**3GPP TSG SA WG2 Meeting #169 *S2-2507731***

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**Source: Xiaomi**

**Title: new solution for KI#2 Revocation of an ongoing Sensing Service**

**Document for: Approval**

**Agenda Item: 20.2.1**

**Work Item / Release:** **FS\_Sensing\_ARC / Rel-20**

**Abstract:** *This paper proposes to update the solution#11 to include revocation of an ongoing Sensing Service in TR 23.700-14.*

\* \* \* Start of Changes (ALL NEW TEXT) \* \* \*

## 6.11 Solution #11: Authorization and revocation based on sensing service conditions

### 6.11.0 High-level solution Principles

In this solution it proposes following high-level principles:

- There are two types of Authorization involved in sensing service:

1) Initial Authorization that is performed for the sensing service request.

2) Optionally, Re-authorization may be performed during the sensing operations, e.g. for target tracking service that may last for some period.

- For the Initial Authorization:

- the NEF authorizes the sensing service consumer that sent the sensing service request.

- permission/consent from the owner of the sensing object may need to check, if the user/owner is the subscriber of the network, and also the user/owner information is included in the request.

- the SF performs the authorization for the sensing service request, by checking the conditions with NF (e.g. UDR, or CCF) configured with service profile (i.e. service information containing specific conditions).

Editor's note: The further determination of the NF to store authorization data for the sensing service request is FFS.

- For re-authorization, the SF may re-select the Sensing Entity(ies) by checking the sensing service specific information (e.g. a flight route, sensing target area, etc.). SF may revoke the ongoing sensing service operation when the conditions are changed and the authorization criteria are no longer met.

- Triggers for revocation of the on-going sensing service could be from 3rd party AF, or internal NF (e.g., ~~PCF,~~ SF, ~~UDM,~~ etc.), due to specific condition(s) are met, e.g., some regulation reasons, the Sensing Service consumer is not authorized to request the Sensing Service, or the sensing target area is not allowed to provide Sensing Service, etc.

### 6.11.1 Description

This solution addresses Key Issue #2 "Authorization and Revocation to Support Sensing Service".

Unlike the legacy mobile communication services which the operators strive to provide to its subscribers anytime anywhere, most of the use cases of sensing services described in TR 22.837 [7] are provided with some case specific conditions, e.g. specific flight route for UAV sensing, specific sensing geographical area/zone, specific time or duration for sensing, specific owner for in-building sensing, etc. These are also captured in clause 5.2.2 of TS 22.137 [2] and the first requirement for network exposure in clause 5.2.3 of TS 22.137 [2] to meet specific requested conditions.

To ensure that specific service conditions are met, this solution proposes that authorization is performed:

- For initial Authorization for the Sensing Service request, after receiving sensing service request from sensing service consumer and before the sensing service operation is triggered in the network;

- Optionally, re-authorization may be also needed to check during the sensing service operations, e.g. target tracking service that may last for some period. For example, when reselecting the Sensing entity(ies), or detecting the target moving out of the sensing target area, etc, if the re-authorization fails, the sensing service needed to be revoked.

The criteria for sensing service request authorization and sensing operation revocation are based on the conditions of specific sensing services.

### 6.11.2 Procedures

#### 6.11.2.1 initial authorization for the sensing service request

Sensing service request is sent from a sensing service consumer (e.g. a 3rd UAV operator or UTM) to an operator network. Once the NEF receives a sensing service request, it needs to check whether the sensing service consumer is allowed to access the requested sensing service:

- A sensing service profile (i.e. the service-level information containing specific conditions) is configured in a NF (e.g. UDR or CCF), The service profile can also be locally configured.

- condition compliance is checked, e.g. whether the condition information from received sensing service request implies specific conditions (e.g. a flight route, an area, a duration, a houseowner, etc.) in the NF (e.g. UDR or CCF).

Editor's note: Whether SF or other NF to checks the condition compliance is FFS.

Editor's note: The details of CAPIF-based authorization is to be addressed by SA WG3.

For some case, house for intruder detection, body for sleep monitoring, or factory of AMR collision avoidance, in order to protect the interests or privacy of the owner of the sensing objects or required by regulations, additional check with the owner may still be needed to ensure the service request sent by the authorized sensing service consumer (e.g. the owner or the user authorized by the owner). Hence, it is proposed that:

- permission/consent from the owner of the sensing target check is needed, as long as the information of user or owner is contained in the service request explicitly or implicitly. If the owner is a subscriber of the network receiving the service request, network obtains the permission/consent from the subscriber via the UE.

