**3GPP TSG-RAN WG2 Meeting #113 Electronic R2-210XXXX**

**25 January – 05 February 2021**

**Agenda item: 8.16.2**

**Source: Nokia**

**Title: Summary of [AT113-e][031][eNPN] SNPN with subscription or credentials by a separate entity**

**WID/SID: NG\_RAN\_PRN\_enh-Core - Release 17**

**Document for: Decision**

# 1 Introduction

This document is the summary of the following email discussion:

* [AT113-e][031][eNPN] SNPN with subscription or credentials by a separate entity (Nokia)

 Scope: Take into account documents submitted to this section, 1st pass: identify what is required to be supported by AS and determine the RAN2 impact, if possible. Identify common views / potential initial agreements, Identify points that need further discussion. Can also gather comments on the need to ask questions to other group.

 Intended outcome: Report with agreeable proposals and discussion points (not too many, preferably < 10) for treatment on-line

 Deadline: 1st Deadline for Comments: Friday Jan 29 1000 UTC. Other deadline if needed by rapporteur. Report Ready for treatment on-line Feb 3.

## Contact person(s) for each participating company

|  |  |  |
| --- | --- | --- |
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# 2 Discussion

Documents considered during this email discussion (papers submitted to agenda item 8.16.2):

[R2-2100543](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100543.zip) Overview of RAN2 impacts to support SNPN with 3rd party subscription Nokia, Nokia Shanghai Bell discussion Rel-17 NG\_RAN\_PRN\_enh

[R2-2101717](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101717.zip) Support SNPN along with credentials owned by an entity separate from the SNPN CMCC discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100241](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100241.zip) Initial Discussion on Credential by a Separate Entity OPPO discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100277](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100277.zip) Consideration on SNPN with Subscription or Credentials by a Separate Entity CATT discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100289](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100289.zip) Discussion of credentials by a separate entity in SNPN China Telecommunication discussion Rel-17

[R2-2100431](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100431.zip) Consideration on the Separate Entity Supporting ZTE Corporation, Sanechips discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100441](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100441.zip) Access to SNPN with credentials from a different entity Qualcomm Incorporated discussion

[R2-2100490](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100490.zip) SNPN and Service Provider (SP) separation Ericsson discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100634](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100634.zip) RAN2 impact on support SNPN along with subscription / credentials owned by an entity separate from the SNPN Intel Corporation discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2100838](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100838.zip) Support SNPN with subscription or credentials by a separate entity vivo discussion

[R2-2100918](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100918.zip) SIB info for third party credentials and UE onboarding Sony discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2101001](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101001.zip) Discussion on RAN2 impact of supporting SNPN with credentials owned by a separate entity Huawei, HiSilicon, China Telecom discussion Rel-17 NG\_RAN\_PRN\_enh-Core

[R2-2101515](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101515.zip) Support of SNPN with subscription or credentials by a separate entity LG Electronics discussion Rel-17

## 2.1 Broadcasting related issues

**Q1.1a: Do you agree that an indicator that "access using credentials from a separate entity is supported" should be broadcasted?**

**Q1.1b: Do you agree that the indicator should be broadcasted per SNPN in shared cells?**

**Q1.1c: Do you have a proposal in which SIB the indicator should be broadcasted?**

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| **Company** | **AnswerQ1.1a** | **AnswerQ1.1b** | **AnswerQ1.1c** | **Comments** |
| ZTE | Yes | Yes | Yes(SIB1) | As concluded in the SA2,

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| - For a UE configured to use SNPNs, automatic SNPN selection is performed in the following order:- UE selects and attempts to register with the SNPN it was last registered with (if available).- UE selects and attempts to register with the available SNPN identified by a PLMN ID and NID for which the UE has SUPI and credentials (i.e. as in Rel-16).- UE selects an available and allowable SNPN, which broadcasts "access using credentials from a separate entity is supported" indication and an SNPN ID contained in the user-controlled list (if available)- UE selects an available and allowable SNPN which broadcasts "access using credentials from a separate entity is supported" indication and a GID contained in the separate entity-controlled list (if available) |

