**3GPP TSG-RAN WG2 Meeting #121 R2-230xxx**

**Athens, Greece, Feb 27 – Mar 03, 2023**

**Agenda item:** 8.2.1

**Source:** Intel Corporation

**Title:** [AT121][411][POS] SLPP specification (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following at meeting offline discussion:

* [AT121][411][POS] SLPP specification (Intel)

Scope: Collect offline comments on the SLPP specification practices.

Intended outcome: Report to CB session

Deadline: Wednesday 2023-03-01 1900 EET

# Contact Information

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

|  |  |
| --- | --- |
| Company | Contact: Name (E-mail) |
| Huawei, HiSiclion | Yinghao Guo (yinghaoguo@huawei.com) |
| Lenovo | Hyung-Nam Choi (hchoi5@lenovo.com) |
| Fraunhofer | Birendra Ghimire ([birendra.ghimire@iis.fraunhofer.de](mailto:birendra.ghimire@iis.fraunhofer.de)) |
| Nokia | Stepan Kucera (stepan.kucera@nokia.com) |
| MediaTek | Nathan Tenny (nathan.tenny@mediatek.com) |
| NEC | wenjinhui@labs.nec.cn |
| vivo | panxiang@vivo.com |
| LG | Jonggil Nam (Jonggil.nam@lge.com) |
| CATT | Jianxiang Li (lijianxiang@catt.cn) |
| ESA | Florin Grec (florin-catalin.grec@esa.int) |

# Discussion

As discussed in R2-2300409:

|  |
| --- |
| From procedure perspective, SL-PP is same as LPP protocol, which is different from RRC specification. Therefore the structure of LPP (TS37.355) can be reused as the baseline, e.g. section 4 Functionality of Protocol, section 5 LPP Procedures, and section 6 Information Element Abstract Syntax Definition. Further discussion is needed on what changes should be based on progress on Sidelink positioning.  **Proposal 2: Regarding the structure, e.g. general part, procedure part of SL-PP, Information Element Abstract Syntax Definition, LPP (TS 37.355) can be used as baseline for further discussion.** |

Rapporteur would like to check companies’ view .

**Question 1: Do companies agree the proposal 2 in R2-2300409, i.e.**

**Regarding the structure, e.g. general part, procedure part of SLPP, Information Element Abstract Syntax Definition, LPP (TS 37.355) can be used as baseline for further discussion.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Remark** |
| Huawei, HiSilicon | Yes, See comments | We have the feeling that the current LPP spec put too much procedural text for the UE to the field description of the LPP ASN.1. it is better to separate these two and leave the field description to its original use |
| OPPO | Yes, but | At this stage, the IEs to be included in each msg should be assume zero from the beginning.  [Rapporteur] Yes, IEs should be started from the beginning. |
| Lenovo | Yes with comments | For clause 4 and 5 we are ok to re-use LPP as baseline. Based on the future agreements we make for SLPP we have to sort out later whether we need to deviate from it or not.  [Rapporteur] Yes, details will be decided later based on further agreements.  For clause 6 we think more discussion is needed, see our comments to Q2. Basically, we prefer to adopt a simpler approach for SLPP ASN.1 compared to LPP or RRC, e.g. we are not convinced in applying delta signaling for SLPP messages. |
| Qualcomm | Yes | The reason why we have detailed field descriptions (instead of much procedural text) is that we have a plurality of positioning methods, which are all optional. Procedural description may get lengthy if handling of fields etc. is described via procedure description like in RRC. We believe the current LPP approach improves readability and reduces spec maintenance effort. |
| Ericsson | Yes, however | It would be good to develop the baseline as separate module within TS 37.355 to begin with. Later we can fork off in separate document.  It would give some insight as which clause can be clearly referred in LPP and which clause needs to be built separately.  [Rapporteur] we can consider what can be referred in LPP. But if we develop the baseline on top of LPP, it cannot reduce our work since we have to analyze which parts are not needed. |
| Fraunhofer | Yes |  |
| Nokia | Yes but | We agree to reuse LPP as baseline but would like to define SLPP concretely in accordance with future agreements, not based on LPP legacy.  [Rapporteur] that is also our understanding. |
| MediaTek | Yes | Agree with Qualcomm about the usefulness of procedural guidance in field descriptions.  We don’t have a strong view on a separate spec vs. a separate module within LPP, but we understand from plenary discussion that there was a general preference for a separate spec. |
| NEC | Yes | We agree that LPP can be used as the baseline for SL-PP, since the procedure/IE may be similar. |
| Vivo | Yes |  |
| LG | Yes | We think it is best way to inherit structure from LPP specification, which will help easy understanding.  RAN2 agreed to separate SLPP ASN.1 module from LPP, so it can be included in LPP TS (i.e. 37.355) or new TS (e.g. 38.355). But if SLPP is defined in LPP spec, additional work to distinguish two protocols may be needed. |
| CATT | Yes with comments | Procedural text can re-use LPP as baseline. For SLPP ASN.1, RAN2 needs to discuss which approach should be used, LPP or RRC. |
| ZTE | Yes |  |
| ESA | Yes |  |