- If the owner cannot be mapped to a subscriber of any mobile network, an owner list or allowed user list associated with the sensing object needs to be configured in the service profile.

Editor's note: Whether SF or other NF to obtain the permission/consent from the owner is FFS.

Editor's note The details of user consent mechanism is to be addressed by SA WG3.

Editor's note: The details of authorization of owner or user is to be addressed by SA WG3.

#### 6.11.2.2 re-authorization During sensing service operation

For some cases, e.g. sensing target tracking service that may last for some period, after the sensing service is triggered by the network, the condition compliance still needs to be checked by the SF, e.g. whether the movement of the sensing service target still aligns with the planed trajectory. SF is responsible for selecting the sensing entities or controlling sensing activation/deactivation during the sensing service operations. Hence, it is proposed that:

- The SF needs to store the information implying sensing service conditions (e.g. a flight route, an area, a duration, a houseowner, etc.) once received from the sensing service request.

Sensing entities may need to be reselected due to the Sensing target’s movement. It is proposed that:

- The SF needs to be aware of the trajectory of the moving object, e.g. notified by the sensing entities or requested from the sensing entities.

- The SF may check the condition information when reselecting the sensing entities while the sensing object is moving.

NOTE 1: For example, during the flying course, if a UAV is detected to have left the coverage of an old Sensing Entity and entered into the coverage of a new Sensing Entity, the old base station needs to stop radio sensing and the new base station needs to be selected for radio sensing. If the flight route is received and stored by the SF, the SF needs to check the flight route to reselect the base station one after another along the flight route.

- The SF may revoke the ongoing sensing operation when the conditions are changed and the authorization criteria are no longer met.

NOTE 2: For example, if the SF detects that a flying UAV enters into the coverage of a new base station residing away from the flight route, the SF needs to deactivate the sensing operation to avoid serving the UAVs flying in an unpermitted route.

Editor’s note: how to monitor the performance of the sensing service is FFS.

#### 6.11.2.3 Revocation of an ongoing Sensing Service

It assumes that Sensing Function is responsible for receiving the request(s) or trigger(s) to revoke the Sensing Service the Sensing Service, and to send the revocation request to Sensing Entity(ies) to terminate or temporarily deactivate the Sensing service operations ~~(e.g., transmitting or receiving the sensing signals, etc.)~~.

Sensing Service ID is defined to uniquely identify the ongoing Sensing Service in core network.

The following procedure as shown in figure 6.11.2.3-1, is to provide general information flows for revocation of the Sensing Service.



figure 6.X.2 procedure for the revocation of Sensing Service

Procedure:

0), One Sensing Service is initiated and indicated with Sensing Service ID. The sensing measurement data is collected by Sensing Function, and the Sensing Function sends the Sensing result to Sensing Service Consumer.

1), Sensing Function receives the trigger/request for revocation of the specific Sensing Service, due to specific condition(s) are met, e.g., due to some regulation reasons, the Sensing Service consumer is not authorized to request the Sensing Service, or the sensing target area is not allowed to provide Sensing Service, etc.

2a), Sensing Function sends the Sensing Service revocation request to Sensing Entity/Entities (Sensing transmitter(s), or/and Sensing receiver(s)), including Sensing Service ID

2b), Sensing Function may send the Sensing Service revocation notification to Sensing Service Consumer with proper cause directly or via NEF.

3), Sensing Entities/Entity terminates or temporarily deactivate the Sensing Service, for example, stop Sensing service operation ~~transmitting and/or receiving the sensing signals~~, and optionally remove the configuration/parameters for this Sensing Service that is identified by the Sensing Service ID

Editor’s Note: how to terminate the sensing service is RAN’s decision and need further alignment with RAN.

4), Sensing Entity/Entities send the Sensing Service revocation response to the Sensing Function with result.

5), Sensing Function may send the Sensing Service revocation notification to Sensing Service consumer with proper cause directly or NEF. If step 2a is performed, step 5 is skip.

### 6.11.3 Impacts on Services, Entities and Interfaces

**SF:**

- Need to store the information implying service conditions.

- Need to select or reselect sensing entities based on service conditions.

- Need to revoke ongoing sensing operation when the check of condition compliance fails.

- To receive the revocation request(s)/trigger(s)

- To send the revocation notification to Sensing Service Consumer

- To receive the revocation response from Sensing Entity

SE:

- To terminate the Sensing Service operation

- To receive the sensing service revocation request

- To send the sensing service revocation response\* \* \* End of Changes \* \* \*