Considering that this indication will affect the network/ cell selection, we prefer to include it in the SIB1, FFS for the *NPN-IdentityInfo-r16* or add a new list to the *CellAccessRelatedInfo* |
| OPPO | Yes | Yes | Yes(SIB1) | The requirements from SA2 TR 23700-07-120 are quite clear, this indicator should be configured per SNPN. To speed up UE cell selection/reselection procedure, SIB1 is more suitable to include this indicator. Anyway, no much overhead will be introduced in SIB1, it’s still acceptable. |
| Huawei, HiSilicon | Yes | Yes | Yes(SIB1) | Agree with the above companies that this is clear in the SA2 TR 23700-07-120, and that 1-bit indication per SNPN will not introduce too much overhead. |
| China Telecom | Yes | Yes | Yes in SIB1 | SA2 has already made interim conclusion of the indicator of “access using credentials from separate entity is supported” with the granularity of per SNPN. It is suitable for SIB1 to carry this indicator for fast discovery of this SNPN type for UEs. |
| MediaTek | Yes | Yes | SIB1 | This is aligned with SA2’s conclusions that an indicator is to be broadcasted per SNPN. Since this affects cell selection, it is preferable to include this information in SIB1 |
| Intel | Yes | Yes | SIB1 | The SIB1 includes the following information and this information should be forwarded to UE upper layers for network selection:- Indication that "access using credentials from a separate entity is supported"- Optionally, an indication whether the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPNSupported Group IDs for an SNPN in SIB1 is broadcast in a separate SIB from SIB1 (e.g. a new SIB). |
| CATT | Yes | Yes | SIB10 or new SIB | Consider the overhead of SIB11. it is not feasible to put all the information required by SA2 in SIB1
2. it does not make sense to only put the 1-bit indication that "access using credentials from a separate entity is supported" in SIB1,as other information(Group IDs,etc)should also be used in SNPN selection/cell selection/reselction.
 |
| Sony | Yes | Yes | Yes (SIB1) | This information is required for network selection so should be broadcasted in SIB1. We think that due to the size of Group ID, it should be broadcasted in a separate SIB and also depends on if Group ID has an impact on cell selection/reselection. |
| Qualcomm | Yes | Yes | SIB1 | This is only 1-bit per SNPN so putting in SIB1 should not be a problem. |
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**Q1.2a: Do you agree that the Supported Group IDs (GIDs) should be broadcasted?**

**Q1.2b: Do you agree that the Supported Group IDs (GIDs) should be broadcasted per SNPN in shared cells?**

**Q1.2c: Do you have a proposal on the maximum number of Supported Group IDs (GIDs) to be broadcasted?**

**Q1.2d: Do you have a proposal in which SIB the Supported Group IDs (GIDs) should be broadcasted?**

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| **Company** | **AnswerQ1.2a** | **AnswerQ1.2b** | **AnswerQ1.2c** | **AnswerQ1.2d** | **Comments** |
| ZTE | Yes | Yes | Yes(See comments) | Yes(See comments) | For the Q1.2c, we think the total number of the Group IDs can be counted independently from the legacy network IDs.E.g. the total number of the Group IDs of all of the SNPNs does not exceed 12 ( meanwhile, the total number of the legacy Network IDs including (PLMNs, PNI-NPNs, and SNPN) does not exceed 12)For the Q1.2d, similar to question 1, considering that this indicate will affect the network/ cell selection, we prefer to include it in the SIB1, FFS for the *NPN-IdentityInfo-r16* or add a new list to the *CellAccessRelatedInfo.* |
| OPPO | Yes | Yes | Yes(See comments) | Yes(See comments) | For the Q1.2c, we have no strong view, fine with value 4, 8, 12, 16.For the Q1.2d, if the overhead is not a big issue, SIB1 is more desirable for fast cell selection/reselection; otherwise, SIB10 is also acceptable. |
| Huawei, HiSilicon | Yes | Yes | No strong view | Preferably in SIB10 | Regarding Q1.2d:According to TR 23700-07-120, the group ID is in the form of SNPN ID.

