**FS\_eNS\_Ph2 Agenda:**

CC#1:  March 25th (Wed.) (tdoc deadline March 23rd (Mon.) @6 am Pacific Time)

- Review and discuss the proposed merge solutions for KI#1 and KI#2 (refer to CC plan attached)

- Review and work on the merger of the Unhandled/revised PCRs from SA2#136 F2F meeting for KI#1 - KI#4

- If time permit, review new PCRs to determine if they are within the scope of KI#1-KI#4 in order to be considered as the potential solution

CC#2: April 3rd (Fri.) (tdoc deadline March 31st (Tue.) @6 am Pacific Time)

- Review and work on the merger of the Unhandled/revised PCRs from SA2#136 F2F meeting for KI#5 - KI#8

- If time permit, review new PCRs to determine if they are within the scope of KI#5-KI#8 in order to be considered as the potential solution

NOTE-1: Merge proposal will have priority to be handled during the CC.

NOTE-2: Following SA2 Vice Chair’s instructions, even for the SA2#136ah unhandled tdoc, please kindly resubmitted your revision. If no revision is received, there will be no discussion on the unhandled tdoc.

Rapporteur Meeting Notes for CC#1

3GPP Folder: ftp://www.3gpp.org/Email\_Discussions/SA2/Mar.25th%20FS\_eNS\_Ph2%20Pre%20SA2%23139e%20CC%231%20r2.zip

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| Item#'s  | Solution Titles | Key Issue#'s | Contributor(s) | Rapporteur’s proposal for Merging  | Outcome  |
| **Key Issue #3: limitation of data rate per network slice in UL and DL per UE** |
| 1 | S2-2000515 KI#3 Solution on limitation of data rate per Network Slice in UL a..\_ mergingv3 (HW & ZTE) | 3 | **HW, ZTE**(Merged PCR) | * RAN Impact (YES)
* Support both GBR and non-GBR (YES)

Could it be merged with Apple’s Iteme#3 below? |  |
| * Samsung raised concern that, in HW/ZTE proposal, given that there is no enforcement at the UPF for the DL slice AMBR, when RAN applies enforcement for the DL traffic and start dropping packets, TCP traffic has built-in flow control which is not an issue, however, UDP traffic could be an issue. Also, for the step#5 in control flow, it would be helpful to clarify what would be trigger condition? HW responded that, today UE AMBR is handled in RAN, there is same impact to the UDP traffic. Hence, the concern that raised by Samsung is not specific to this particular proposal for proposing RAN to keep track of slice AMBR. Samsung and HW/ZTE should have further discussion on the SA2 mailing list to clarify the concern.
* E/// would like HW/ZTE to clarify the impact of this proposal towards service interface. Furthermore, is the expectation of this proposal to assume that the enforcement for the given UE is based on subscription parameter, or it is based on some form of info obtained from the UDM? This aspect also needs to be clarified. ZTE responded that, the assumption is based on UE subscription parameter because according to GSMA, there could be different levels of enforcement based on UE type – gold, silver or bronze classes of UE. E/// did not think that GSMA has fully made their decision in term of the GST requirement at this point.
* Matrixx asked if there could be different slice AMBR for different UE subscriptions for the same slice. ZTE responded that, it is possible from his perspective for the considerations of roaming UEs. Matrixx agrees.
* Please provide further questions to the SA2 mailing list to ask for clarification for this PCR.
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| 2 | S2-20xxxxx-Solution-for-Key-issue-3\_FS\_eNS\_ph2\_1 (Apple) | 3 | **Apple**  | * RAN Impact (NO)
* AMF approach
* Support both GBR and non-GBR (NO)
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| * ZTE asked if Apple considers only for the PDU session which is in active state, otherwise, there will be no user plane. Apple agrees that this aspect needs further consideration to support the accumulated per-session AMBR.
* DoCoMo asked how this solution handled for the case when the maximum bandwidth is reached and this UE is a gold class UE, would other UE to be bumped to give room for this UE. Apple responded that, this particular KI is for per slice per UE. Hence, the scenario raised by DoCoMo does not apply.
* Matrixx seems to agree with DoCoMo’s consideration and suggested that, rather than to reject the given PDU session, would it be better to juggle the resources and give it to the gold UE.
* Samsung asked if this solution needs to ensure the AMF selection is able to support this solution. E/// disagrees that such consideration is needed given the AMF selection is corresponding to the given slice, then the given AMF should be able to support this functionality.
* Nokia reminded Apple that, the LS response from GSMA indicated that, the accumulated AMBR include both GBR and non-GBR. Hence, this solution should take both into consideration, and not just the non-GBR.
* Lenovo asked Apple to clarify how this solution handles the scenario when the UE have already multiple PDU sessions, but the UE was in IDLE state, and is not coming back to request another PDU session.
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| 3 | S2-20xxxxx-Solution-for-Key-issue-3\_FS\_eNS\_ph2\_2 (Apple) | 3 | **Apple** | * RAN Impact (YES)
* Support both GBR and non-GBR (NO)

