3GPP TSG-RAN WG3 Meeting #129-bis R3-25xxxx

**Prague, Czech Republic, 13 – 17 October 2025**

Agenda Item: 13.2

Source: China Telecom (moderator)

Title: Summary of Offline Discussion for CB#21 ISAC

Document for: Discussion

# 1 Introduction

**CB: # 21\_ISAC**

**- TP for section 7 of TR, capturing logical architecture for ISAC e.g. 6558 but with two boxes**

**- Terminology in section 3?**

**- Capture general requirements, if time allows and agreeable**

**- Introduce basic/general call flow using 6529 as baseline, with Editor’s Notes, FFSes, refinements, etc.**

**- Capture open issues**

(moderator - China Telecom)

Summary of offline disc [R3-25xxxx](file:///C%3A%5CUsers%5Ch00871680%5CAppData%5CRoaming%5CeSpace_Desktop%5CUserData%5Ch00364927%5CReceiveFile%5CInbox%5CR3-25xxxx.zip)

# 2 For the Chair Notes

Editor’s Note: For Rel-20 study/work items, please consider that when agreements/FFSes are captured in a TP, additional inclusion in the Chair Notes may be unnecessary (particularly for stage 3 details).

**Propose the following:**

R3-25xxx1 – merged

R3-25xxx2 rev in R3-25xxx3 – agreed

R3-25xxx4 rev in R3-25xxx3 – endorsed

* **TP to TR38.765 for Terms, Abbreviations and References – R3-25XXXX () – agreed**
* **TP to TR38.765 for Network Architecture – R3-256558 rev in R3-25xxxx () – agreed**
* **TP to TR38.765 for basic sensing call flow – R3-256529 rev in R3-25xxxx () – agreed**
* **[TP to TR38.765 for sensing function support – R3-25XXXX () – agreed]**

**Propose to capture the following in Chair Notes:**

Agreement: [carefully crafted text]

Agreement: [carefully crafted text]

WA: [carefully crafted text]

No consensus: [carefully crafted text]

To be continued: [carefully crafted text]

**Propose to further discuss the following online:**

[issue 1]

[issue 2]

# 3 Discussion on network architecture (13.2)

The moderator copies the online agreements as follows:

* **Capture logical architecture for ISAC**
* **RAN3 focus on sensing protocol in coordination with SA2**

## 3.1 Terminology discussion

In SA2 TS 23.700-14, the following terms are defined as copied as follows.

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| --- |
| **Sensing Entity**: The Sensing Entity referring to a Sensing Transmitter and/or to a Sensing Receiver.NOTE 1: In this release, the Sensing Entity is only referring to gNB.**Sensing Function**: Indicating the logical function which is involved to support Sensing Service.NOTE 2: The Sensing Function cannot be a Sensing Entity. |

To ease RAN3 discussion at this stage, the moderator proposes to define the following terms:

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| Sensing TRP: A sensing TRP supports transmitting and/or receiving the sensing signals.Sensing gNB: Hosts certain sensing functions for a gNB.Sensing CN: Hosts certain sensing functions for a 5GC.  |

**Moderator summary:**

Proposal 1: [to capture above into the TP].

Proposal 2: Add TR 23.700-14 as a reference in Section 2.

## 3.2 Logical architecture discussion

The moderator proposes the following logical architecture for CB discussion.

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| This clause attempts to identify and describe the system architecture to support the sensing in the overall 5G system architecture.Figure 7.1 depicts a logical system architecture for ISAC, where the Xx interface is between the sensing gNB and the sensing CN. Figure 7.1 Logical system architecture for ISACEditor’s Note 1: The Sensing CN may include the AMF and Sensing Function, or Sensing Function only, which is up to SA2 decision.Editor’s Note 2: Whether "Xx" interface is NG interface or new interface needs further discussion and decision.  |

**Moderator summary:**

Proposal 2: [to capture above into the TP].

# 4 Discussion on RAN-CN procedures and signaling (13.3)

## 4.1 The basic sensing call flow

The moderator proposes the following call flow for CB discussion.

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| --- |
| TP for TR<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<change starts>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>8.X Sensing procedure Editor’s Note: the detailed signaling procedure is to be formulated, e.g., the message name, the information included in the message, as well as other signalling messages etc. Figure X.1-1: Message flow for sensing1. The sensing CN sends sensing request to the sensing gNB.
2. The sensing gNB sends sensing response to the sensing CN.
3. The sensing gNB sends sensing report to the sensing CN.
4. After the sensing is completed, a sensing termination procedure may be performed to release the sensing resources in the sensing gNB

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<change ends>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> |

**Moderator summary:**

Proposal 3: [to capture above into the TP].

