3GPP TSG-RAN WG2 Meeting #118-e R2-220xxxx

Electronic, 9th May – 20th May 2022

**Agenda Item: 6.10.1.1**

**Source: CMCC**

**Title:** **Report of [AT118][0XX][NTN] reply LSs to CT1 (CMCC)**

**Document for: Discussion**

# Introduction

This document aims for gathering and summarizing companies’ views for the following offline discussion:

* [AT118-e][114][NTN] Reply LSs to CT1 (CMCC)

 Initial scope: Discuss whether some minimal update to 38.304 is needed related to the CT1 LS on list of PLMNs not allowed to operate at the present UE location and the need/content of a reply LS for CT1 LS about NR satellite RAT type in UE NAS

 Initial intended outcome: Agreeable TP for a 38.304 CR on list of PLMNs not allowed to operate at the present UE location and reply LS to CT1 on NR satellite RAT type in UE NAS

 Deadline (for companies' feedback): Monday 2022-05-16 12:00 UTC

 Deadline (for rapporteur's summary in R2-2206206): Tuesday 2022-05-17 08:00 UTC

**Note1:** All the proposals listed in the summary will be categorized into two types:

* **Type1:** proposal for agreement, e.g. reach consensus by the majority.
* **Type2:** proposal needs further discussion.

Contact table

|  |  |
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# Discussion

In last meeting, CT1 had sent LS to RAN2 on LS introducing the list of PLMNs not allowed to operate at the present UE location as below:

|  |
| --- |
| CT1 is working on the support of PLMN selection for satellite NG-RAN access technology, and has introduced a list of "PLMNs not allowed to operate at the present UE location". In this list for each entry there could be information related to whether or not the PLMN is allowed within a certain area.**To RAN2** **ACTION:** CT1 kindly asks to RAN2 to take above information into account for their future work on this work item. |

Per the agreed CRs in CT1, the UE shall store a list of "PLMNs not allowed to operate at the present UE location" as follows:

- *the PLMN identity of the PLMN which sent a message including 5GMM cause value #78 "PLMN not allowed to operate at the present UE location" via satellite NG-RAN access technology;*

*- the geographical location, if known by the UE, where 5GMM cause value #78 was received on satellite NG-RAN access technology;*

*- the distance to the current UE location;*

*- a timer which is started upon the UE receiving an integrity protected reject message with cause value #78 "PLMNs not allowed to operate at the present UE location" from a satellite NG-RAN cell.*

Therefore, the UE’s behaviours are as follows:

* In NTN, when a UE receives an reject message with cause value #78 "PLMNs not allowed to operate at the present UE location" from a NTN cell, the UE maintains a list of "PLMNs not allowed to operate at the present UE location" in which it stores the PLMN ID of the rejecting PLMN, and the current geographical location and a timer.
* And the List can be removed when the timer associated to the entry expires or the UE successfully registers to the PLMN stored in the entry.



Hence, in our understanding, since NOT ALL the coverage of the PLMN is forbidden, only the **partial coverage** which fulfils the conditions as depicted in 1) is not allowed to the UE, the information should be transmitted to the AS to facilitate the cell selection and re-selection. That is, during cell selection, the UE should take the list into account as **the list of “Forbidden TAs”**.

**Q1: which part is impacted by the new introduced list of "PLMNs not allowed to operate at the present UE location"?**

***A: Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state***

***B: Defintion of suitable cell***

***C: Cell selection/re-selection, e.g., description on Cells with cell reservations, access restrictions or unsuitable for normal camping***

