**3GPP TSG-RAN WG2 Meeting #117 electronic R2-2203632**

**Online, February 21 - March 3, 2022**

**Agenda Item: 9.4**

**Source: Vodafone (Rapporteur)**

**Title: Report of [AT117-e][203][UPIP] LTE UPIP configuration and capabilities (Vodafone)**

**Document for: Discussion and Decision**

# Introduction

This document aims to discuss the issues that have been raised by contributions submitted to AI 9.4 “User Plane Integrity Protection support for EPC connected architectures”.

**1st phase comment deadline: Wednesday W1, 1000 UTC.**

# Documents submitted, etc

(UPIP\_EN-DC\_UE; leading WG: RAN3; REL-17; WID: RP‑213669)

Time budget: 0.5 TU

Tdoc Limitation: 2 tdocs

Including discussion on SA3 LS R2-2200153

Including configuration and capability aspects of allowing full rate UPIP for EN-DC UEs connected to EPC

R2-2202145 Reply LS on LTE User Plane Integrity Protection (R3-221473; contact: Vodafone) RAN3 LS in Rel-17 To:SA3, SA2 Cc:CT4, CT1, RAN2

R2-2202717 Introducing support of UP IP for EPC connected architectures using NR PDCP Huawei, HiSilicon, Vodafone, Ericsson CR Rel-17 36.331 16.7.0 4763 - B UPIP\_SEC\_LTE

R2-2202718 Introducing support of UP IP for EPC connected architectures using NR PDCP Huawei, HiSilicon, Vodafone, Ericsson CR Rel-17 38.331 16.7.0 2904 - B UPIP\_SEC\_LTE

R2-2202719 Introducing support of UP IP for EPC connected architectures using NR PDCP Huawei, HiSilicon, Vodafone, Ericsson CR Rel-17 36.300 16.7.0 1353 - B UPIP\_SEC\_LTE

R2-2202720 Introducing support of UP IP for EPC connected architectures using NR PDCP Huawei, HiSilicon, Vodafone, Ericsson CR Rel-17 37.340 16.8.0 0294 - B UPIP\_SEC\_LTE

R2-2202721 Introducing support of UP IP for EPC connected architectures using NR PDCP Huawei, HiSilicon, Vodafone, Ericsson CR Rel-17 38.323 16.6.0 0085 - B UPIP\_SEC\_LTE

R2-2202722 Discussion on LTE User Plane Integrity Protection (SA3 LS) Huawei, HiSilicon discussion Rel-17 UPIP\_SEC\_LTE

R2-2203369 draft Reply LS on LTE User Plane Integrity Protection Vodafone LS out Rel-17 To:SA3 Cc:RAN3, SA2

# Discussion

## 3.1 UE Capabilities for LTE UPIP are sent in NAS signalling

The RAN plenary WID in RP‑213669 states the following:

*Note: For security related reasons, the UE’s support/non-support for EPS-UPIP is not sent in the UE Radio Access Capabilities, and instead, it is sent from the UE to the MME in NAS messages and then sent by the MME to the RAN in S1-AP signalling.*

*EN-DC capable devices need to support NR-PDCP, and the support of EN-DC is signalled to the eNB within existing R15 UE Radio Access Capabilities. Hence no changes to TS 36.306 are anticipated to be needed.*

TS 24.301 provides some of the related procedures in sections 5.4.3.2 and 5.4.3.3, e.g.:

#### 5.4.3.3 NAS security mode command accepted by the UE

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received replayed UE security capabilities, the received replayed UE additional security capabilities, if included in the SECURITY MODE COMMAND message, and the received nonceUE have not been altered compared to the latest values that the UE sent to the network.

**Question 1: please indicate ONLY if you believe that changes to the UE capabilities in TS 36.306 are required for this work item.**

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| **Company** | **comments** |
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## 3.2 Response to LS in LS S3-214462/R2-2200153

In this LS, SA3 requested RAN 2 “…***to inform SA3 on their final decision with respect to which algorithm code points are to be used***”.

The discussion document in R2-2202722 proposes that the Rel-15 principle of security configuration of ciphering for EN-DC capable UE should be reused, i.e. that:

*Proposal 1: UPIP for the EPC connected architectures using NR PDCP is configured in following way:*

* *LTE algorithm code point is configured in SMC as legacy LTE UE, which is used to derive KUPint.*
* *NR algorithm code point indicated by integrityProtAlgorithm included in RadioBearerConfig is used to configure the UP IP algorithm applied by NR PDCP to perform integrity protection.*
* *The integrityProtection indicated in pdcp-Config is used to activated/deactivated the UP IP, which can be changed only by DRB release and add.*

With small editorial changes, this proposal is captured in the draft response LS in R2-2203369.

