**3GPP TSG-SA/WG2 Meeting #141E *S2-2007332r15r2***

**Elbonia, 12 – 23 Oct. 2020, Electronic meeting**

**Source: Qualcomm, NEC, Ericsson**

**Title: KI#6 evaluation and conclusion**

**Document for: Agreement**

**Agenda Item: 8.4**

**Work Item / Release: FS\_eNS\_Ph2 / Rel-17**

***Abstract of the contribution:*** *This contribution* *proposes evaluation and conclusions for KI#6*

# 1 Proposal

The paper analyses solutions for KI #6 and proposes conclusions.

**Start of Change**

# 7 Overall Evaluation

## 7.x Evaluation of Solutions for Key Issue #6 - Constraints on simultaneous use of the network slice

**The related solutions are #26, #27, #28, #39, #40, #41, #42**

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| Solution #26 | Network controlled enforcement of simultaneous usage of network slices based on user preference | The principles of this solution are:* it enables the UE to determine the priority for all the requested slices, or a subset of them, based on the services/applications active in the UE.
* It enables the CN to determine the Allowed NSSAI even if the UE does not provide any prioritization
* it requires coordination between the UE and the network, and that the network interprets the prioritization provided by the UE.
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| Solution #27 | Network slices simultaneous usage incompatibility support | Somehow similar to solutions #28, #41, and #42 in the sense that the UE is provided configuration information wrt network slice incompatibility attribute per allowed S-NSSAI for simultaneous use.The principles of the solution are:* It is deterministic in the CN knowledge of whether the UE can support network slices simultaneous usage incompatibility feature, due to the UE explicit indication
* The UE is provided explicit incompatibility information per allowed S-NSSAI.
* It allows the UE to register to slices that are incompatible while using UP resources only for compatible sets of slices.
* it relies on UE or network to release or deactivate PDU sessions if UE needs to establish or activate a PDU session for an incompatible slice
* it does not require UE to re-register to get user plane resources for incompatible slices wrt the current slices with active PDU Sessions
* it allows an option for light mode of operation where the incompatibility attribute is not provided to the UE and the incompatibility enforcement is done in the network only. (this aspect makes this solution then not friendly to supporting UEs)
* the solution cannot prevent simultaneous registration to incompatible slices (the attribute sent to the UE is used only by SM)
* The incompatibility for simultaneous use attribute is a subscription information,
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| Solution #28 | Compatibility Class based support for simultaneous use of the network slice | Somehow similar to solutions #27, #41, and #42 in the sense that the UE is provided configuration information wrt the sets of slices that are compatible. It proposes that the network provides to the UE for each S-NSSAI a "simultaneous use information" compatibility class defining the compatibility with other Network Slices, and that the UE shall not include in the Requested NSSAI S-NSSAIs that map to HPLMN S-NSSAIs which are incompatible with each other The principles of this solution are as follows: * The UDM provides the AMF with compatibility class info if any applies to a S-NSSAI in subscription
* This is provided to the UE together with the of the Configured NSSAI
* It requires UE to be aware of the Compatibility Class information during the UE registration.
* If a VPLMN does not support the feature, only compatible slices can be sent as subscription data to that VPLMN.
* If the UE does not support the feature , the Configured NSSAI only includes compatible slices. Based on HPLMN decision (they are highlighted in subscription data as the compatible set to be provided in this case)
* It prevents the UE to attempt to register with incompatible slices upfront as the UE is aware of what slices are compatible according to the policy it receives from the network
* The UE is only provided with HPLMN constraints related to simultaneous usage of network slices. Serving network constraints related to simultaneous usage of network slices are not provided to the UE, which means that a number of incompatibility scenarios resulting from serving network constraints related to simultaneous usage of network slices are still not known to the UE.
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| Solution #39 | Support registration for incompatible network slice(s) in UE's current serving RA or different one | The solution does not address all the scenarios.The principles of this solution are as follows: * It imposes minimal impact to the UE
* It enables the CN to determine the Allowed NSSAI even if the UE does not provide any prioritization
* It allows operator to deploy compatible and incompatible slices within the same TA/RA (via the new Rejection Cause)
* It does not differentiate the Rejected S-NSSAIs which are outside of the UE’s current serving TA/RA.

NOTE: The new Rejection Cause is necessary to allow same TA/RA to serve the compatible/incompatible slices because today Rejection Cause forbid UE to re-register Rejected S-NSSAI within the same TA/RA.  |
| Solution #40 | Separate SUPI/GPSI per isolated set of S-NSSAIs | This creative solution enables different “UE profiles” associated to different SUPIs/GPSIs and that identify specific set of S-NSSAIs that are compatible.The principles of the solution are as follows: * It assumes roaming agreements ensures that compatibility between S-NSSAIs is coordinated.
* It does not require UE to declare what it supports to the network nor requires any coordination between VPLMN and HPLMN for upgrades since it is backward compatible with existing procedures and mechanism for allowed/configured/subscribed slices. What is not understood is just ignored.
* it has NAS impacts in terms of new registration procedure and new NAS mechanisms internal to the UE (e.g. switch between SUPIs).
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| Solution #41 | Simultaneous use of the network slice via Configured NSSAI | The solution is similar to #27, #28, and #42 in the sense that the UE is provided configuration information wrt the sets of slices that are compatible. - It can inform the UE of all the deployment and business constraints related to the serving network's network slices (based on network configuration, SLA with HPLMN and possibly dynamic information).This solution has similar design principles as #28 and #42 that:* It requires UE to be aware of the SUG (Simultaneous Usage Group) information during the UE registration.
* the supporting UE is not expected to register at the same time for incompatible slices
* as since Rel-15, it requires UE to re-register to get data resources for incompatible slices wrt the current slices with active PDU Sessions
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| Solution #42 | UE handling of constraints on simultaneous use of network slices based on network assistance | The solution is similar to #27, #28, and #41 in the sense that the UE is provided configuration information wrt the sets of slices that are compatible.This solution has similar design principles as #28 and #41 that:* It requires UE to be aware of the category information during the UE registration. Furthermore, this solution proposes multi-level network slice compatibility.
* the UE can never register at the same time for incompatible slices
* it requires UE to re-register to get data resources for incompatible slices wrt the current slices with active PDU Sessions
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**Next Change**

**End of Changes**