***D: None***

|  |  |  |
| --- | --- | --- |
| **Company** | **Which part do you prefer** | **comments** |
| CMCC | A,B,C | From our understanding, since NOT ALL the coverage of the PLMN is forbidden, only the **partial coverage** which fulfils the conditions as depicted in 1) is not allowed to the UE, the information should be transmitted to the AS to facilitate the cell selection and re-selection. That is, during cell selection, the UE should take the list into account as **the list of “Forbidden TAs”.** |
| Apple | A or D | It seems cleaner from the spec point of view to let NAS deal with all aspects related to PLMN selection including located based aspects.  |
| Lenovo | A at least, B and C optional | At least we need to indicate in 4.2 of 38.304, that it is NAS to maintain a list of “PLMNs not allowed to operate at the present UE location”. The list may need to be provided to AS if impacts are identified.For B and C, we see some regulation requirements of forbidding UE access to a certain PLMN at certain locations, e.g. country border area. In our understanding it is about in what granularity do we need to meet the requirements. If the NTN cell coverage can align with borders or the regulation needs to be strictly complied, then B and C are reasonable to implement at cell level. Besides, as Rel-18 is considering UE location verification in NR NTN e.g. to fulfil the requirements defined in 22.926, implementation at verified location level is also an option. |
| Intel | A | For A, we agree that it’s NAS to maintain a list of “PLMNs not allowed to operate at the present UE location”.For B and C, it’s possible that partial coverage of one cell is within this “certain area”, i.e., calculated by present UE location and “the distance to the current UE location”, and the other coverage of this cell is still ok to get access. In this case, this cell is a partial suitable cell, and UE should be allowed to access to this cell. |
| Ericsson | D (fine with A as it is more Stage 2-ish) | Our understanding is what is being introduced in NAS is that the list of the PLMNs not allowed to operate at the current location only applies when the UE is not registered. The cause code that leads to adding a PLMN to the the list can be received at initial registration reject or at network initiated deregistration. Thus the content of the list applies to prevent an attempt for initial registration to a PLMN, i.e at PLMN selection. Our understanding is thus that the AS provides to NAS the list of suitable cells including the ones possibly restricted by the list and lets NAS/PLMN selection do the further filtering taking the list into account. This means that B and C should not need to be affected. If we are unclear about this, we can indicate this to CT1 in our response. Note that the LS sent from CT1 to SA1 may have idle mode impact depending on what SA1 decides (R2-2204509), but for now nothing is likely to be needed.  |
| Qualcomm | Exactly follow Forbidden Tracking Areas |  |
| Xiaomi | A or D  | We think the UE AS will report the PLMN not allowed to operate at the present locaotion to the UE NAS, and then UE NAS will do PLMN selection based on the procedure defined in the NAS specification.  |
| Nokia | A or D | D is our preference, but if there is a strong desire to capture something, then TP to 38.304 for A can be considered (although CT1 has not asked us to do it and has not shared any further details regarding the introduced mechanism).We wonder what the AS will do, even if it is informed PLMN is not allowed to operate at present location? How will it work, will it require the UE to always have its location info available? |
| OPPO | D | We don’t think this change the AS/NAS functions. Still PLMN is selected by NAS and UE simply performs cell selection based on the selected PLMN. Anything NAS should take care on the list should be discussed and captured by CT1 spec. |
| Samsung | A | Agree with Ericsson. No need to apply the list of “PLMNs not allowed to operate at the present UE location” in cell selection/reselection since the cell falls into the forbidden area shall not considered in PLMN selection, cf. [2] “if a cell fulfils the conditions related to the list of "PLMNs not allowed to operate at the present UE location", it is not considered as candidate for PLMN selection”. A is fine. |
| vivo | A | We think new introduced list of "PLMNs not allowed to operate at the present UE location" is about PLMN selection, and thus there is no impact on AS. UE AS should perform cell selection/reselection based on the selected PLMN or the registered PLMN or PLMN the Equivalent PLMN list provided by the NAS as legacy. |
| Huawei, HiSilicon | A | PLMN selection is performed by NAS. Besides, the unallowed PLMNs will not be configured as equivalent PLMNs, so the current definition of suitable cell still works. |
| ZTE | A, B, C | We are fine to align the handling of PLMNs not allowed to operate at the present UE location with that of forbidden TA. |

**The opinions from the participants can be summarized as follows:**

* Vast majority of companies (**12/13)** agree to indicate the impact of the new list in 4.2 of 38.304 (**Option A**);
* 5 companies think either Option A or Option D could work;
* 3 companies (CMCC, QC and ZTE) prefer to handle the new list as that for “Forbidden Tracking Areas”

Regarding the views from participants that majoritycompanies agree to indicate the impact of the new list in 4.2 of 38.304 (**Option A**), majority support the proposal. Hence, to progress the discussion, it is suggested by rapporteur to attempt conclusion as follows:

**Proposal 1: It is proposed to indicate the impact of the new list in 4.2 of 38.304 (*Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state*).**

