3GPP TSG-RAN WG2 Meeting #117 Electronic R2-220xxxx

21 February – 03 March 2022

**Agenda item: 8.16.2**

**Source: Nokia (Rapporteur)**

**Title: Report from [AT117-e][048][eNPN] Open Issues (Nokia)**

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

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report of the following email discussion:

* [AT117-e][048][eNPN] Open Issues (Nokia)

      Scope: Treat tdocs on open issues: R2-2202208, R2-2202620, R2-2202832, R2-2202855, R2-2202889, R2-2202896, R2-2202898, R2-2203075, R2-2203264, R2-2203447, Also, review the CR in R2-2202636 and consider the open issues listed there, for UE capabilities.

      Intended outcome: Report

      Deadline: W1 Friday (for on-line CB W2 Monday). It is expected that this discussion continues W2 for final agreement of the CRs.

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Nokia (Rapporteur) | Gyuri Wolfner | gyorgy.wolfner@nokia.com |
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# 3 Discussion

## 3.1 Number of GINS

The following proposals were submitted in this area:

R2-2202208 (OPPO):

Proposal 1: The maximum number of GIN broadcast per cell is 12.

R2-2202620 (CMCC):

Proposal 1: The maximum number of GINs listed in the new SIB can be 12.

R2-2202832 (China Telecom)

Proposal 1: The maximum number of GINs in the new SIB is twelve.

R2-2202855 (Samsung)

Proposal 1: RAN2 to agree that Maximum number of GINs supported per cell as 16.

R2-2202889 (Huawei, HiSilicon)

Proposal 1: The maximum number of GINs (maxNrofGIN) is 12 or 24.

R2-2202896 (vivo)

The maximum number of GINs per cell is 24.

R2-2202898 (ZTE Corporation, Sanechips)

Proposal 1: The Maximum number of GINs can be 24 or 48.

R2-2203075 (Nokia, Nokia Shanghai Bell)

Proposal 1: The maximum number of GINs per cell is 32.

R2-2203264 (LG Electronics Inc)

Proposal 3: The maximum value of GINs to be broadcast is [48 or 24].

R2-2203447 (Ericsson)

Proposal 3 : maxNrofGIN can be set to 12, or at most 16.

The following proposals were made: 12, 16, 24, 32, 48.

**Question 1: Please indicate in the table which value(s) you prefer (P) and you can accept (A) (please try to be flexible):**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Company | 12 | 16 | 24 | 32 | 48 | Comments |
| Intel | A | P | A |  |  | No strong view. |
| Qualcomm | A | A | A | A | P | Having a large maximum value is always the safe option for future. This of course doesn’t mean that all will be needed in the first deployments. |
| vivo |  |  | P | A |  | Based on our analysis, the maximum SIB size cannot support 48 GINs. In addition, considering that a common list of GINs is used for these two features and different GIN values can be used for each feature, we prefer the value of 24. |
| OPPO | P | A |  |  |  | We think 12 or 16 is sufficient for use. |
| Nokia |  |  | A | P | A | Agree with Qualcomm: we think a large maximum number is more future proof. We see no technical reason to limit future deployments. We prefer 32, as in that case it is guaranteed that all GINs can fit in a SIB message without any optimization, but optimization may enable to have more GINs in a single SIB message. |
| Ericsson | P | A |  |  |  | No specific requirements have been identified by other WGs. However, we see that on the one hand, one aspect for introducing GINs was to reduce the overhead as one GIN may cover various networks/credential holders/manufacturers. And on the other hand, in many cases, the UE is simply pre-configured with the SNPN IDs that it should select. Thus, we think that it would not be necessary to broadcast more than 12-16 GINs per cell. |
| LGE |  |  | P | A | A | Given the clarified GIN encoding, there is a risk that SIBx with 48 GINs may not fit into SIB, hence 24 or 32 seems fine. 12 is too restrictive. |
| Huawei, HiSilicon | P | A | P |  |  | An average or 1~2 GINs associated to an SNPN should be enough. |
| ZTE | A | A | A | P | A | A new SIB was introduced together with some encoding optimization (e.g. sharing the PLMN part), so a large number of GINs can be supported, otherwise, there is no need to be introduce any optimization. |
| Samsung | A | P | - | - | - | GINs were proposed already as a way to reduce signalling overhead of sending individual Service Provider ID. Thus we think 12/16 GINs per cell is sufficient. |
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**Summary**: TBD.