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| The following enhancements will be progressed in the normative phase:- Group ID as a specific case of SNPN ID reusing SNPN ID encoding in TS 23.003 [15], where  |

Since a V-SNPN may have multiple group IDs, and that each SNPN ID is composed of a PLMN ID (24bits) and an NID (44bits), it will bring too much overhead to SIB1. Therefore, we would prefer to have it in SIB10 (SIB10 is an NPN-specific SIB anyway). |
| China Telecom | Yes | Yes | Yes | Yes | SA2 has the following conclusion as follow:*Group ID as a specific case of SNPN ID reusing SNPN ID encoding*Thus, it should act the same as SNPN ID. The total number of Network ID including PLMN, PNI-NPN, SNPN and Group ID, should not exceed 12. It can include in SIB1 like NID. |
| MediaTek | Yes | No? (treat group ID same as an SNPN ID) | Yes | SIB1 | SA2 concluded that the group ID is a specific case of SNPN ID, and re-uses SNPN ID encoding. Therefore from a RAN’s perspective, the group ID should be viewed as the same as an SNPN ID, i.e. that it is not an extra indication ‘per SNPN’ but a ‘SNPN’ on its own.Since we should treat the group ID the same as an SNPN ID, the same limits as max number of SNPNs apply. That is, the total number of NIDs including groups IDs, SNPNs, PNI-NPNs and PLMNs should not exceed 12.Similarly, the information should be broadcast in SIB1 just as SNPN IDs are provided today. |
| Intel | Yes | Yes | See comments | Yes. See comments | For Q1.2c If it is not on SIB1, the number of Group IDs does not need to be too constrained. For Q1.2d In a separate SIB to SIB1 (e.g. a new SIB). The UE knows from SIB1 that it should read this new SIB to receive the GID of the SNPN. |
| CATT | Yes | Yes | 4 per SNPN is fine | SIB10 or new SIB | For Q1.2d ,Same comments as Q1.1c |
| Sony | Yes | FFS | FFS | FFS | We think RAN2 should wait for the details of format of Group ID and if Group ID influence cell selection/reselection before deciding where to broadcast. |
| Qualcomm | Yes | Yes | 16 | SIB1 | 2a and 2b are per SA2 agreements. We can have a large enough value, e.g. 16 for future proof-ness. Grouping of SNPNs which share the same GUID, e.g. similar to UAC parameters, can reduce the broadcast information size. We can consider other SIB or a new SIB if size of the information is still deemed to be an issue. |
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**Q1.3a: Do you agree that an indicator whether "the SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN" should be broadcasted?**

**Q1.3b: Do you agree that the indicator should be broadcasted per SNPN in shared cells?**

**Q1.3c: Do you have a proposal in which SIB the indicator should be broadcasted?**

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| **Company** | **AnswerQ1.3a** | **AnswerQ1.3b** | **AnswerQ1.3c** | **Comments** |
| ZTE | Yes | Yes | Yes(See comments) | Similar to question 1, considering that this indicate will affect the network/ cell selection, we prefer to include it in the SIB1, FFS for the *NPN-IdentityInfo-r16* or add a new list to the *CellAccessRelatedInfo.* |
| OPPO | Yes | Yes | Yes(See comments) | Similar answer with Q1.1a~ Q1.1c. |
| Huawei, HiSilicon | Yes | Yes | Yes (SIB1) | For Q1.3c: since it is a 1-bit indication, it can be included in SIB1. |
| China Telecom | Yes | Yes | Yes in SIB1 | Same with Q1.1 |
| MediaTek | Yes | Yes | SIB1 | Same as Q1.1 |
| Intel | Yes | Yes | SIB1 | See our comments for Q1.1 |
| CATT | Yes | Yes | SIB10 or new SIB | For Q1.3c,Same comments as Q1.1c. |
| Sony | Yes | Yes | Yes SIB 1 | Same as Q1.1 |
| Qualcomm | Yes | Yes | SIB1 |  |
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**Q1.4: Other broadcasting related proposals (e.g. other parameters to be broadcasted) to support SNPN with subscription or credentials by a separate entity?**