Could it be merged with ZTE’s Iteme#1 above?  |  |
| * The main different of this Apple PCR compared to HW/ZTE one as shown in item#1 is that, this PCR focuses only on the non-GBR traffic. It was recommended by rapporteur for Apple, HW/ZTE to merge the two PCRs, if possible.
* AT&T asked if Apple, HW/ZTE proposals consider the priority handling among different traffic flow. Apple responded that, they have considered the prioritization for the non-GBR traffic only. HW responded that, in case of GBR, it reuses the existing ARP mechanism to prioritize GBR flows.
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| 4 | S2-2000xxx\_eNS\_kI#3 - limitation of data rate per network slice per UE (Ericsson) | 3 | **Ericsson** | * RAN Impact (NO)
* PCF approach
* Support both GBR and non-GBR
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| * Nokia asked should the slice AMBR to be determined at runtime or should it be based on UE subscription as E/// is proposing per UE subscription approach. Nokia concerns that, if there are competing PDU sessions within the same slice for the AMBR, how to determine which PDU session to obtain the full session AMBR w.r.t. slice AMBR. E/// responded that, in such case, if there is same PCF to serve both PDU sessions, the PCF can make the adjustment between the competing PDU session. However, E/// believe that most of the time, one PDU session is established for a given UE.
* ZTE asked if E///’s proposal allows vPCF to adjust the session AMBR? E/// responded that, the current proposal is for the hPCF to determine the session AMBR for the UE. E/// also does not see any use case for the need of vPCF to do the adjustment.
* Matrixx asked whether only the mobile operator to make the policy decision or could the service operator to make the policy decision via service operator’s PCF which provides the slice service.
* Samsung asked how to support the selection of the same PCF in order to handle multiple competing PDU sessions for the same slice AMBR? Also, does E/// assume different slice AMBRs for different classes of QoS, e.g. gold, silver and bronze? E/// responded that, in the selection of PCF, different parameters can be used which include S-NSSAI. E/// will clarify in the revision on how such selection can be done. E/// does assume that different slice AMBRs could be configured for different classes of QoS.
* HW asked for more clarifications from E///’s proposal on how to handle the proper run time session AMBR allocation to different UE PDU sessions if the policy is controlled by the PCF. More offline discussion is needed for E/// to understand HW’s question.
* Nokia advocated that, one should not restrict to limit to same PCF for all UE’s PDU sessions in order to enforce the slice AMBR. E/// responded that, such comment will be taken into consideration.
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| 5 | S2-2000694 revised - KI3 Sol Resub (Samsung) | 3 | **Samsung** | * RAN Impact (NO)
* SMF approach
* Support both GBR and non-GBR (YES)
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| * ZTE asked if Samsung’s solution requires the SMF to know if the user plane is active or not? Samsung responded that, SMF would require information from 5GC and not the information from RAN.
* Convidawireless asked shouldn’t slice AMBR based on SLA and not dynamic? Samsung responded that, UE could get the slice AMBR either from UDM (i.e. UE’s subscription) or determine by PCF. SMF will cap the session AMBR for all PDU sessions according the slice AMBR.
* Matrixx commented that, slice AMBR should not be dynamic and it should static from operator. Convidawireless agrees with Matrixx
* HW asked if PCF determines the Session AMBR, why would the SMF determines the Session AMBR? Also, the control flow Samsung PCR does not explain how PCF knows that SMF sets the dynamic Session AMBR? Samsung responded that, if dynamic PCC is supported, then, SMF will use the Session AMBR provided by the PCF; otherwise, the SMF will determine the session AMBR.
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| **Key Issue#1: Support of network slice related quota on the maximum number of UEs** |
| 6 | S2-2000317 Updates to Solution #2 Max number of UEs per Network Slice control at registration ver03 KI#1(NEC) | 1 | **NEC** | * New NF NSQ
* Clarify how to support NSSAA
* Clarify how roaming is supported