## 3.2 Meaning of missing *supportedGINs-r17* and other related proposals

The following proposals were submitted in this area:

R2-2202208 (OPPO):

Proposal 2: *supportedGINs-r17* is always present for each SNPN involved in *snpn-AccessInfoList* provided in SIB1.

R2-2202832 (China Telecom)

Proposal 3: If the the n-th entry in gins-PerSNPNList is missing, the n-th SNPN does not have GINs.

R2-2202855 (Samsung)

Proposal 2: If supportedGINs-r17 in nth element in ginsPerSNPN-List is absent, it would indicate that the nth SNPN in snpn-AccessInfoList provided in SIB1 does not support any GINs.

R2-2202889 (Huawei, HiSilicon)

Proposal 2: The n-th entry in *ginsPerSNPN-List* should correspond to the n-th SNPN that supports extCH and/or onboarding as listed in *snpn-AccessInfoList* provided in SIB1.

R2-2202896 (vivo)

Proposal 1: If n-th entry in the snpn-AccessInfoList is absent, there is no supported GIN for the n-th SNPN listed in snpn-AccessInfoList.

R2-2202898 (ZTE Corporation, Sanechips)

Proposal 2: If the n-th entry in the ginsPerSNPN-List is missing, the associated SNPN supports neither Credentials Holder nor the on-boarding feature.

R2-2203075 (Nokia, Nokia Shanghai Bell)

Proposal 2.1: Missing explicit assignment indicates that the given SNPN cannot be associated with any of the advertised GINs when multiple SNPNs are supported in the cell.

Proposal 2.2: If there is only a single SNPN identifier in the CellAccessRelatedInfo then gins-PerSNPN should not be present as all GINs are associated with that SNPN.

R2-2203264 (LG Electronics Inc)

Proposal 1: RAN2 to decide one of the following options:

- Option1: If a SNPN in SIB1 has no associated GIN, the corresponding gins-perSNPN-r17 is set to all zeros.

- Option2: If a SNPN in SIB1 has no associated GIN, the corresponding gis-perSNPN-r17 is omitted.

Proposal 2a: If option2 is taken, agree to the following:

- Introduce a new bitmap, in SIBxy, representing a subset of SNPNs in SIB1, where each bit corresponds to each SNPN in SIB1 and indicates whether the corresponding SNPN has at least one GIN in the GIN list in SIBxy.

- The field gins-PerSNPN-r17 has the same number of entries as the length of the new bitmap, and n-th entry in ginsPerSNPN-r17 corresponds to n-th SNPN indicated by the new bitmap.

- If a SNPN in SIB1 has no associated GIN, the corresponding GINs-perSNPN-r17 is omitted.

R2-2203447 (Ericsson)

Proposal 1 : Decide whether all SNPNs in snpn-AccessInfoList or, only the SNPNs broadcasting ‘extCH-Supported’ and/or ‘onboardingEnabled’, should be included in the gins-PerSNPN-List.

Proposal 2 : Instead of broadcasting the bitmap with all bits set to ‘0’, the field ‘supportedGINs’ being absent can be used to indicate that a given SNPN does not support any GIN.

Rapporteur's summary is the following:

At least 5 company proposes that the field ‘supportedGINs’ being absent for an SNPN indicates that a given SNPN does not support any GIN.

There is a proposal on the enhancement of SIBXY if a SNPN in SIB1 has no associated GIN, the corresponding gis-perSNPN-r17 is omitted (Proposal 2a of R2-2203264):

Proposal 2a: If option2 is taken, agree to the following:

- Introduce a new bitmap, in SIBxy, representing a subset of SNPNs in SIB1, where each bit corresponds to each SNPN in SIB1 and indicates whether the corresponding SNPN has at least one GIN in the GIN list in SIBxy.