**Question 2: Do you agree that we should reply to SA3? Do you have comments to the above proposal and draft LS?** Comments/updates on the LS should still be possible in a second round of discussion**.**

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| **Company** | **Reply to SA3**  **Yes/No** | **comments** |
| Qualcomm | Yes | Draft reply LS is ok |
| Huawei, HiSilicon | Yes | Agree with the content in the draft LS. |
| Samsung | Yes | We are fine with the draft reply LS. |
| Ericsson | Yes | The reply LS should be made as clear as possible, so that SA3 does not need to come back to RAN2 for clarifications and that they can evaluate whether the solution is OK for their part.  We suggest to make it crystal clear that the intention is to use the existing signaling in TS 36.331, for example append the first bullet with “i.e., the legacy field *integrityProtectionAlgorithm* in *SecurityModeCommand* is used for derivation of both K\_RRCint and K\_UPint”  Also, is the intention that the NR code point in bullet 2 is mapped to the LTE code point in bullet somehow? It would be good to clarify the intention in the reply. |
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## 3.3 Do the CRs submitted to this meeting cover all the changes needed in RAN 2’s specifications?

R2-2202717, 2718, 2719, 2720 and 2721 provide (respectively) CRs to TSs 36.331, 38.331, 36.300, 37.340 and 38.323.

Are changes to other specifications required?

Do the changes within these CRs cover all sections that need updating?

**Question 3: Are changes to other specifications needed? Do other sections in these specifications need to be updated?**

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| **Company** | **comments** |
| Qualcomm | See below for 36.331 |
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**Question 4: Any comments to these CRs?** Comments/updates on the CRs should still be possible in a second round of discussion**.**

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| **Company** | **comments** |
| Qualcomm | For 36.331, as there are several suggestions, not all of them are not listed here. Please see suggestions uploaded to drafts folder. In summary:   * Other specs impacted incomplete in coverpage * Some suggestions on wordings of changes for clarity * Added reference to 24.301 (for NAS capability) * Instead of referring to all DRBs, we should refer to only those for which UPIP is configured/activated. * Also missing is update in field description of integrityProtAlgorithm.   For 38.331, Coverpage: other specs impacted incomplete  For 36.300/ 37.340: Coverpage: other specs impacted incomplete  For 38.323: Coverpage: other specs impacted incomplete. In the first change in 5.9, we think it makes more sense to have “and” instead of or, but no strong view. I.e.:  as specified in TS 33.501 [6] for NR ~~or~~ and in TS 33.401 [xx] for E-UTRA/EPC. |
| Huawei, HiSilicon | Thanks to Qualcomm for the careful review on the CRs. Most of suggestions look fine to us, and we will update the CRs in phase II.  About the detailed suggestions on 36331CR, please see our response in the CR. |
| Samsung | We are fine with all the suggestions in the updated CR from Qualcomm, and made very minor updates there. |
| Ericsson | Updates look OK to us. |

## 3.4 LS dialogue between RAN3 and SA3 and SA2

RAN3 responded to the SA3 LS (S3-214462/R2-2200153) in R2-2202145/R3-221473 asking questions of SA3 and SA2.

SA2 have replied to SA3 and RAN3 in S2-2201518, and a reply from SA3 to RAN3 is anticipated soon.

It is believed that all these 3 LSs can be “noted” by RAN2.

**Question 5: Please comment ONLY if you believe any of these LSs need handling by RAN2.**

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| **Company** | **comments** |
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# 4. Summary

4 companies plus the rapporteur contributed to the discussion.

Based on the discussion, the rapporteur makes the following (hopefully all “easy to agree”) proposals:

**Proposal 1: (Aligned with text in the RAN WID), no company thinks that TS 36.306 needs to be changed for this WID.**

**Proposal 2: We reply to the SA3 LS (S3-214462/R2-2200153) using R2-2203369 as the starting point for a second phase of discussion.**

**Proposal 3: Companies agreed that (for RAN 2) only TSs 36.331, 38.331, 36.300, 37.340 and 38.323 are impacted by this WID and that the (respective) CRs submitted in R2-2202717, 2718, 2719, 2720 and 2721 seem to cover the sections of these TSs impacted by this WID.**

**Proposal 4: Detailed editing of the CRs in R2-2202717, 2718, 2719, 2720 and 2721 should continue in a second phase of discussion.**

**Proposal 5: the following 3 LSs that were copied to RAN 2 can be Noted:  
a) LS from RAN 3 to SA2 and SA3 in R2-2202145 / R3-221473;  
b) LS reply from SA2 to RAN 3 and SA3 in R2-2203728 / S2-2201518; and  
c) LS reply from SA3 to RAN 3 and SA2 in R2-2203755 / S3-220464.**

# 5. Contact information

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| Company | Delegate contact |
| COMPANY\_NAME | NAME ([email@address.com](mailto:email@address.com)) |
| Vodafone (Rapporteur) | chris.pudney@vodafone.com |
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