## 4.2 The interface functions

There were some online comments to discuss the interface functions, e.g., the sensing initiation, sensing report, sensing modification, sensing termination etc. The moderator listed the following for CB discussion.

* Sensing initiation
* Sensing modification
* 5GC initiated sensing termination
* gNB initiated sensing termination
* Sensing report

**Moderator summary:**

Proposal 4: [To reach following agreements:]

The RAN-CN interface should support following functionalities for ISAC:

* Sensing initiation
* Sensing modification
* 5GC initiated sensing termination
* gNB initiated sensing termination
* Sensing report

Proposal 5: [to capture above into the TP].

# 5 General requirements for ISAC (if time allows)

In the SID, it is described that SA1 TS 22.137 already provided sensing requirements.

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| TR 22.837 identifies a very wide range of ISAC use cases, and requirements for such are defined in TS 22.137, in particular, detection and/or tracking of UAV (Uncrewed Aerial Vehicles). SA2 also has an ongoing Rel-20 study on Architecture Enhancement to support Integrated Sensing and Communication (FS\_Sensing\_ARC, SP-250401). |

For reference, the moderator copies the basic requirments in 5.2.1 as below. It can be observed that there are already some requirements related to the Sensing CN/Sensing gNB work, some of which are highlited below.

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| 5.2.1 GeneralThe 5G system shall be able to provide sensing service to detect, and/or track one or more objects (e.g., UAVs, birds) and the environment around the object(s).Based on operator’s policies, operator’s control and regulation, the 5G system shall be able to collect 3GPP sensing data from sensing receivers for processing.The 5G system shall be able to provide 5G wireless sensing service in a target sensing service area location using sensing transmitters and sensing receivers.Subject to regulation and operator policy, the 5G network shall be able to activate, configure, and deactivate 5G wireless sensing based on parameters such as location and network conditions (e.g., network load).Subject to operator’s policy, the 5G system may be able to use sensing assistance information to derive the sensing result.Subject to user consent, regulation, and operator’s policy, the 5G system shall be able to collect non-3GPP sensing data from authorized non-3GPP sensors and securely provide it to 5G network.Subject to user consent, regulation, and operator’s policy, the 5G system should support the joint processing of the 3GPP sensing data and non-3GPP sensing data to derive a combined sensing result.The 5G system shall support continuity for 5G wireless sensing service (e.g., for sensing a moving object).Subject to operator’s policy, the 5G System shall be able to provide the 5G wireless sensing service in case of roaming.Subject to regulation and operator’s policy, 5G network shall provide prioritization among 5G wireless sensing services as well as prioritizing between communication and sensing services.Subject to local regulation, the 5G network shall enable UEs without 5G coverage to use unlicensed spectrum to provide 5G wireless sensing service.Subject to regulation, the 5G network shall enable UEs supporting V2X application to perform 5G Wireless sensing when not served by RAN using the allowed ITS spectrum and unlicensed spectrum. |

It is moderator’s understanding that we should not repeat the same discussion as SA1 did. If there is any need to capture the sensing requirement, this is better to leave it to conbirution driven.

**Moderator summary:**

* It is contribute driven to address the further sensing requirements.

# 6 Guidance for the next meeting discussion (no need to have concluson at this meeting, but at least can collect companies views if time allows)

## 6.1 Discuss the protocol stack

As observed from the contributions, there are several CP protocol stacks are proposed (below just provide several examples):

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| Option 1: New interface solution[R3-256558]In this solution, a new interface between the ISAC RAN and the Sensing Function and the corresponding new protocol stack should be defined. XX in the new interface, the ISAC signalling is transported over the XXAP.Control-plane Protocol Stack for sensing |
| Option 2: Ambient-IoT like solution [R3-256676] Control-plane Protocol Stack for sensing |
| Option 3: Positioning like solution [R3-256558]In this solution, a new application protocol like NRPPa should be defined. NLX in the new interface between AMF and Sensing Function, NRxPa is the new application protocol, and the ISAC signalling is transported over the NRXPa on the top of NGAP.Control-plane Protocol Stack for sensing |

The common thing is that the SCTP/IP could be reused as the transport layer of Control-plane between sensing gNB and sensing CN.

**Moderator summary:**

Proposal 5: SCTP/IP is reused as the transport layer of Control-plane between sensing gNB and sensing CN

Proposal 6: To discuss the CP protocol stack for ISAC, e.g., new application prpotocol, Ambient-IoT like protocol stack, Positioning like protocol stack etc.

## 5.2 Discuss whether to use C-plane or U-plane for data reporting

As observed from the contributions to this meeting, some propose to use C-plane to transmit the sensing data, while others propose to use U-plance to report sensing data. Clearly these two solutions should be discussed and compared at the next meeting when the exact sensing report format is clear.