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| **Company** | **Proposal** |
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## 2.2 Impacts on cell selection and reselection

**Q2.1: Do you agree that the AS should report to the NAS about the broadcasted parameters listed in Q1.1, Q1.2 and Q1.3?**

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| **Company** | **Answer** | **Comments**  |
| ZTE | Yes | At least for the Q1.3, it shall be reported to the NAS, for that in the SA2’s interim conclusion, on the indication of Q1.3, it said “ - If the UE detects a plurality of such SNPNs, the order in which the UE selects and attempts a registration with an SNPN is implementation specific” we think the AS can send such kind of the SNPNs list and relaed indication in Q1.3 to the NAS and left the NAS to make the final decision.For the Q1.1/1.2, it also depends on the interaction between NAS and AS, at least for the case that the NAS layer indicate a list of SNPNs in the user-controlled list, or a list of Group IDs, the UE AS should report to the NAS about the broadcasted parameters of the corresponding SNPNs /Group IDs explicitly. For the case that the NAS layer indicate only one SNPN or only one Group ID, the parameter in Q1.1, Q1.2 can be reported implicitly.Anyway, the AS should report to the NAS about the broadcasted parameters listed in Q1.1, Q1.2 and Q1.3 explicitly or implicitly |
| OPPO | Yes | Based on these enhanced parameters reported by AS, i.e. parameters listed in Q1.1, Q1.2 and Q1.3, NAS will know which type of procedure will be triggered, but we still have some concern for GID, if only GID reported by AS matches with UE NAS configuration, whether the selected GID is visible to UE AS ? or only the selected SNPN ID associated to the GID will be visible to UE AS. We think NAS should clarify something on this as this issue has impact on AS behavior. |
| Huawei, HiSilicon | Yes | The network selection is performed by NAS, therefore AS needs to report these external authentication related parameters to NAS to help NAS select an appropriate SNPN. |
| China Telecom | Yes | The parameters are needed for NAS to conduct different procedures. |
| MediaTek | Yes | These parameters are needed by NAS (regardless of whether they are indicated implicitly or explicitly) |
| Intel | Yes | It is required by NAS for network selection. |
| CATT | Yes | Agree with HW, it will be used by NAS in network selection. |
| Sony | Yes |  |
| Qualcomm | Yes |  |
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**Q2.2: Do you see any impacts on cell selection or cell reselection (e.g. a need to change suitable cell criteria) to support SNPN with subscription or credentials by a separate entity?**

