

Evaluations on ISAC_ARC work scope & timeline

Sherry Shen (Moderator)

Background

- Study on channel modelling for Integrated sensing and communication (ISAC) for NR (FS_ISAC_NR) approved with 69 supporting companies (RP-234069/RP-240799)
- FS_ISAC_ARC (SP-231754) endorsed on SA#102 with 0 TU allocated, to be revisited in Sep, 2024 based on RAN progress (i.e. more work than channel modelling will be established by RAN)

This DP attempts to evaluate the work scope and time schedule of the stage 2 work for ISAC.

Report-of-meeting-SP-102

- [SP-231365](#) (SID-NEW) New SID on Study on Architecture Enhancement to support Integrated Sensing and Communication. (Source: Xiaomi (Moderator of ISAC))
Document for: Approval
Abstract:
Proposal of new SID on Architecture Enhancement to support Integrated Sensing and Communication.
 - **Comment:** Revision of S2-2313745.
 - **Plenary Discussion:**
 - It was reported that the decision on whether to start a study on this will not be made by TSG^{RAN} until September 2024. TSG^{SA} can then review the status and determine whether to bring such a study for approval. The handling of this Stage 2 work in Rel-19 can be decided at that time. Huawei suggested the SA^{WG2} architecture design can still be started in advance of September 2024. Ericsson commented that it will be very difficult to do any meaningful Stage 2 work before RAN WGs have provided their channel modelling results. Qualcomm clarified that Huawei suggest a small part of the work can be done without RAN input and suggested that such a WID is drafted to see if it can achieve consensus at this meeting. Nokia suggested coming back to this in September 2024 and determine then whether this can be done for Rel-19. The SA^{WG2} Chair commented that if it is decided to review this in September, then some TUs should be set aside to do any Stage 2 work that can be done. This was left for off-line discussion and was revised in [SP-231679](#).
 - The TSG^{SA} Chair suggested that following the Joint TSGs Session, the ISAC work will be reviewed again in September 2024 when RAN make their decision on the RAN related studies for this. This was left for further discussion and was revised in [SP-231702](#).
 - It was suggested to add a note about discussing WT1 - WT6 after RAN feedback at TSG SA#105. Ericsson also asked to discuss restricting to monostatic devices TSG SA#105. Note 7 was replaced. This was revised in [SP-231754](#).
 - This will not be part of the prioritization session as there are 0 TUs estimated. This new SID was **endorsed**. **Sherry (Yang Shen, Xiaomi) should be considered as the Rapporteur.**
- Status:** Endorsed.

ISAC status and outlook in RAN

Status

- The Rel-19 ISAC SID in RAN only includes the channel modeling, with the check point in RAN#105 to discuss whether more work beyond channel modeling can be included in Rel-19.
- The channel modeling work in RAN1 is on-track with good progress. However it is difficult to define/complete channel modeling before RAN#105, even for one use case (e.g. UAV).