Basic concepts of NEC’s PCR and Apple’s one are similar, could it be possible to be merged with Apple’s one in item#8 below?  |  |
| * Nokia asked why in the roaming scenario, the vAMF query the UDM instead of hNSQ for the quota info? NEC responded that, because there is already an existing interface between AMF and UDM so that, such approach introduces lesser system impact.
* E/// asked whether the re-registration impacts the incremental counts in the NSQ. NEC responded such scenario has already covered in the this PCR.
* Apple concerned that NEC’s proposal for NSSAA procedures are conflicting to today NSSAA procedures because NEC proposed to make the pending S-NSSAI as the rejected S-NSSAI. NEC responded that, the procedure is for the network initiated NSSAA and if the given S-NSSAI fails, it should become rejected S-NSSAI.
* Matrixx asked for the clarification that, if NSQ is responsible for managing the quota allocation and consuming, what is the role of OAM for the quota management? NEC clarified that the quota allocation is allocation is actually controlled by OAM.
* Matrixx raised the same concern as Nokia that, NEC proposal could be a lot of signalling overhead to UDM.
* HW commented that GSMA currently may defer the roaming consideration for the GST parameter. Hence, quota management may not need to consider roaming support for now.
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| 7 | S2-200xxxx\_00630\_Solution#1 updates \_v4.5 KI#1 (HW) | 1 | **Huawei** | * Distributed PCF control
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| * Samsung commented that HW’s proposal introduces new requirement to support direct communication between PCF and UDM.
* Nokia concerns that PCF pulls information from UDM which makes UDM to operate like an OAM function.
* Matrixx commented that, the concern from Nokia can be easily be addressed by replacing UDM with CHF. Nokia commented that CHF provides charging quota and not UE quota for slice.
* Orange commented that, it is better to make it as generic quota management function which can be placed by operator to wherever the proper places.
* HW responded to Nokia that, the interaction between PCF and UDM to obtain the slice quota is no different from obtaining the subscription data from UDM. However, HW agrees with Samsung’s comment.
* Matrixx questioned why can’t the CHF to take on also the slice quota management. Nokia responded that because of potential roaming support. CHF would not be the proper function to support also slice quota management.
* Matrixx expressed concern to have UDM to support quota management. Further offline discussions are needed between HW and Matrixx on this issue.
* E/// commented that, it is unclear how the distributed quota management proposed by HW works based the parameter Global quota. More offline discussions and clarifications are needed.
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| 8 | S2-20xxxxx-was-S2-2000932-Solution-for-Key issue-1-Registration-Quota\_v6 (Apple) | 1 | **Apple** | * New NF NSQM
* Proactive notification to prior rejected UE when S-NSSAI becomes available