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| **Company** | **Answer** | **Comments (e.g. details on the impacts)** |
| ZTE | Yes | We think at least it will affect the suitable cell definition |
| OPPO | Maybe | Up to whether the selected GID is visible to UE AS. |
| Huawei | Depends | Once an SNPN is selected, UE NAS should indicate the selected SNPN to UE AS to request cell selection. If all cells belonging to the selected SNPN broadcast the same contents with regard to external authentication (i.e., broadcast the "external authentication supported" indication and the same supported Home SP group IDs), then UE AS can select cells without considering the broadcast information on external authentication. Otherwise, the broadcast information on external authentication shall be considered during the cell selection procedure.Therefore, we suggest to ask SA2 to clarify that: Is it possible for the cells belonging to the same SNPN to broadcast different contents with regard to external authentication (e.g., some of them broadcast the "external authentication supported" indication while others don’t, or, the cells broad cast different group IDs)? |
| China Telecom | Yes | We think there are two impacts for the definition of suitable cell:1. The SNPN cell broadcasts the indication of allowing external credential
2. The SNPN cell does not broadcast the indication while it has same SNPN ID with the external credential SNPN
 |
| MediaTek | Yes | Indications ‘*access using credentials from a separate entity*’ and ‘*SNPN allows registration attempts from UEs that are not explicitly configured to select the SNPN*’ will have an impact on cell selection. The group ID would not be visible to the UE AS as it would be treated the same as an SNPN ID.Agree with Huawei that a clarification from SA2 is useful if these indications change from cell to cell within the same SNPN. If so, there could be an impact on cell reselection as well. |
| Intel |  | From the current SA2 requirement, it doesn’t look like there is any impact to idle mode mobility. The broadcast information is just transparently forwarded by AS to NAS for network selection. There may be some Stage-3 impact on this part on TS38.331 and 304, but should not affect cell selection or reselection or the suitability criteria. With a SNPN selected, the subsequent idle mode mobility is as per legacy procedure. |
| CATT | FFS | 1.We think the support of access using credentials from a separate entity should be SNPN specific,so only SNPN selection will be impacted.for cell selection or cell reselection within the selected SNPN, there is no impact at all.2.But,there is additional mobility scenarios to be considered.In 23.700, for KI#1, It is described in that for the mobility aspect, moving between SNPNs and PLMNs with the same separate entity could be supported, it may have impact on cell selection or cell reselection,

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| - Mobility scenarios, including service continuity, for:- UE moving from SNPN#1 with separate entity#1 to SNPN#2 with separate entity#1 available; and- UE moving between SNPN#1 (where separate entity=PLMN) and PLMN. |

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| Sony | FFS | Agree with Intel |
| Qualcomm | No | SNPN selection will be done by NAS as before but this time also considering GUIDs. None of this impact AS procedures other than passing the broadcast information to NAS. |
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## 2.3 Other issues

**Q3.1: Do you see any impacts on connected mobility to support SNPN with subscription or credentials by a separate entity?**

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| **Company** | **Answer** | **Comments (e.g. details on the impacts)** |
| ZTE | No | Up to now, we don’t see any impacts on the connected state mobility.  |
| OPPO |  | Up to RAN3 to decide, RAN2 can just wait. |
| Huawei, HiSilicon | No |  |
| China Telecom |  | Up to RAN3 |
| MediaTek | No |  |
| Intel | No |  |
| CATT | FFS | Same comments as Q2.2 |
| Sony | No |  |
| Qualcomm | No |  |
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**Summary:**

**Rapporteur's Proposal:**

**Q3.2: Other issues that are not covered by previous questions related to support SNPN with subscription or credentials by a separate entity to be discussed in RAN2**