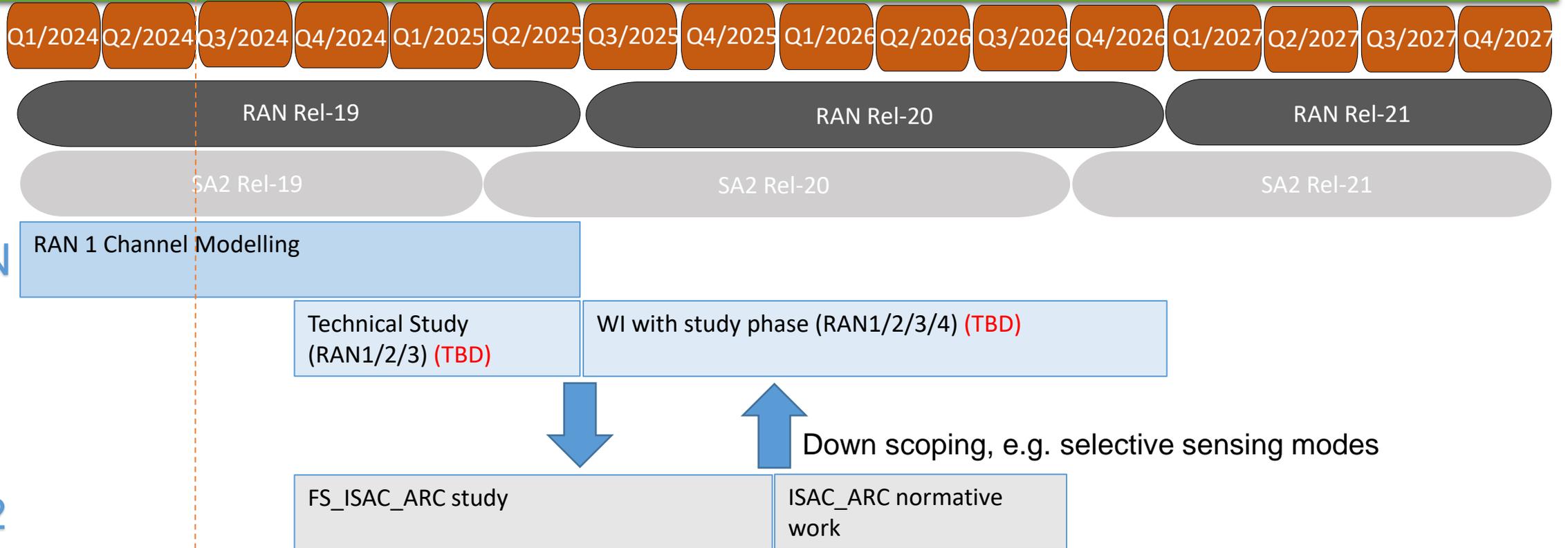
Outlook

- It is possible for RAN to have additional study (e.g. ISAC RAN architecture and protocol stacks) beyond channel modeling in RAN, especially in RAN2 and RAN3. The feasibility of sensing solutions with regards to certain metrics (e.g. accuracy on range/angle/velocity) is expected to be evaluated in Rel-20.
- The study phase on the feasibility of sensing solutions and detailed signaling procedures is expected to last 2-3 quarters.

General principles to determine SA2 ISAC work scope and timeline

- SA2 FS_ISAC_ARC will start from R19, and the normative work for 5G-A ISAC will be completed in R20
- FS_ISAC_ARC SID endorsed on SA#102 (SP-231754) will be used as the starting point for defining the work scope and work tasks
- FS_ISAC_ARC work scope may be extended with the consideration of previously reduced WT#5 (continuity) and WT#7 (non-3GPP sensing) and RAN status
- Work scope of ISAC_ARC normative work will be updated (down-scoped) based on the selective use case scenarios and RAN alignments:
 - SA1 has defined multiple use case categories; however, not all of them can be easily achieved using 5G-A sensing. Hence, a further down scoping of use case scenarios may be necessary before the start of the normative work
 - Outcome of RAN feasibility study may also be considered
- Conclusion of the FS_ISAC_ARC study will be provided to RAN to facilitate the work scope determination
- The smooth evolution from 5G-A to 6G has to be considered, e.g. using 5G-A ISAC architecture as the basis of the 6G study

Proposed FS_ISAC_ARC timeline



Proposed work scope (based on SP-231754)

- WT-0: Overall architecture and function enhancements to support ISAC.
- WT-1: ISAC service authorization and revocation. This includes investigating mechanisms for authorization and revocation sensing service requests from the service consumer (e.g. 3rd party application, UE or 5GC NF).
- WT-2: Discovery and selection of sensing entities (e.g. UE, gNB, 5GC NF) based on service requirements triggered by the service request and capability of the sensing entities.
- WT-3: Sensing data and the associated information collection and transport mechanisms for result calculation.
- WT-4: Service invocation, including providing sensing associated information, and result (including sensing result and contextual information) exposure mechanisms, for one time, periodic or event based reporting.
- WT-6: Configuration parameters/policy provisioning to the sensing entities (e.g. UE, gNB) for the support of ISAC services. When UEs act as the transmitter and receiver, both the cases of UEs served by NG RAN and UEs not served by NG RAN are considered.

ANNEX

Additional Details for Rel-20 Timeline (SA Perspective) (SP-240457)

Proposal: [in Rel-20](#)

- **For 5G-Advanced: 18-month.** Assuming no delay of Rel-19, it implies the following dates
 - Stage-1 freeze : Jun 2025
 - Stage-2 freeze : Jun 2026 ($\geq 80\%$); Sep 2026 (100%)
 - Stage-3 freeze : Mar 2027
 - ASN.1/OpenAPI freeze: June 2027
- **For 6G SI**
 - SA1 SI approval: TSG#105 (Sept2024) - endorsed at TSG#102
 - SA2 SI approval: TSG#108 (June'2025) - endorsed at TSG#102
 - Other SA WG (SA3, SA4, SA5, SA6) : TBD at future TSG meeting
 - SA1/SA2 6G SI may continue beyond Stage-1/Stage-2 freeze dates for 5G-Advanced.
 - 6G SI (this may use time from Rel-21)
 - SA1 6G SI completion: Mar 2026
 - SA2 6G SI completion: Dec 2026 or Mar 2027 (To be confirmed at future TSG meeting)
 - Can be revisited at later TSGs based on SI progress