Basic concepts of Apple’s PCR and Apple’s one are similar, could it be possible to be merged with Apple’s one in item#6 below? |  |
| * AT&T asked if NSQ in Apple proposal maintains the allocated quota or the provisioned quota. In case of the allocated quota, how NSQM gets such info. Apple responded that, NSQM maintained BOTH. NSQM obtained the allocated quota based on UE registration via AMF of which AMF updates the quota in NSQM.
* NEC commented that the first two procedures in Apple’s PCR have already been captured in NEC’s proposal. As for the additional proactive notification to other UEs for the newly available quota complicate the existing UE registration procedures significantly because it is unclear how the AMF determines for which the UE(s) should be notified for the available quota. Also, NEC does not believe that there is agreed KI in the current TA support this additional procedure.
* Convidawireless asked how NSQM knows which AMF should be contacted for the newly available quota? Apple responded that, it is based on prior UE registration, NSQM keeps track of the corresponding AMF.
* Nokia and NEC both recommended Apple to remove the proactive notification of the available quota which has not clear use case. Rapporteur suggested Apple to take these objections into consideration because there is lack of support for this proactive approach.
* Matrixx made the general comment that, today operator already provide the PDU session quota management, when supporting slice related quota management, a common platform/solution should be used instead of having a new kind of solution approach.
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| 9 | S2-2000076\_eNS\_Ph2\_Sol4\_Updates-r1 KI#1 (DoCoMo) | 1 | **DoCoMo** | * Extending NWDAF
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| * E/// advocated that GSMA has not finagling the requirement for the roaming requirement for quota management. Hence, it may not be good to support roaming scenario in all different PCRs. Nokia disagreed with E///’s comment that, there is not sufficient time to wait for GSMA due to the timeline of Rel-17, and roaming support in general is important for realistic deployment. Rapporteur suggested to have this discussions over the SA2 mailing list because it is not specific to this PCR.
* Matrixx has the concern for this proposal to leverage NWDAF to support the quota management. DoCoMo responded that NWDAF has the accounting and analytic information, and hence it could be expanded to support quota management. Matrixx responded that those information is specific for analytic purpose and not for quota management.
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| 10 | S2-2000686 KI1 Backoff timer (Samsung) | 1 | **Samsung** | * Generic proposal for KI#1 to use backoff timer
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| * DoCoMo asked should this issue belongs to stage-3?
* E/// asked that, given we have already defined S-NSSAI backoff timer, what kind of additional impact needs to specified. Samsung responded that additional cause value needs to be introduced because the trigger is due to quota management.
* Matrixx asked for clarification why this backoff time has anything to do with the quota management of the slice. E///and Nokia responded that due to quota management, it affects the existing mobility management and registration procedures.
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| **Key Issue #2: Support of network slice related quota on the maximum number of PDU Sessions** |
| 11 | S2-2xxxxxx-Solution-for-Key issue-2\_PDU-Quota\_Availability\_To\_UE\_v4 (Apple) | 2 | **Apple** | * New NF NSQM
* Piggy back SM procedure for quota udpate
 |  |
| * Matrixx asked how this proposal interworks with existing PDU session quota management via the support from SMF and CHF?
* Interdigital concerned that the quota is continued running and dynamically updated, with this kind of notification should further complicate the existing UE registration support for quota management.
* Orange, E///, HW and ZTE concern to allow the UE to be aware of network quota info, it could attract more DOS attack. Rapporteur suggested Apple to reconsider the benefit of this proposal given that there is lack of support.
* AT&T made a general comment that, SA2’s work for quota management needs to update SA5 for the current status to ensure the coordination between the two working groups because quota management in general considered as part of the charging architecture.
* Matrixx agreed with AT&T, furthermore, from his perspective, quota management involves slice management and subscription management.
* Sprint commented that, the different between the existing quota management is per UE’s perspective, but for this feature, the quota management is targeting for network slice.
* Nokia raised concern to the argument that, the slice quota management is required to be interacted with charging management.
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| 12 | S2-20xxxxx-was-S2-2001477-Solution-for-Key issue-2\_PDU-Quota\_v1.3 (Apple) | 2 | **Apple** | * New NF NSQM
* Proactive release de-activated PDU session for quota relief
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| * Apple agreed to defer the discussion of this PCR offline due to the similar nature as the previous PCR.
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| 13 | S2-200yyyy\_Solution#7 updates \_v2.6 KI#2 (HW) | 2 | **Huawei** | * Distributed PCF based quota management according to additional criteria (e.g. DNN, QoS, Access Type etc.)
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| * HW deferred the quota management proposal from this PCR offline due to the debate of the quota management.
* Matrixx raised the concern of the approach of this PCR could introduce significant overhead to UDM. HW clarified that, PCF does not need to communicate with UDM for every registration. It will wait for the expiration of the quota and then PCF will contact with UDM again. Such intention has already captured in the PCR. Matrixx does not think that the current proposal from HW address his concern. Further offline discussion is needed.
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| 14 | KI#2 Updates to the Max number of PDU Session perNetwork Slice control ver01 (NEC) | 2 | **NEC** | * New NF NSQ
*
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| * Matrixx suggested to partition the scenarios to be addressed in the PCRs in two cases: the VPLMN is under control by the operator, and the VPLMN is not under control by the operator.
* Rapporteur and NEC did not fully understand such kind of scenario and needs more clarifications offline.
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| **Late PCRs** |
| 15 | S2-2000xxx multiple PCFs final KI#2 (Nokia) | 2 | **Nokia** | * PCF based
* Supporting multiple PCFs with master PCF
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| * NOT Handled
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| 16 | S2-2000xxx integrity | 1 | **Nokia** | * NSSF based
* Clarification of integrity support
 |  |
| * NOT Handled
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**OPEN ISSUES:**

1. GSMA has not concluded roaming support for the GST parameters, should FS\_eNS\_Ph2 go ahead to proceed the working assumption to support roaming scenario?
2. Should quota management in FS\_eNS\_Ph2 be required to be part of the charging architecture in order to ensure compatibility?