**Q2: If any part you prefer to update, please provide your text description.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Which part do you prefer** | **comments** |
| CMCC | A,B,C | As the TP part shown in  |
| Apple | A | Can reuse the part of the provided TP impacting A |
| Lenoco | A at least, B and C can be accepted | As we replied to Q1, B and C is a possible option of implementing “PLMNs not allowed to operate at the present UE location”. |
| Intel | A | agree with Apple |
| Ericsson | D (fine with A) |  |
| Qualcomm | Exactly follow Forbidden Tracking Areas |  |
| Xiaomi | A |  |
| Nokia | A | Would be good to know the exact details of the solution introduced by CT1. Our concerns from Q1 also apply. |
| OPPO | D |  |
| Samsun | A |  |
| vivo | A | Only the description that “maintain a list of "PLMNs not allowed to operate at the present UE location” should be added to UE NAS function for PLMN Selection and SNPN Selection in section 4.2 in TS 38.304. |
| Huawei, HiSilicon | A | Agree with Apple |
| ZTE | A,B,C | As the TP part shown in  |

**The opinions from the participants can be summarized as follows:**

* Vast majority of companies (**11/13)** agree to reuse the section 4.2 in TP in [4];
* One company (Nokis) express that it is be good to know the exact details of the solution introduced by CT1, but part of the detail description was introduction in the [4], and the related CT1 CRs are referred in the [2][3];
* One company (vivo) express that only the description that “maintain a list of "PLMNs not allowed to operate at the present UE location” should be added to UE NAS function for PLMN Selection and SNPN Selection in section 4.2 in TS 38.304;

Regarding the views from participants, majority agree to reuse the section 4.2 in TP in [4]. Hence, to progress the discussion, it is suggested by rapporteur to attempt conclusion as follows:

**Proposal 2: It is proposed to indicate the impact of the new list in 4.2 of 38.304 (*Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state*) as in the Annex A.**

Besides, in the last meeting, RAN2 received an LS from CT1 describing the NR satellite RAT type in UE NAS[1]:

|  |
| --- |
| *CT1 is discussing extending NAS supervision timers at NR satellite access based on information on RAN delay provided in a Reply LS (C1-220079 / R2-2111612) and there have been discussions in CT1 to consider whether the NAS solution should take NR satellite RAT type into account for possible differentiation of the applied NAS timer extension.**CT1 understands that NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) is provided to the AMF from the gNB via NGAP, but is not aware of any corresponding indication available to the NAS at the UE.**CT1 would therefore like to know:** *Is indication of the NR satellite RAT type available, or planned to be made available, to the NAS at the UE?*
* *If such indication is available, or will be available, can it be trusted that the UE value corresponds to the value provided to the AMF?*

*CT1 would like to make clear that there currently is no common agreement to differentiate extended NAS timers based on NR satellite RAT type even if NR satellite RAT type is available, or will be available, to the NAS at the UE.* |

For Question 1, in our understanding, UE can know the NW type implicitly through the satellite assistance information in *SIB19*, e.g. Ephemeris data, common TA parameters, koffset, validity duration for UL sync information and epoch time. However, such information is only available in AS layer. So far it seems RAN2 has not specified any solution on how to enable the NAS to be notified about this information yet.

**Q3: Do you agreed that so far RAN2 has not specified any solution on how to enable the NAS to be notified about this information yet.**

**.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **comments** |
| CMCC | agree | Currently, such information is only available in AS layer. |
| Apple | agree |  |
| Lenovo | Agree |  |
| Intel | agree |  |
| Ericsson | Agree |  |
| Qualcomm | Agree |  |
| Xiaomi | Agree |  |
| Nokia | Agree |  |
| OPPO | Agree |  |
| Samsung | Agree |  |
| vivo | Yes |  |
| Huawei, HiSilicon | Agree |  |
| ZTE | Agree |  |

**The opinions from the participants can be summarized as follows:**

* All companies (**13/13)** agree that so far RAN2 has not specified any solution on how to enable the NAS to be notified about this information yet.

**Observation 1: RAN2 has not specified any solution on how to enable the NAS to be notified about this information yet.**

From the LS, it seems that the information of NR satellite RAT type is possible to facilitate the differentiation of the applied NAS timer extension.

From the LS, it seems that the information of NR satellite RAT type is possible to facilitate the differentiation of the applied NAS timer extension.