- The field gins-PerSNPN-r17 has the same number of entries as the length of the new bitmap, and n-th entry in ginsPerSNPN-r17 corresponds to n-th SNPN indicated by the new bitmap.

- If a SNPN in SIB1 has no associated GIN, the corresponding GINs-perSNPN-r17 is omitted.

There are proposals that in *ginsPerSNPN-List* only the SNPNs that support either extCH or onboarding or both are listed:

Proposal 2: The n-th entry in *ginsPerSNPN-List* should correspond to the n-th SNPN that supports extCH and/or onboarding as listed in *snpn-AccessInfoList* provided in SIB1.

Proposal 1 : Decide whether all SNPNs in snpn-AccessInfoList or, only the SNPNs broadcasting ‘extCH-Supported’ and/or ‘onboardingEnabled’, should be included in the gins-PerSNPN-List.

There is a proposal that gins-PerSNPN is absent when the cell only supports a single SNPN:

Proposal 2.2: If there is only a single SNPN identifier in the CellAccessRelatedInfo then gins-PerSNPN should not be present as all GINs are associated with that SNPN.

**Question 2.1: Do you agree that the field ‘supportedGINs’ being absent for an SNPN indicates that a given SNPN does not support any GIN?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | Yes |  |
| Qualcomm | Yes |  |
| vivo | Yes |  |
| OPPO | No | Let field ‘supportedGINs’ always present is simpler and can avoid to make spec complex. |
| Nokia | Yes | We think that this is a simple and beneficial optimization |
| Ericsson | Yes | Proponent |
| LGE | See comment | Does the question assume to introduce a parent IE to indicate associated GINs for an SNPN and within the IE the supportedGINs field is optionally present such that in case the concerned SNPN does not support any GIN, the instance of the IE is an empty container (i.e., supportedGINs is absent for the SNPN)? If this is what the question assumes, we are fine with this. If this is not the intention, our answer is just “maybe”. |
| Huawei, HiSilicon | No | We have a similar concern with LGE on the feasibility. There’s no SNPN index in gins-PerSNPNList, so if a GIN list is absent, the UE does not know the absence corresponds to which SNPN.  In comparison, the proposal in Q2.3 is much simpler. You can tell from the indications in SIB1 whether an SNPN supports external credential or onboarding. |
| ZTE | Yes |  |
| Samsung | Yes |  |
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**Summary**: TBD.

**Question 2.2: Do you agree with proposal 2a of R2-2203264 if a SNPN in SIB1 has no associated GIN is absent (see Q2.1)?**

- Introduce a new bitmap, in SIBxy, representing a subset of SNPNs in SIB1, where each bit corresponds to each SNPN in SIB1 and indicates whether the corresponding SNPN has at least one GIN in the GIN list in SIBxy.

- The field gins-PerSNPN-r17 has the same number of entries as the length of the new bitmap, and n-th entry in ginsPerSNPN-r17 corresponds to n-th SNPN indicated by the new bitmap.

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| Company | Yes/No | Comments |
| Intel | No | We do not see the need of this enhancement |
| Qualcomm | No | Option 2 in the paper is too complicated at this stage. We probably don’t need a Choice between “empty” and Bitstring, as argued in the paper, but it would be good to confirm. |
| vivo | No | Fail to see the need of optimization. |
| OPPO | No | No much benefit we can get for this further optimization. |
| Nokia | No |  |
| Ericsson | No | The bitmap is not needed. If 2.1 is agreed, presence of ‘supportedGINs’ already indicates that there is at least one associate GIN, and absence means that there is no associated GIN. |
| LGE |  | We do not have a strong view. Any simple and workable signalling would be fine. |
| Huawei, HiSilicon | No | This is complicated. |
| ZTE | No |  |
| Samsung | No | Absence of supportedGINs-r17 field is sufficient and adding a bitmap is not needed |
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**Summary**: TBD.

