP2’s core network.

NOTE 2: OP2\_5G/OP2\_4G is OP2’s network, may be MOCN networks or non-shared network.

1. The shared network is generally planned to be deployed in a specific area, which is based on the consensus of both operators. The challenge is to avoid unnecessary complaints about charges and service failures to the shared network of users not ready for accessing to, operators generally hope that communications with sharing technology occurs in specific areas, which have sharing agreement. And it is also required to be aware of the area where network sharing applies, based on related regional regulatory policies..Thus, It is expected that the 5G system can steer one or a group of UEs to the shared network of a certain sharing method and collect the information of the UEs accessing the shared network for a specific area via a certain sharing method. (corresponding to PR 5.A.-002/5).

3. As a hosting operator, its 3GPP system always have the ability to enable roaming users to access services provided by their home environment in another country, and provide service capability to a UE of paticipanting operators moves to the shared network of Hosting operator. Thus, when a wireless network provides services for roaming users and users of participating operators via sharing technology at the same time, the network needs to provide appropriate network operations for different users (corresponding to PR 5.A.6-003).

4. When the UE moves to the specific area which has more than one operator's wireless access technology simultaneously supporting, e.g., hosting operator’s 5G network and the Participating Operator’s 4G network, etc.. It is worthy to have a kind of mechanism to help 3GPP system to choose an appropriate access technology for the UE, when there is an agreement between sharing parties (corresponding to PR 5.A.6-004 ).

### 5.A.4 Post-conditions

All forms of mobility (i.e. between participating operators RAN and shared RAN for both CONNECTED mode and IDLE mode UE, see clause 3.1 of TS 23.122 [X2]) successfully processed in a sharing scenario without direct connections between the shared access and the core networks of the participating operator.

### 5.A.5 Existing feature partly or fully covering use case functionality

SA1 has performed various studies on mobility and network sharing in previous releases, where related normative stage 1 requirements are introduced in 3GPP TS 22.101 [x1] and 22.261[x3].

3GPP TS 22.261 [x3] introduces requirements of Diverse mobility management, stated as follows:

*The 5G system shall support inter- and/or intra- access technology mobility procedures within 5GS with minimum impact to the user experience (e.g. QoS, QoE).*

3GPP TS 22.261 [x3] describes various access related requirements, stated as follows:

*Based on operator policy, the 5G system shall support steering a UE to select certain 3GPP access network(s).*

3GPP TS 22.101 [x1] introduces requirements of mobility of network sharing, stated as follows:

*It shall be possible to support different mobility management rules, service capabilities and access rights as a function of the home PLMN of the subscribers.*

The above requriements are based on MOCN.

### 5.A.6 Potential New Requirements needed to support the use case

[PR 5.A.6-001] Mobility management shall be supported if a user crosses the border between the shared network managed by Hosting operator and the Participating Operator’s network or if a user crosses the border between the two shared network managed by different Hosting operators.

[PR 5.A.6-002] 5G system shall support steering a UE or a group of UE to select certain network sharing method to access 5G network(s) when UE moves to network sharing area based on operator policy.

[PR 5.A.6-003] 5G system shall be able to determine the UE accessing via indirection connection network sharing method rather than 5G system roaming when this UE moves to sharing network.

[PR 5.A.6-004] Subject to the network sharing agreement, 3GPP system shall be able to determine the access technology if different 3GPP access technologies (e.g., NR or E-UTRA) co-exist in the network sharing area.

[PR 5.A.6-005]The 5G system shall support means for an operator to be aware of the area where the network sharing applies with a certain sharing method.