**Q4: If you agree Q3, do you agree that such indication of the NR satellite RAT type is helpful for NAS and support to forward the NR satellite RAT type from AS to the NAS at the UE side?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **comments** |
| CMCC | agree | From the LS, it seems that the information of NR satellite RAT type is possible to facilitate the differentiation of the applied NAS timer extension. And maybe there are other benefits, anyway, the identification of the benefit is CT1/SA2’s scope. Hence, we support to forward the NR satellite RAT type to the NAS at the UE. |
| Apple | Disagree | It is for CT1 to decide whether this information is needed in NAS or not.  |
| Lenovo | Agree | We are OK to ask in LS if NR satellite RAT type is needed at NAS. |
| Intel | agree |  |
| Ericsson | Agree that the indication can be done | We do not think that this is quite what they are asking from us. They are essentially asking if there is an indication of the satellite type that can be made available to the NAS, which we believe it can. Whether it is helpful completely depends on what they decide upon.  |
| Qualcomm | May be | It may be sufficient for NAS just to know the UE-gNB RTT value according to which NAS can determine the NAS timers.But we just need to focus on the response to the LS. They are asking, lets just reply them that UE should be able to determine the RAT type from the satellite information.It is up to CT1 how it wants to make use of it. |
| Xiaomi | Agree | We can just inform the CT1 that UE AS has the NR satellite RAT type information, whether it is needed or not is up to CT1. |
| Nokia | Disagree | We see not such request from CT1 side. They are just asking if such indication is available or will be available. We expect the usefulness of such information at NAS shall be decided in CT1, not in RAN2.  |
| OPPO | Disagree | This should be based on request from CT1, which is not there for now. |
| Samsung | Maybe | Up to CT1 whether this information is helpful/needed, if they ask, RAN2 should support to forward the information. |
| vivo | No | The motivation of this LS is unclear to us. In our understanding, RAN2 does not need to do anything until CT1 decide to take NR satellite RAT type into account and request RAN2 to take some solution.  |
| Huawei, HiSilicon | Disagree | CT1 is not asking to provide an indication to NAS but to know if there is any specified in RAN2 TS. We only need to inform CT1 of RAN2 status (as in Q3). |
| ZTE | / | Such indication is available at AS layer and whether AS will provide such information to NAS layer depends on whether such indication is needed in NAS, which should be decided by CT1. |

**The opinions from the participants can be summarized as follows:**

* Vast majority of companies express that whether the indication is helpful completely depends on what CT1 decide upon.

Hence, it is proposed as follows:

**Proposal 3: whether the indication is helpful completely depends on what CT1 decide upon.**

For Question 2 in the LS, since the AS layer in UE side indentify the NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) implicitly through the satellite assistance information in *SIB19* broadcasted by gN*B*, e.g. Ephemeris data, common TA parameters, koffset, validity duration for UL sync information and epoch time. In principle, it will be align with the value gNB provided to the AMF. However, whether there are some uncertain error during type deriving depends on the UE implemention.

**Q5: Do you agree that since the AS layer in UE side derive the NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) implicitly through the satellite assistance information in *SIB19* broadcasted by gN*B*. In principle, it will be align with the value gNB provided to the AMF. However, whether there are some uncertain error during type deriving depends on the UE implemention.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **comments** |
| CMCC | agree |  |
| Apple | Disagree | We expect all UEs will use the information broadcast in SIB19 to reach the same determination abour satellite NR type |
| Lenovo | Agree with comments | We think the UE-derived result shall align with the value gNB provided to the AMF. Therefore the last sentence may not be necessary. |
| Intel | agree |  |
| Ericsson | Agree with comments | We are a bit uncertain about the part “**However, whether there are some uncertain error during type deriving depends on the UE implemention.**”. Using the satellite ephemeris parameters, the UE should be able to determine the satellite position precisely to do uplink synchronization thus determining the satellite altitude and by extension whether it is LEO/MEO/GEO should not be a problem, unless there is some ambiguity as to what is considered LEO/MEO.  |
| Qualcomm | Yes |  |
| Xiaomi | Yes with comments  | For the “**However, whether there are some uncertain error during type deriving depends on the UE implemention.**”, we think UE and gNB will have the same understanding on the NR satellite RAT type based on the SIB19. |
| Nokia | Disagree | We are of the same opinion as Apple. It is difficult to imagine two UEs will interpret differently some typical parameters for e.g. LEO and GEO systems (which are largely different).  |
| OPPO | Not ok with the “however” part |  |
| Samsung | Agree with comments | Share same view as above |
| vivo | See comments | Referring to our reply for Q4, UE AS doesn’t need to derive the NR satellite RAT type. |
| Huawei, HiSilicon | Agree with comments | The last sentence is not needed. |
| ZTE | Agree |  |

**The opinions from the participants can be summarized as follows:**

* Vast majority of companies express the opinion that the UE-derived result will be align with the value gNB provided to the AMF. And only one company (vivo) expree the opinion that the UE AS doesn’t need to derive the NR satellite RAT type.