**Question 2.3: Do you agree that in ginsPerSNPN-List only the SNPNs that support either extCH or onboarding or both are listed?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | Yes | This maybe a worthwhile optimisation if majority prefer. |
| Qualcomm | Maybe | It can be easier to signal an empty container for the SNPN without any GIN support. |
| vivo | No | Seems like signalling optimization. We do not see strong motivation |
| OPPO | No | Not critical optimization. |
| Nokia | Maybe | We do not see a major benefit of this optimization, but we can accept it if it has a strong support |
| Ericsson | No strong view | By only providing GIN related information for SNPNs which broadcast extCH-Supported and/or onboardingEnabled, a few bits can be saved.  However, with this optimization, the association to the SNPNs in the snpn-AccessInfoList becomes slightly more complex. Given that only a few bits can be saved it could be better to strive for better readability. |
| LGE | Neutral | We do not think this offers non-trivial signalling gain in typical deployment. But we are fine with majority view. |
| Huawei, HiSilicon | Yes | This is simpler than using an empty container and brings less overhead. |
| ZTE | No strong view | We don’t have strong view on this and we can follow the majorities’ view. |
| Samsung | No | This might result in confusion in interpreting the SNPN-GIN mapping.   * Consider the case of SNPN supporting just onboarding and is supporting a list of GINs. * The onboarding indicator can be toggled (for congestion purpose) * In such cases, will the GIN SIB be modified? If not, this case would cause confusion in mapping SNPN and GINs   It is better to avoid such confusion. |
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**Summary:** TBD.

**Question 2.4: Do you agree that gins-PerSNPN is absent when the cell only supports a single SNPN (Proposal 2.2 of R2-2203075)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | Yes |  |
| Qualcomm | Yes | It saves signalling so fine. |
| vivo | Yes |  |
| OPPO | No strong view |  |
| Nokia | Yes | We think that this is a simple and useful optimization. |
| Ericsson | No strong view | We would be OK to have this if there is majority support. |
| LGE | No | We do not think it is wise to introduce two different interrelations for absence of gins-PerSNPN (one interpretation for a single SNPN case and ther other for multiple SNPN case) and the signalling gain is trivial. |
| Huawei, HiSilicon | Yes | Ok to have this simple optimization. |
| ZTE | No strong view | We don’t have strong view on this and we can follow the majorities’ view. |
| Samsung | Yes | This can be an optimisation with just text addition to field description. |
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**Summary**: TBD.

## 3.3 IDLE/INACTIVE mode related proposals

The following proposals were submitted in this area:

R2-2202208 (OPPO)

Proposal 3: Define a separate acceptable cell definition for SNPN.

R2-2202898 (ZTE Corporation, Sanechips)

Proposal 3: The NAS shall indicate AS layer whether the AS need to read/report the GIN.

Proposal 4: The AS layer read the SIBxy for the GINs when the NAS layer indicated.

R2-2203447 (Ericsson)

Proposal 5 : RAN2 to wait for RAN3's resolution on whether there is a need to reconsider how the onboardingEnabled indication is used.

Rapporteur's view is that proposals of R2-2202208 and R2-2202898 can be accepted if other companies support them and there is no strong concern. As proposal 5 of R2-2203447 proposes only to wait for a potential LS, it does not require further discussion before RAN2 receives the LS.

**Question 3.1: Do you agree to define a separate acceptable cell definition for SNPN (Proposal 3 of R2-2202208)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | No | We do not see the need of it |
| Qualcomm | No | These were discussed before; we shouldn’t spend more time. |
| vivo | No |  |
| OPPO | Yes | We don’t think we have discussed this issue before, this issue is essential and critical, and we also don’t see any technical concern for this issue based on companies’ comments above, maybe let me explain again:  For PLMN, one acceptable cell should support originate emergency calls and receive ETWS and CMAS notifications at the same time;  But for SNPN, a cell only supporting originate emergency calls can be an acceptable cell based on following agreement   * An SNPN cell is considered an “acceptable cell” if it supports emergency services.   If we mix the above definition, this will force SNPN to support PWS always along with emergency calls, which is not desirable for SNPN operator.  So this proposal should be supported. |
| Nokia | No |  |
| Ericsson | No | It should be the same as for PLMNs |
| LGE | No | To have a separate acceptable cell definition is not acceptable. We can accept having a Note to clarify that the ETWS and CMAS may not be supported in SNPN. |
| Huawei, HiSilicon | No | The current definition of acceptable cell is not restricted to PLMN. |
| ZTE | No | We don’t think it’s necessary to have a separate definition. |
| Samsung | No | No separate text for SNPN is needed. Perhaps a note can be added stating that a cell does not have to support ETWS/CMAS services to be categorised as “acceptable cell” in case of SNPN access. |
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**Summary**: TBD.