**Moderator summary:**

Proposal 7: To discuss whether to use C-plane or U-plane for sensing data reporting.

## 5.3 Discuss whether the DU-CU Split Architecture for ISAC should be supported

There was no conclusion online. As obersved from the contrinbutsions, some companies propose to study the DU-CU split architecture for ISAC and propose the related network architecture and possible protocol layering for SF to gNB-DU Signalling e.g., [R3-256827] [R3-256558] [R3-256826] [R3-257118]. While others think the spit architecture should be depriotized or even no need for R20.

**Moderator summary:**

Proposal 8: To discuss whether the Split Architecture for ISAC should be studied in this study item.

## Discuss the Signaling procedures

Companies propose some functionalities and procedures between RAN-CN interface for ISAC support, e.g. sensing information exchange function between RAN-CN.

Moderator summary:

To contininue the discuss the necessary functions and the detailed signaling procedures.

# References

## 13.2. Network architecture

|  |  |  |
| --- | --- | --- |
| R3-256528 | Discussion on ISAC Architecture and General Aspects (Xiaomi) | other |
| R3-256558 | Discussion on Network Architecture for ISAC (ZTE Corporation) | other |
| R3-256586 | (TP for 38.765) Network architecture solution for gNB-based mono-static sensing (China Telecom) | other |
| R3-256676 | (TP for ISAC TR) Network architecture for ISAC (Huawei) | other |
| R3-256685 | Discussion on Network Architecture for NR ISAC (Tejas Network Limited) | discussion |
| R3-256771 | Discussion on network architecture for ISAC (CATT) | discussion |
| R3-256784 | The discussion on ISAC network architecture (NEC) | discussion |
| R3-256826 | Network Architecture and Protocol Aspects for NR Sensing Support (Qualcomm Incorporated) | discussion |
| R3-256854 | Discussion on Network Architecture for Sensing (CMCC) | discussion |
| R3-256895 | Discussion on architecture for ISAC (Nokia, Nokia Shanghai Bell) | discussion |
| R3-256914 | Discussion on ISAC network architecture (Lenovo) | discussion |
| R3-256922 | Discussion on Network Architecture for ISAC (Ericsson, Jio Platforms) | discussion |
| R3-256941 | Discussions on the framework of ISAC (China Unicom) | discussion |
| R3-256947 | Network architecture enhancements for NR ISAC (Hanbat National University) | discussion |
| R3-257111 | Discussion paper on ISAC network architecuture (CEWiT) | discussion |
| R3-257118 | NR ISAC Network Architecture (InterDigital, Inc.) | discussion |
| R3-257123 | Discussions for ISAC network architecture in RAN3 (LG Electronics Inc.) | discussion |
| R3-257144 | Discussion on network architecture for ISAC (Samsung) | discussion |

## 13.3. RAN-CN procedures and signaling

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| --- | --- | --- |
| R3-256529 | Discussion on Sensing procedures and singalling (Xiaomi) | other |
| R3-256559 | Discussion on RAN-CN Procedures and Signalling for ISAC (ZTE Corporation) | other |
| R3-256587 | On RAN-CN procedures and signalling for supporting sensing (China Telecom, BUPT) | discussion |
| R3-256677 | (TP for ISAC TR) RAN-CN procedures and signaling for ISAC (Huawei) | other |
| R3-256686 | Discussion on RAN-CN procedures and signaling for ISAC (Tejas Network Limited) | discussion |
| R3-256712 | Discussion on RAN3 impact of gNB-based mono-static sensing (OPPO) | discussion |
| R3-256772 | RAN-CN procedures and signaling on ISAC (CATT) | discussion |
| R3-256785 | The discussion on ISAC RAN-CN procedure and signaling (NEC) | discussion |
| R3-256827 | Signalling and Procedures for NR Sensing Support (Qualcomm Incorporated) | discussion |
| R3-256855 | Discussion on RAN-CN Procedures Supporting ISAC (CMCC) | discussion |
| R3-256896 | Discussion on RAN-CN procedures and signaling for ISAC (Nokia, Nokia Shanghai Bell) | discussion |
| R3-256915 | Discussion on general procedures for gNB-based sensing (Lenovo) | discussion |
| R3-256942 | RAN-CN procedures and signaling of ISAC (China Unicom) | discussion |
| R3-257025 | Discussion on RAN-CN procedures and signaling to support ISAC (Ericsson, Jio Platforms) | discussion |
| R3-257119 | NR ISAC RAN-CN Procedures and Signaling (InterDigital, Inc.) | discussion |
| R3-257124 | Discussions on ISAC RAN-CN procedures and signalling (LG Electronics Inc.) | discussion |
| R3-257145 | Discussion on RAN-CN procedures and signaling (Samsung) | discussion |