**Summary: 14 companies provided inputs, and all companies are ok with the proposal, but some issues need to be discussed further:**

* **Issue 1: procedure description in the field description as LPP?**

Huawei mentioned LPP put procedure description in the field description, and suggest to decouple them as RRC. This was also mentioned in Q2 by some companies, e.g. Lenovo, Nokia. However QC has different view and think current LPP approach is clean.

* **Issue 2: support delta signalling or not?**

Lenovo we prefer to adopt a simpler approach for SLPP ASN.1 compared to LPP or RRC, e.g. we are not convinced in applying delta signaling for SLPP messages. Rapporteur will provide summary based on Q2.

OPPO, Lenovo, Nokia commented that we should define SLPP concretely in accordance with future agreements, not based on LPP legacy. Rapporteur confirmed the intention is to reuse the structure instead of the content details.

**Proposal 1: Regarding the structure of SLPP, e.g. general part, procedure part , Information Element Abstract Syntax Definition, the structure of LPP (TS 37.355) can be used as baseline for further discussion. The content of each section will be added in accordance with future agreements, not based on LPP legacy directly. FFS on procedure description in the field description as LPP.**

Regarding ASN.1 structure, R2-2300409 discussed:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| For ASN.1 itself, LPP used LTE RRC ASN.1 principle, e.g. Need code, naming convention, extension.   |  | | --- | | The ASN.1 in this clause uses the same format and coding conventions as described in Annex A of TS 36.331 [12]. |   However, there are some differences between LTE RRC and LPP:   * **Difference 1:** constraint is defined within the IE instead of common section in RRC (RRC multiplicity and type constraint values);   From readability perspective, it is easy to check if we put all constraint in the same place;   * **Difference 2**: Fields in the field descriptions is sorted based on presence order instead of alphabet order;   No big difference between RRC approach and LPP approach. Alphabet order is slightly better from readability perspective.   * **Difference 3**: Regarding extension, only “Ellipsis” and “spare” (only message level) are used instead of “nonCriticalExtension” ;   “nonCriticalExtension” in message level can group the IEs introduced in a new release together with less overhead, especially for size critical message, e.g. system information, initial setup, etc. But “nonCriticalExtension” can only be used at the end of the message. We do not see the reason why LPP should abandon it.   * **Difference 4**: setup/release, addition/modification are not used in LPP; However we may consider this in SL-PP since it is related to how to handle the SL-PRS resources.   **Observation 1: RRC approach on common session for constrains, Fields in the field description are sorted based on alphabet order and “nonCriticalExtension” at message level is better. FFS on whether setup release structure should be introduced in SL-PP.**  In Rel-15, follow enhancements are introduced in NR RRC compared with LTE RRC:   * **Difference 1:** Define ASN.1 elements for UE capabilities in a dedicated section (i.e. “UE capability information elements”) separate from “Other Information elements” - section. * **Difference 2:** Need code   Need codes defined for NR RRC should be clearer and unambiguous. (More discussion needed on when modules are used)  3 The use of need codes should be clarified to ensure consistent usage, in particular  a) Need codes should reflect the action performed upon receiving a message with the field absent (rather than the action when the field is not configured)  b) Need codes should distinguish one-shot and regular configuration parameters e.g. by introducing an additional need code.  Finally new Need codes were introduced in NR RRC as   |  |  | | --- | --- | | Need S | *Specified*  Used for (configuration) fields, whose field description or procedure **specifies** the UE behavior performed upon receiving a message with the field absent (and not if field description or procedure specifies the UE behavior when field is not configured). | | Need M | *Maintain*  Used for (configuration) fields that are stored by the UE i.e. not one-shot. Upon receiving a message with the field absent, the UE maintains the current value. | | Need N | *No action* (one-shot configuration that is not maintained)  Used for (configuration) fields that are not stored and whose presence causes a one-time action by the UE. Upon receiving message with the field absent, the UE takes no action. | | Need R | *Release*  Used for (configuration) fields that are stored by the UE i.e. not one-shot. Upon receiving a message with the field absent, the UE releases the current value. |   It would be good to make specification clear, therefore from editor perspective, SL-PP can follow NR RRC on these two new things.   * **Difference 3:** SetupRelease type is introduced. FFS on whether SL-PP needs setup/release compared with LPP.  |  | | --- | | – *SetupRelease* *SetupRelease* allows the *ElementTypeParam* to be used as the referenced data type for the setup and release entries. See A.3.8 for guidelines.  -- ASN1START  -- TAG-SETUPRELEASE-START  SetupRelease { ElementTypeParam } ::= CHOICE {  release NULL,  setup ElementTypeParam  }  -- TAG-SETUPRELEASE-STOP-- ASN1STOP |   **Observation 2: NR RRC approach on Need code, Define ASN.1 elements for UE capabilities in a dedicated section (i.e. “UE capability information elements”) is better.**  **Proposal 3: Regarding the ASN.1 part of SL-PP, follow NR RRC approach, e.g.**   * **Need code** * **Define ASN.1 elements for UE capabilities in a dedicated section (i.e. “UE capability information elements”)** * **Common session for constrains** * **“nonCriticalExtension” at message level** * **Fields in the field description are sorted based on alphabet order** * **FFS on whether setup release structure should be introduced in SL-PP** |

Rapporteur would like to check companies’ view .