**Question 3.2: Do you agree that the NAS shall indicate to AS layer whether the AS need to read/report the GINs and the AS layer only reads the SIBxy when it is indicated by the NAS (Proposal 3 and 4 of R2-2202898)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | No | This can be left to UE implementation |
| Qualcomm | No | There are many similar AS-NAS interactions for other features. These are all UE internal and left to implementation. |
| vivo | No | Agree with QC. |
| OPPO | No | Fine to UE implementation |
| Nokia | No |  |
| Ericsson | No | There is no need to capture this in the spec and can be left to UE implementation |
| LGE | No |  |
| Huawei, HiSilicon | No |  |
| ZTE | Yes | We think anyway, NAS need to indicate this to the AS, so we prefer to specify it clearly |
| Samsung | No | NAS-AS interactions can be left to UE implementation. |
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**Summary**: TBD.

## 3.4 UE capability related proposals

The draft running CR in R2-2202636 is based on the following agreements from RAN2#116bis:

* No UE AS capability signalling is needed for CH and onboarding.
* No CH and onboarding AS capabilities without capability signalling needs to be specified in TS38.306
* There is no need to specify UE AS capability signalling for CGI reporting for CH and onboarding
* No UE AS capability signalling is needed for IMS emergency services.
* The existing conditional mandatory without capability signalling for IMS emergency call can be reused for IMS emergency call for UE in SNPN access mode. Add the following to the existing capability: “It is mandatory to support IMS emergency call over SNPN for UEs that are IMS voice capable over SNPNs”

The following proposals were submitted in this area:

R2-2202896 (vivo)

Proposal 3: Modify the existing capability signaling for IMS emergency call to “It is mandatory to support IMS emergency call over PLMN for UEs which are IMS voice capable in NR”.

Proposal 4: Add the following to the existing capability for IMS emergency call: “For SNPN capable UE, it is mandatory to support IMS emergency call over SNPN for UEs that are IMS voice capable over SNPNs”.

R2-2203447 (Ericsson)

Proposal 4 : For voiceOverNR capability, clarify that IMS voice over NR includes SNPN if the UE is SNPN capable.

Rapporteur's understanding is that the proposals are intending to enhance the current running CR based on the agreements of the previous meeting.

**Question 4: Do you agree**

**a) Proposal 3 of R2-2202896 (**Modify the existing capability signaling for IMS emergency call to “It is mandatory to support IMS emergency call over PLMN for UEs which are IMS voice capable in NR”.**)?**

**b) Proposal 4 of R2-2202896 (**Add the following to the existing capability for IMS emergency call: “For SNPN capable UE, it is mandatory to support IMS emergency call over SNPN for UEs that are IMS voice capable over SNPNs”.**)?**

**c) Proposal 4 of R2-2203447 (**For voiceOverNR capability, clarify that IMS voice over NR includes SNPN if the UE is SNPN capable.**)?**

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| --- | --- | --- | --- | --- |
| Company | a) | b) | c) | Comments |
| Intel | Y | Maybe | Y | The addition in b) w.r.t last meeting agreement (“It is mandatory to support IMS emergency call over SNPN for UEs that are IMS voice capable over SNPNs”) is probably not that essential, but can accept if majority think it is needed.  We are fine with c) as UE can only access SNPN or PLMN at any one time and hence the capability can be reused. |
| Qualcomm | Y | Y | Y | Either b or c is fine. |
| vivo | Y | Y | Y |  |
| OPPO | Y | Y | Y | C is preferred. |
| Nokia | Y | Y | Y |  |
| Ericsson | Yes | No | Yes(Proponent) | b) is not necessary. If a UE is IMS voice capable over SNPNs, it implies that the UE is SNPN capable. |
| LGE | Y | Y | Y | For b and c, we may need to adopt both, rather than having either b or c, because b is about IMS emergency call feature (cond.mand.) while c is about voiceOverNR feature (with cap.signal.). |
| Huawei, HiSilicon | Y | Y | Y |  |
| ZTE | Y | N | Y | Share the similar view as Ericsson |
| Samsung | Y | Y | Y |  |
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**Summary**: TBD.

