**3GPP TSG-RAN WG2 Meeting #113 electronic R2-20xxxxx**

**Online, Jan 25th – Feb 5th, 2021**

**Agenda Item:**  **XX.XX.XX**

**Source: CMCC**

**Title:** **Draft TP for 38.832 to capture output of [Post112-e][253][RAN slicing] Prioritized solutions for RAN slicing**

**Document for: Discussion and Decision**

# 4 General

*Editor Note: capture the general descriptions*

# 5 Study mechanisms to enable UE fast access to the cell supporting the intended slice

## 5.1 Slice based cell reselection under network control

### 5.1.1 Scenario and issue description

*Editor Note: capture the description of scenario and issue.*

**General description for the scenario:**

**• Multiple and different slices can be supported on different frequencies**

**• Multiple and different slices can be supported on the same frequency in different regions.**

For each scenario we study both IDLE and INACTIVE and determine whether there is need for a solution and possible solutions. Connected mode will also be considered but with a lower priority.

*Editor Note: Both cell selection and cell re-selection will be studied.*

 

**Figure 5.1.1-1: Examples for slice deployment scenarios**

In the examples shown in Figure 5.1.1-1, slice 1 refers to e.g. eMBB, and slice 2 refers to e.g. URLLC. "Cell X" in the figures represent a set of cells.

Geographical Location 1 is deployed in the factory or hospital. In this location, F1 supports slice 1 (e.g. eMBB), while F2 supports both slice 1 and slice 2 (e.g. eMBB and URLLC).

Geographical Location 2 is the public area. F1 and F2 all supporting slice 1 (e.g. eMBB) for smart phone users, no slice 2 (e.g. URLLC) is supported in Geographical Location 2. And F2 is deployed as hotspot to provide wideband access.

Geographical Location 3 illustrates that different slices are supported on different frequencies. F1 only supports slice 1 and F2 only supports slice 2.

Geographical Location 4 illustrates a typical scenario that slices are available via multiple frequencies. And one or a set of frequencies are preferred for certain slice, e.g. F1 is preferred for slice 2 and F2 is preferred for slice 1 in Geographical Location 4.

eMBB and URLLC slices are used only as an example of various slices. The deployment of any slice on any frequency band is up to network implementation.

RAN2 common understanding is that intended slice is based on the information AS receives from NAS for the particular use case. This may be different in different cases:

- In case of cell selection/reselection, the intended slice means the allowed or requested S-NSSAI(s).

- For the initial registration, and requesting new S-NSSAI(s): intended slices = Requested S-NSSAI(s)

- For idle-mode mobility: intended slices = allowed S-NSSAI(s)

- In case of MO traffic, the intended slice means the S-NSSAI associated with MO traffic based on indication from NAS to AS. For MO service, UE is aware of the intended slice.

- In case of MT traffic, UE is unaware of the slice for the paged service in current NR specification.

*Editor’s Note: FFS whether UE needs to know the intended slice for MT service.*

The following issues will be studied:

Issue 1: The UE is unaware of the slices supported on different cells or frequencies, which prevents UE from (re)select to the cell or frequency supporting the intended slice.

Issue 2: Dedicated priorities would not be available to the UE prior to first RRC connection establishment and only remain valid before T320 expires upon entering IDLE mode. In addition, dedicated priorities are discarded each time when UE entering CONNECTED mode and need to be configured again before UE leaving CONNECTED mode.

Issue 3: Operator may require different frequency priority configurations for the specific slice in different areas, however the dedicated priority always overwrites the broadcast priorities if configured.

Issue 4: If the serving cell is unable to support the requested slices, the serving cell may need to perform handover to a cell supporting the requested slices or release the RRC connection. That may increase control plane signalling overhead as well as long control plane latency for the UE to access the network.

### 5.1.2 Solutions

*Editor Note: Capture the solutions for the scenario and issue.*

The following solution approaches will be studied:

Solution 1: Legacy dedicated priority via *RRCRelease* message.

Solution 1 (i.e. Legacy dedicated priority via RRCRelease message) cannot address issue 2&3, and has no specification impact.

Solution 2: Rel-15 mechanisms such as HO, CA, DC and redirection can be used to access the intended slice in different cell.

Solution 2 is legacy solution. With solution 2, the UE is still unaware of the slices supported in different cell or frequencies and the HO, CA, DC and redirection can be used to compensate for such loss with increased signalling overhead and latency. HO, CA, DC, redirection are applicable only for connected mode UE.

There is no complexity to support solution 2.

Solution 3: Slice related cell selection info, the slice info of serving cell and neighboring cells is provided in the system information or *RRCRelease* message.

*Editor’s note: FFS what information is broadcast for solution 3.*

Solution 3 can address issue 1/2/4. There is benefit to broadcast slice related cell selection info in SIB and it is recommended for normative work. The concerns on SIB payload size for broadcasting slice related cell selection info can be resolved (e.g. providing only SST, on-demand SIB, SIB segmentation, slice grouping, or slice associated UAC information).

Solution 4: Slice related cell reselection info (e.g. Cell reselection priority per slice), the slice info of neighboring cells is provided in the system information or *RRCRelease* message.

*Editor’s note: FFS what information is broadcast for solution 4.*

Solution 4 can address the issue 1/2/3/4. There is benefit to broadcast slice related cell reselection info in SIB and it is recommended for normative work. The concerns on SIB payload size for broadcasting slice related cell reselection info can be resolved (e.g. providing only SST, on-demand SIB, SIB segmentation, slice grouping, or slice associated UAC information).

## 5.2 Slice based RACH configuration or access barring

### 5.2.1 Scenario and issue description

*Editor Note: capture the description of scenario and issue.*

The intentions and use cases for slice based RACH configuration are as follows:

Intention 1: RACH resource isolation. From marketing point of view, some of the industrial customers have the requirement for access resource isolation, in order to provide guaranteed RA resources for their sensitive slices.

Intention 2: Slice access prioritization. In R15/16, all slices are sharing the same RA resources and cannot be differentiated by network side. But some slices may need to be prioritized during the RA procedure.

### 5.2.2 Solutions

*Editor Note: Capture the solutions for the scenario and issue.*

The following solution approaches will be studied:

Solution 1: Slice-specific separate RACH resources pool can be configured per slice or per slice group, in addition to the existing common RACH resources.

Solution 1 can meet both intention 1 and intention 2. The complexity and impact on specifications is low. Solution 1 is recommended for normative work.

Solution 2: Slice-specific RACH parameters prioritization can be configured per slice or per slice group.

Neither solution may not be applicable to all possible slices.

Solution 2 can meet intention 2. The complexity and impact on specifications is low. Solution 2 is recommended for normative work.

# 6 Study necessity and mechanisms to support service continuity

//partially omitted//