**Question 2: Do companies agree the proposal 3 in R2-2300409, i.e.**

**Regarding the ASN.1 part of SLPP, follow NR RRC approach, e.g.**

* **Need code**
* **Define ASN.1 elements for UE capabilities in a dedicated section (i.e. “UE capability information elements”)**
* **Common session for constrains**
* **“nonCriticalExtension” at message level**
* **Fields in the field description are sorted based on alphabet order**
* **FFS on whether setup release structure should be introduced in SLPP**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Remark** |
| Huawei, HiSilicon | Yes, but | In general, a better baseline for the SLPP should be PC5-RRC rather than UU-RRC in TS 38.331.  For the need code, the issue is that it is absent for UL and mandatorily needed for optional DL fields for Uu. While for PC5, there is no UL/DL difference. So the current PC5-RRC is quite unclear in this aspect. Hope the issue can be well addressed in SLPP  For the setupRelease, it should be discussed together with NeedM and AddModList mechanism that allow delta signaling. From spec point of view, SetupRelease has to be supported if we support need M. We also find it beneficial to support delta signaling  The others are OK |
| Lenovo | Partly, see comments | We agree to follow NR RRC approach for:   * Grouping of UE capability IEs into a dedicated section to improve readability. * Use of common/separate section for multiplicity and type constraint values. * Use of “non-critical extension” approach at message level to be code-efficient. * Sorting of field descriptions in alphabetical order.   For the following aspects we need further discussion:   * Other useful grouping of IEs to improve readability. * To introduce procedural descriptions to improve readability. * Delta signaling/need codes. Before going into ASN.1 details we should discuss first whether we should support delta signaling for SLPP messages at all or to which extent. Referring to discussions in the past for NR RRC, specifying need codes can be really a pain. So far, only “Provide assistance data message” may make sense for using delta signaling. We don’t see the need to apply delta signaling for UE capability enquiry/transfer etc. Furthermore, if we support groupcast/broadcast signaling (under the condition that security issues for these cast types can be solved by SA3) at least for broadcast transmission we don’t see the need for delta signaling. In general, compared to NR RRC we prefer to adopt a simpler approach for SLPP ASN.1. |
| Qualcomm | partly | Need Codes: We feel the need codes used in LPP are sufficient for positioning ASN. However, this can be revisited during the work. It may also be sensible to define SLPP specific need codes (i.e., not reuse RRC definition).  UE capabilities: We prefer to do it like in LPP. Each positioning method section is self-contained, including capabilities.  Common section for constrains: O.K. If the spec is getting bigger over time, this improves readability.  “nonCriticalExtension” at message level: Not sure yet, but O.K. as "working assumption."  Fields in the field description are sorted based on alphabet order: O.K. At the beginning of LPP, we didn't anticipate that all the IEs get so many fields added over time…  FFS on whether setup release structure should be introduced in SLPP: O.K. with the FFS. We will see during the work if this is sensible or not. |
| Ericsson | Yes | Agree we should reuse and also agree with Huawei that we need to be careful on need code as it was used for DL message. We should then also follow SL RRC message to follow some guidance on Need code. |