## 3.5 Other proposals

The following other proposals were submitted

R2-2202832 (China Telecom)

Proposal 2: RAN2 correct the typo of gin-per-SNPN list and recommend to use “gins-PerSNPNList”.

R2-2202889 (Huawei, HiSilicon)

Proposal 3: Use separate bitmaps for extCH and onboarding in SIBYX.

R2-2203264 (LG Electronics Inc)

Proposal 4: RAN2 to discuss allowing early implementation of emergency services support in SNPN by Rel-16 UEs capable of IMS voice in SNPN.

Rapporteur's view on Proposal 2 of R2-2202832 is that it should be corrected in the next version of the draft CR, no need to discuss it. The views on the other proposals are to be discussed.

**Question 5.1: Do you agree with Proposal 3 of R2-2202889 (**Use separate bitmaps for extCH and onboarding in SIBYX**)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | No | We have discussed this in past meeting and it is our understanding that GIN value is transparent to the AS. |
| Qualcomm | No | NAS can differentiate the two cases. |
| vivo | No | Agree that NAS can differentiate the two cases. |
| OPPO | No | NAS can do the differentiation. |
| Nokia | No |  |
| Ericsson | No | RAN2 already agreed that there is no need to differentiate on AS level:   * There is a common list of GINs for both onboarding and SNPN access using external CHs. |
| LGE | No |  |
| Huawei, HiSilicon | Yes | We understand there has been discussion in the past. However, we think NAS is unable of differentiating the two cases. |
| ZTE | No |  |
| Samsung | Yes | Having separate bitmap for extCH and onboarding avoids confusion at UE while network selection.  For example, Consider a case where,   * Cell 1 has SNPN1 which broadcasts support for both onboarding and external CH access. And common GIN list consist of {GIN1, GIN2} in which GIN1 is associated for onboarding purpose and GIN2 is associated for external CH access. * Cell 2 has SNPN2 which broadcasts support for {GIN1, GIN2} in which GIN1 is for external CH access purpose only and GIN2 is used for onboarding. * Both Cell 1 and Cell 2 would broadcast onboarding supported flag and externalCHAccess flag in SIB1 (the indication is set per SNPN) * Both cell 1 and cell 2 would broadcast similar GIN SIB   This would cause confusion in UE as it cannot differentiate which GIN is for which purpose. |
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**Summary**: TBD.

**Question 5.2: Do you agree a need to discuss of allowing early implementation of emergency services support in SNPN by Rel-16 UEs capable of IMS voice in SNPN (Proposal 4 of R2-2203264)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | No | As long as NAS support it and UE is support voice over SNPN, everything should work as it is. |
| Qualcomm | Yes | This can help with early adoption of voice support in private networks. |
| vivo | No | In TS 23.122 g61, it is clearly stated that “An MS operating in SNPN access mode never attempts to make emergency calls” in the clause 2. It seems that early implementation of emergency service support in SNPN by Rel-16 SNPN capable UEs is not meaningful as the NAS of R16 UE is not allowed. |
| OPPO | No | Not critical from our side. |
| Nokia | Maybe | We can accept it if it has a strong support |
| Ericsson | No | We don’t see the need for this. |
| LGE | Yes |  |
| Huawei, HiSilicon | No |  |
| ZTE | No |  |
| Samsung | Yes |  |
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**Summary**: TBD.

## 3.6Other proposals

The rapporteur would like to check if there is any other issue that should be discussed to be able to complete the specification of this feature.

**Question 6: Do you see any other important issue that should be discussed before completing the feature?**

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**Summary**: TBD.

# 4 Conclusion

TBD.