**3GPP TSG-SA WG Meeting #92-e S1-204022R1**

**Electronic Meeting, Nov. 9- 18, 2020**

Title: Multicast Broadcast for network slice

Agenda Item: 7.6.1 [FS\_EASNS]

Source: LG Electronics

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*Abstract: This contribution describes a new use case for EASNS*

## 1. Proposal

It is proposed to agree on the following text proposal for FS\_EASNS.

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## 5.x. Broadcast for network slice

### 5.x.1 Description

For a flexible and dynamic management, a network slice used for broadcast services can be provided over a dedicated frequency band. For example, in a specific frequency band or in a specific region, only sessions for broadcast can be allowed while all other unicast sessions are not allowed. This may trigger various deployment scenarios where third parties such as broadcasters may create their own network slices and the mobile operator packs these network slices into a specific dedicated frequency band.

Typically, for broadcast service, all or most traffic flows in downlink direction only. This characteristic may fit well to some frequency spectrum allocation and can increase utilization ratio of frequency spectrum.

### 5.x.2 Pre-conditions

An operator OPM owns a bunch of spectrum. One of the spectrum is FB1, and this is an unpaired spectrum, e.g. downlink only spectrum. The other spectrum is FB2 and this spectrum supports both downlink and uplink.

OPM decides to dedicate spectrum FB1 for broadcast service slices. Because, services over broadcast service slices are broadcast/multicast service which does not generates UL traffic. For example, TV service is best suited for this broadcast service slice.

The operator OPM also provides network slices for unicast traffic services, and this network slices are configured to use frequency band FB2, because FB2 is a paired spectrum which supports both UL traffic and DL traffic.

With OPM, a UEa has a subscription for the broadcast service slice, and also for a unicast traffic service slice. This UEa does not support simultaneous operation over FB1 and FB2 due to capability limitation. Thus, while the UE engaged in the broadcast service slice, the QoS over a unicast service slice may degrade or may stop.

### 5.x.3 Service Flows

Following is service flow for this use case:

- User of UEa starts browsing internet contents. The internet traffic for the browsing is transported over unicast network slices, which is configured to use FB2.

- The user discovers that a famous TV show is ongoing and he/she has a subscription for that. The user launches a TV application, which uses broadcast service slice. Now, the user does not use browsing application anymore because the user now watches TV service.

- Because the broadcast service slice is provided over FB1, the UEa tunes to that frequency band.

- The UEa starts to receive traffic for TV show via the broadcast service slice.

- While the user is watching the TV show delivered over broadcast service slice, an incoming call is notified. From the phone number information, the user identifies it as a Robocall and decides not to take the call. In this step, i.e., while the UEa is engaged in the notification procedure of incoming call, the quality of experience of broadcast service slice is not degraded. I.e, there is no noticeable interruption of TV show.

- Later, a friend of the user makes a phone call to the user. An incoming call is notified to the user who is in the middle of watching a TV program.

- Once the user decides to take the phone call, the UEa may suspend TV application. I.e, the use of broadcast slice is suspended.

Above service flows are described using a

### 5.x.4 Post-conditions

The user ends TV reception and starts voice call with his/her friend.

### 5.x.5 Existing features partly or fully covering the use case functionality

Following are existing requirements specified in TS 22.261:

*- The 5G system shall enable a UE to be simultaneously assigned to and access services from more than one network slice of one operator.*

*- Traffic and services in one network slice shall have no impact on traffic and services in other network slices in the same network.*

These existing requirements specify the case where the UE access simultaneous access multiple network slices. However, the assumption here is that the UE can support multiple frequency spectrum simultaneously. If the UE cannot support multiple frequency bands and if each frequency band supports different network slices, the UE cannot simultaneously use network slices on different frequencies. For this UE, the UE can use multiple network slices only when the network slices are on the same frequencies.

In the service flow in the previous section, the UE has limited capability so that the UE cannot support simultaneous reception/transmission on multiple frequency bands. And, this has not been address by existing service requirements.

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

Following new requirements can be derived from this use case:

[PR.5.x.6-1] 5G system shall be able to support a mechanism to configure a network slice to support either downlink traffic only or uplink traffic only or traffic in both directions. BC: Given existing requirements that allow various ways to configure network slices, it’s not clear to me that this is new or needed.

[PR.5.x.6-2] 5G system shall be able to provide a means for a UE to receive a broadcast service via a network slice on one radio resource (e.g. frequency band) while the UE is provided with a unicast service via another network slice on the other radio resource, when the UE cannot simultaneously receive both. BC: This requirement is not at all clear. It states that the UE is receiving information from 2 frequency bands simultaneously when it does not support the ability to do so. Perhaps changing ‘via’ to ‘for’ makes it feasible.

[PR.5.x.6-3] 5G system shall be able to minimize service degradation for a UE, when the UE receives a broadcast service via a network slice on one radio resource (e.g. frequency band) while the UE is provided with a unicast service via another network slice on another radio resource. BC: isn’t this already covered by existing requirements to minimize any impact from 1 slice to another?

[PR.5.x.6-4] 5G system shall be able to inform a UE of incoming traffic via a network slice configured over one radio resource, when the UE is engaged in a service on other network slices over another radio resource, if the UE does not support two radio resources simultaneously.

BC: I agree with the second change in the above, but not the first as ‘via’ seems to imply the UE is receiving on both bands simultaneously, even though the requirement says that is not supported. It could be possible for such information to come across the radio access of the 2nd slice, as long the network is aware the UE is able to use both…

[PR.5.x.6-5] 5G system shall be able to perform traffic steering between traffic on a network slice using a frequency band and traffic on another network slice using another frequency band. BC: isn’t this already covered by existing requirements that allow traffic steering across slices?