Hence, it is proposed as follows:

**Proposal 4: the UE-derived result of NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) implicitly through the satellite assistance information in *SIB19* broadcasted by gN*B* should be align with the value gNB provided to the AMF.**

**Q6: Do you agree that a reply LS is needed for the LS (C1-222098)?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **comments** |
| CMCC | agree | The reply is needed for at least for the the NAS solution of differentiation of the applied NAS timer extension. |
| Apple | Agree | We should simply inform CT1 that satellite type information is available at the AS layer |
| Lenovo | Agree |  |
| Intel | agree |  |
| Ericsson | Agree |  |
| Qualcomm | Yes |  |
| Xiaomi | Agree |  |
| Nokia | OK to send the LS |  |
| OPPO | Agree |  |
| Samsung | Agree |  |
| vivo | No strong view | Perhaps RAN2 does not need to do anything until there is an agreement regarding how to use NR satellite RAT type in CT1. |
| Huawei, HiSilicon | Agree |  |
| ZTE | Agree |  |

No company objects to send the LS, hence, it is proposed that:

**Proposal 5: it is proposed that RAN2 send a reply LS to CT1 for [6].**

**Q7: If you agree to send a reply LS to CT1, which point would you like to mentioned in the LS?**

|  |  |
| --- | --- |
| **Company** | **comments** |
| CMCC | 1: For Question 1, the information of NR satellite RAT type is only available in AS layer. Per that the information is possible to facilitate the differentiation of the applied NAS timer extension indicated in the LS from CT1, RAN2 is planning to support forwarding the NR satellite RAT type to the NAS at the UE.2: For Question 2, since the AS layer in UE side derive the NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) implicitly through the satellite assistance information in SIB19 broadcasted by gNB. In principle, it will be align with the value gNB provided to the AMF. However, whether there are some uncertain error during the type deriving depends on the UE implemention. |
| Apple | 1. We should inform CT1 that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs. 2. We should say RAN2 expects that the satellite type provided by UE should align with the type provided by the gNB to the AMF. |
| Lenovo | 1. Availability of satellite type information at AS, which could be helpful for NAS. 2. UE-derived RAT type aligns with the value provided to the AMF by gNB. |
| Intel | agree with CMCC |
| Ericsson | Agree with Apple points, remember they are just asking us for information.  |
| Qualcomm | Just simply yes to the answers. Ok with Apple’s suggestion. |
| Xiaomi | Agree with Apple. |
| Nokia | Availability of satellite type information and the way it is derived (implicitly inferred from the parameters). Agree with Apple. |
| OPPO | Agree with Apple. |
| Samsung | Agree with Apple |
| Huawei, HiSilicon | Apple’s suggestions with some revisions:1. We should inform CT1 that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs. 2. We should say RAN2 expects that the satellite type provided implicitly to the UE should align with the type provided by the gNB to the AMF. |
| ZTE | Agree with Apple. |

**The opinions from the participants can be summarized as follows:**

Vast majority of companies tend to agree the text descritption in the reply LS as follows:

 1. We should inform CT1 that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs.

2. We should say RAN2 expects that the satellite type provided by UE should align with the type provided by the gNB to the AMF.

**Proposal 6: the text descritption in the reply LS as** **in Annex B:**

 **1. We should inform CT1 that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs.**

**2. We should say RAN2 expects that the satellite type provided by UE should align with the type provided by the gNB to the AMF.**

# Summary

**Proposal 1: It is proposed to indicate the impact of the new list in 4.2 of 38.304 (*Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state*).**

**Proposal 2: It is proposed to indicate the impact of the new list in 4.2 of 38.304 (*Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state*) as in the Annex A.**

**Proposal 3: whether the indication is helpful completely depends on what CT1 decide upon.**

**Proposal 4: the UE-derived result of NR satellite RAT type (LEO/MEO/GEO/OTHERSAT) implicitly through the satellite assistance information in *SIB19* broadcasted by gN*B* should be align with the value gNB provided to the AMF.**

**Proposal 5: it is proposed that RAN2 send a reply LS to CT1 for [6].**

**Proposal 6: the text descritption in the reply LS as** **in Annex B:**

 **1. We should inform CT1 that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs.**

**2. We should say RAN2 expects that the satellite type provided by UE should align with the type provided by the gNB to the AMF.**