| Fraunhofer | Yes | Agree with the general principle.   * **Common session for constrains**   We presume this was meant as section and not session.  **[Rapporteur] Thanks for spotting the error**  We are fine with it.   * **“nonCriticalExtension” at message level**   We are fine with the LPP approach, as well as the proposed RRC-like approach.  Regarding the setup/release: We think this is a useful functionality and support FFS on this. |
| Nokia | Yes but | Views similar to Lenovo |
| MediaTek | Generally yes; see comments | Most aspects are fine. We think the NR need codes (M/R/N/S) are a bit more usable than the LTE need codes (there seems to be a tendency to misinterpret “OP” as “OPtional”, for example).  SetupRelease should be driven by use cases. If we find ourselves writing ASN.1 with the “setup/release branch” idiom, of course it would be good to introduce a parametrized shorthand for it. In general, we should feel free to use parametrized types if we have repetitive or complex ASN.1 structures—we don’t need to be constrained by how RRC does it.  Regarding the section for capability IEs, today we effectively have this per method (the Method-ProvideCapabilities subsections). We tend to think this is a clearer organization, because many capabilities are method-specific and a common capability section will end up with method-specific subsections anyway. Isn’t a reader more likely to want to find capabilities for a specific method than all capability-related IEs? |
| NEC | Yes with comments. | Agree with Huawei that PC5-RRC may be a better baseline.  We support sorting field descriptions in alphabetical order. Besides, in the current RRC spec, no specific rules to order the IEs. We may also consider how to group IEs, e.g., in function or in alphabetical order.  We agree with other parts. |
| vivo | Yes | We share same views with Huawei on the UL need code and delta configuration. |
| LG | Yes, but | We understand intension and it may be good to have same language rules on ASN.1 between SLPP and RRC. We do not have strong view but we do not think SLPP needs to follow RRC approach because LPP specification is already familiar to us. Also, we could not see critical reason for introducing RRC rules in SLPP. Anyway, we are fine to go with majority view. |
| CATT | Yes | Agree with Huawei to use PC5-RRC as baseline of SLPP. And Need code should be discussed depending on PC5-RRC. And setupRelease structure should be discussed together with NeedM and AddModList mechanism. |
| ZTE | Yes | Need code: PC5-RRC signaling in 38.331 also follows the RRC signaing rule at least for need code. So for the need code, NR RRC can be referred.  UE capability: agree to be a separate session  Common session for constrains: yes  “nonCriticalExtension” at message level : yes  Fields in the field description are sorted based on alphabet order : yes  SetupRelease: Current we do not see the usecase of setuprelease since SLPP is to take LPP as baseline, where LPP does not have SetupRelease structure |
| ESA | General yes, with a particular comment | UE capabilities: ***in the future new positioning methods may be added to sidelink such as RAT-independent, in particular support for GNSS (e.g., exchange of assistance data from UE in coverage to UE out of coverage, etc.) and this will have specific capabilities. Therefore, we prefer to keep the structure of LPP where specific capabilities are allocated under Positioning Methods.***  Need Codes; Common section for constrains; “nonCriticalExtension” at message level; Fields in the field description are sorted based on alphabet order; FFS on whether setup release structure should be introduced in SLPP: ***no views on this, therefore OK with what the group decides.*** |