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| **Company** | **Issue** |
| ZTE | For the SNPN that only support group ID, whether the indication in the Q1.1 shall be set? Though in the SA2 interim conclusion, it said that “- UE selects an available and allowable SNPN which broadcasts "access using credentials from a separate entity is supported" indication and a GID contained in the separate entity-controlled list (if available)” , we still have concern on the case that the SNPN only support Group ID. For example, for cell A, the SNPN 1 only support Group ID1, then the UE (with HSP 1) that include the SNPN1 in user-controlled list may try to access Cell A to access it’s corresponding HSP 1, but for the Cell A, it only support HSP with Group ID1, it doesn’t support HSP1.  |
| OPPO | Suitable cell clarification:Cell A: support SNPN1, SNPN2;Cell B: support SNPN1 and GID1;UE NAS: Home SNPN= SNPN2, but configured with GID1;In the beginning, UE has done the registration in Cell B (GID1 match case), then UE moves to Cell A coverage, what’s the UE behavior:UE behavior1: UE think Cell A is suitable as RSNPN, e.i. SNPN1 is broadcast by Cell A .UE behavior2: UE think Cell A is not suitable and do registration again on SNPN2 as no GID1 is associated with SNPN1 in Cell A even if SNPN1 is broadcast by Cell A .We believe NAS should clarify something |
| Huawei, HiSilicon | The issue we mentioned in Q2.2:Ask SA2 to clarify that: Is it possible for the cells belonging to the same SNPN to broadcast different contents with regard to external authentication (e.g., some of them broadcast the "external authentication supported" indication while others don’t, or, the cells broad cast different group IDs)?We think the answer from SA2 has impact on cell selection/reselection. If the answer from SA2 is “No”, AS procedures will be much easier: after NAS selects an SNPN, AS could follow the legacy cell selection/reselection procedure. |
| China Telecom | We think it is still uncertain for where (AS or NAS) is responsible for matching GID with SNPN IDs. This issue has impact of the interaction between AS and NAS. |
| CATT. | The issue we mentioned in Q2.2:In 23.700,cluse 5.1, it is mentioned to support the following mobility scenario for key issue#1,

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| - Mobility scenarios, including service continuity, for:- UE moving from SNPN#1 with separate entity#1 to SNPN#2 with separate entity#1 available; and- UE moving between SNPN#1 (where separate entity=PLMN) and PLMN. |

But there are no explicit conclusion on this in 23.700,so we may need to ask SA2 whether these mobility scenarios should be supported. |
| Qualcomm | Regarding Oppo and HW comments. We can assume uniform support of GID across registration area. This can be confirmed with SA2. |
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**Summary:**

**Rapporteur's Proposal:**

## 2.4 Proposed questions to other WGs

**Q4: Proposed questions to other WGs related to SNPN with subscription or credentials by a separate entity (please provide only a question if you think it is important to send an LS to other WGs from this RAN2 meeting)**

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| **Company** | **WG(s)** | **Question** |
| ZTE | RAN3/CT1/SA2 | **Whether the Ran node need the additional information for the AMF selection?**  |
| OPPO | SA2 | **Question1 for clarification:**Whether the GID configured in NAS will be given to AS after registration to assist UE subsequence cell reselection, just like the EPLMN list, which is given to UE AS after registration.**Question2 for clarification:**Cell A: support SNPN1, SNPN2;Cell B: support SNPN1 and GID1;UE NAS: Home SNPN= SNPN2, but configured with GID1;In the beginning, UE has done the registration in Cell B (GID1 match case), then UE moves to Cell A coverage, what’s the UE behavior:UE behavior1: UE think Cell A is suitable as RSNPN, e.i. SNPN1 is broadcast by Cell A .UE behavior2: UE think Cell A is not suitable and do registration again on SNPN2 as no GID1 is associated with SNPN1 in Cell A even if SNPN1 is broadcast by Cell A .Which UE behavior is desirable from NAS side? |
| Huawei, HiSilicon | SA2 | **Is it possible for the cells belonging to the same SNPN to broadcast different contents with regard to external authentication** (e.g., some of them broadcast the "external authentication supported" indication while others don’t, or, the cells broad cast different group IDs)? |
| MediaTek | SA2 | The same question as Huawei. With regards to the question from ZTE, it is our understanding that SA2 are discussing the topic and we can wait from their conclusion. |
| CATT | SA2 | Whether the following mobility scenarios related to key issue#1(Support SNPN along with credentials owned by an entity separate from the SNPN) is supported,

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| - Mobility scenarios, including service continuity, for:- UE moving from SNPN#1 with separate entity#1 to SNPN#2 with separate entity#1 available; and - UE moving between SNPN#1 (where separate entity=PLMN) and PLMN. |

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**Summary:**

**Rapporteur's Proposal:**

# 3 Conclusions

## 3.1 Proposals that may be agreed

## 3.2 Proposals/Issues that requires further discussion

## 3.3 Potential questions to other WGs