# References

1. [R2-2204450](file:///C%3A%5C%5CData%5C%5C3GPP%5C%5CExtracts%5C%5CR2-2204450_C1-222096.doc%22%20%5Co%20%22C%3AData3GPPExtractsR2-2204450_C1-222096.doc) LS on introducing the list of PLMNs not allowed to operate at the present UE location (C1-222096; contact: CMCC) CT1 LS in Rel-17 5GSAT\_ARCH-CT To:RAN2
2. 23122\_CR0741r7\_(Rel-17)\_C1-221824-was-C1-221056\_23122\_cause78\_forbidn\_geo\_area\_05
3. 24501\_CR3975r1\_(Rel-17)\_C1-221744-was-C1-221073\_24501\_cond\_78\_list\_06

1. [R2-2205158](file:///C%3A%5C%5CData%5C%5C3GPP%5C%5CExtracts%5C%5CR2-2205158%20Impact%20on%20Cell%20selection%20re-selection%20by%20the%20new%20PLMN%20list%20from%20CT1.docx%22%20%5Co%20%22C%3AData3GPPExtractsR2-2205158%20Impact%20on%20Cell%20selection%20re-selection%20by%20the%20new%20PLMN%20list%20from%20CT1.docx) Impact on Cell selection/re-selection by the new PLMN list from CT1 CMCC discussion Rel-17 NR\_NTN\_solutions-Core
2. [R2-2205159](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2205159%20draft%20Reply%20LS%20on%20introducing%20the%20list%20of%20PLMNs%20not%20allowed%20to%20operate%20at%20the%20present%20UE%20location.docx) draft Reply LS on introducing the list of PLMNs not allowed to operate at the present UE location CMCC LS out Rel-17 NR\_NTN\_solutions-Core To:CT1
3. R2-2204070 NR satellite RAT type in UE NAS (C1-222098; contact: Ericsson) CT1 LS in Rel-17 To:RAN2 Cc:RAN3, SA2
4. [R2-2205027](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2205027%20Discussion%20on%20CT1%20LS%20about%20NR%20satellite%20RAT%20type%20in%20UE%20NAS.docx) Discussion on CT1 LS about NR satellite RAT type in UE NAS CMCC discussion Rel-17 NR\_NTN\_solutions-Core
5. [R2-2205028](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2205028%20%5BDRAFT%5D%20Reply%20LS%20to%20CT1%20on%20NR%20satellite%20RAT%20type%20in%20UE%20NAS.docx) [DRAFT] Reply LS on NR satellite RAT type in UE NAS CMCC LS out Rel-17 NR\_NTN\_solutions-Core To:CT1 Cc:RAN3, SA2

# Annex A: TP on 38.304

*First Modified Subclause*

## 4.2 Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state

Table 4.2-1 presents the functional division between UE non-access stratum (NAS) and UE access stratum (AS) in RRC\_IDLE state and RRC\_INACTIVE states. The NAS part is specified in TS 23.122 [9] and the AS part in the present document.