**Summary: 13 companies provided inputs, and all companies are general/partial yes, and some issues need to be discussed further:**

* **Issue 1: Need code, How to handle the need code of PC5 since there is no UL/DL difference.**

Huawei mentioned SLPP should refer to PC5 RRC, While for PC5, there is no UL/DL difference. So the need code of current PC5-RRC is quite unclear in this aspect. Hope the issue can be well addressed in SLPP. Ericsson agree with Huawei on this. Rapporteur agree, we should refer to PC5 RRC.

QC mentioned we may define SLPP specific need code.

* **Issue 2: support delta signalling or not?**

Lenovo prefer to adopt a simpler approach for SLPP ASN.1 compared to LPP or RRC. only “Provide assistance data message” may make sense for using delta signaling and at least for broadcast transmission don’t see the need for delta signaling.

No such concern from other companies. Most companies still consider to have Need code.

[Rapporteur] it is also related to need code discussion.

* **Issue 3: where to put capability IEs?**

QC/MTK/ESA prefer to do it like in LPP. Each positioning method section is self-contained, including capabilities. From Rapporteur perspective, we can still distinguish positioning methods based on the IE name, therefore no need to put it under each positioning method section. Another approach is similar to LPP, i.e. high level capability IE is still per positioning method, however capability for each features should be captured in capability dedicated section.

**Proposal 2: Regarding the ASN.1 part of SLPP, follow NR PC5-RRC approach, e.g.**

* **FFS on Need code (e.g. how to support no UL/DL)**
* **FFS on support of delta signalling**
* **Define ASN.1 elements for common UE capabilities in a dedicated section (i.e. “UE capability information elements”); FFS whether same as LPP, positioning method specific capability should be put under the section of each positioning method.**
* **Common session for constrains**
* **“nonCriticalExtension” at message level**
* **Fields in the field description are sorted based on alphabet order**
* **FFS on whether setup release structure should be introduced in SLPP**

# Summary

Based on the input from companies, we have the following proposals:

**Proposal 1: Regarding the structure of SLPP, e.g. general part, procedure part , Information Element Abstract Syntax Definition, the structure of LPP (TS 37.355) can be used as baseline for further discussion. The content of each section will be added in accordance with future agreements, not based on LPP legacy directly. FFS on procedure description in the field description as LPP.**

**Proposal 2: Regarding the ASN.1 part of SLPP, follow NR PC5-RRC approach, e.g.**

* **FFS on Need code (e.g. how to support no UL/DL)**
* **FFS on support of delta signalling**
* **Define ASN.1 elements for common UE capabilities in a dedicated section (i.e. “UE capability information elements”); FFS whether same as LPP, positioning method specific capability should be put under the section of each positioning method.**
* **Common session for constrains**
* **“nonCriticalExtension” at message level**
* **Fields in the field description are sorted based on alphabet order**
* **FFS on whether setup release structure should be introduced in SLPP**

# Reference

[1] RP-223549 New WID on Expanded and Improved NR Positioning

[2] TS 36.331

[3] TS 37.355

[4] TS 38.331