Table 4.2-1: Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state

| RRC\_IDLE and RRC\_INACTIVE state Process | UE Non-Access Stratum | UE Access Stratum |
| --- | --- | --- |
| PLMN Selection and SNPN Selection | **For a UE not operating in SNPN access mode, perform the following:**Maintain a list of PLMNs in priority order according to TS 23.122 [9]. Select a PLMN using automatic or manual mode as specified in TS 23.122 [9] and request AS to select a cell belonging to this PLMN. For each PLMN, associated RAT(s) may be set.Evaluate reports of available PLMNs and any associated CAG-IDs from AS for PLMN selection.Maintain a list of equivalent PLMN identities.Maintain applicable disaster roaming information for available PLMNs including potential disaster PLMNs for available PLMNs.To support manual CAG selection, provide request to search for available CAGs and evaluate reports of available CAGs from AS for CAG selection.**For a UE operating in SNPN access mode, perform the following:**Maintain a list of SNPNs according to TS 23.122 [9]. Select a SNPN using automatic or manual mode as specified in TS 23.122 [9] and request AS to select a cell belonging to this SNPN.Evaluate reports of available SNPNs from AS for SNPN selection. | For a UE not operating in SNPN access mode, search for available PLMNs.If associated RAT(s) is (are) set for the PLMN, search in this (these) RAT(s) and other RAT(s) for that PLMN as specified in TS 23.122 [9].For a UE operating in SNPN access mode, search for available SNPNs only consider NR cells.Perform measurements to support PLMN/SNPN selection.Synchronise to a broadcast channel to identify found PLMNs/SNPNs.Report available PLMNs and any associated CAG-IDs with associated RAT(s) to NAS on request from NAS or autonomously.Report applicable disaster roaming information for available PLMNs autonomously including potential disaster PLMNs.For a UE operating in SNPN access mode, report available SNPNs to NAS autonomously; report information related to SNPN access with subscription of a different Credentials Holder, indicator whether onboarding is enabled, and the list of supported GINs to NAS autonomously, as specified in TS 38.331 [3].**To support manual CAG selection, perform the following:**Search for cells broadcasting a CAG-ID.Read the HRNN (if broadcast) for each CAG-ID if a cell broadcasting a CAG-ID is found.Report CAG-ID(s) of found cell(s) broadcasting a CAG-ID together with the associated manual CAG selection allowed indicator, HRNN and PLMNto NAS.On selection of a CAG by NAS, select any acceptable or suitable cell belonging to the selected CAG and give an indication to NAS that access is possible (for the registration procedure)To support manual SNPN selection, report available SNPNs together with associated HRNNs (if available) to NAS on request from NAS. |
| Cell Selection | Control cell selection for example by indicating RAT(s) associated with the selected PLMN to be used initially in the search of a cell in the cell selection.Maintain a list of "Forbidden Tracking Areas" and provide the list to AS.For a UE not operating in SNPN access mode: Maintain Allowed CAG list and optional CAG-only indication along with associated PLMN ID(s) on which the UE is allowed access and provide these lists to AS. To support manual CAG selection, select a CAG and request AS to select a cell belonging to this CAG. | Perform measurements needed to support cell selection.Detect and synchronise to a broadcast channel. Receive and handle broadcast information. Forward NAS system information to NAS.Search for a suitable cell. The cells broadcast one or more 'PLMN identity' or 'SNPN identity' (for a UE operating in SNPN access mode) in the system information. Respond to NAS whether such cell is found or not.If associated RATs is (are) set for the PLMN, perform the search in this (these) RAT(s) and other RATs for that PLMN as specified in TS 23.122 [9].If a cell is found which satisfies cell selection criteria, camp on that cell. |
| Cell Reselection | For a UE not operating in SNPN access mode,maintain a list of equivalent PLMN identities and provide the list to AS.Maintain a list of "Forbidden Tracking Areas" and provide the list to AS.For a UE not operating in SNPN access mode, maintain Allowed CAG list and optional CAG-only indication along with associated PLMN ID(s) on which the UE is allowed access and provide these lists to AS.Maintain slice information including slice/slice group priorities and provide this information to AS. | Perform measurements needed to support cell reselection.Detect and synchronise to a broadcast channel. Receive and handle broadcast information. Forward NAS system information to NAS.Change cell if a more suitable cell is found.Derive cell reselection priorities for slice-based cell reselection. |
| Location registration | Register the UE as active after power on.Register the UE's presence in a registration area, for instance regularly or when entering a new tracking area.Deregister UE when shutting down.Maintain a list of "Forbidden Tracking Areas".Control and restrict location registration for a UE in eCall Only Mode. | Report registration area information to NAS. |
| RAN Notification Area Update | Not applicable. | Register the UE's presence in a RAN-based notification area (RNA), periodically or when entering a new RNA. |

*End of Modified Subclause*

# Annex B: Reply LS to CT1 on NR satellite RAT type in UE NAS

**1. Overall Description:**

RAN2 would like to thank CT1 for their LS about NR satellite RAT type in UE NAS. RAN2 has discussed the questions and concluded that:

* Question 1: Is indication of the NR satellite RAT type available, or planned to be made available, to the NAS at the UE?
	+ Answer 1: RAN2 considers that satellite type information is available at the AS layer. Whether CT1 decides to use the information or not should have no impact on our specs.
* Question 2: If such indication is available, or will be available, can it be trusted that the UE value corresponds to the value provided to the AMF?
	+ Answer 2: RAN2 expects that the satellite type provided implicitly to the UE should align with the type provided by the gNB to the AMF.

**2. Actions:**

**To CT1:**

**ACTION:** RAN2 kindly asks CT1 to take the above into account.