



Title: Feedbacks on solutions for 5WWC_Ph2 Key Issue 1
Response to: 3GPP S2-2207761 'solutions for 5WWC_Ph2 Key Issue 1'

Source: CableLabs
To: 3GPP TSG SA WG2
Cc: BBF

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Contact Person:

Name: Dr. Yunjung Yi
Tel. Number: +1 303 661 3849
E-mail Address: y.yi (at) cablelabs (dot) com

Name: David Debrecht
Tel. Number: +1 303 661 9000
E-mail Address: d.debrecht (at) cablelabs (dot) com

Attachments: None

Dear Colleagues,

CableLabs thanks 3GPP SA2 for LS S2-2207761 regarding solutions studied under FS_5WWC_Ph2.

The following table captures CableLabs' feedback.

For each solution, CableLabs assumes the applicable device type(s) as listed in column 3 of the table.

CableLabs prefers solutions supporting both 5G-RG and FN-RG (e.g., via W-AGF), wherever applicable, in 3GPP's normative work.

Solution #	3GPP Questions	Applicable Device Type(s)	CableLabs Feedback
Solution #1	a) Assumes administrative settings on the 5G-RG can group non-3GPP devices based on MAC addresses and/or physical Ethernet ports and/or separate WLAN SSIDs and/or separate VLAN(s)	NAUN3	CableLabs consider the solution as feasible and beneficial.

	<ul style="list-style-type: none"> b) Assumes the 5G-RG is configured (by TR-69, or via PCF/URSP or both) to associate each group of devices with PDU Session characteristics such as DNN/ S-NSSAI c) Assumes that a non-3GPP device can be enforced/authorized to use a certain SSID or Ethernet port or VLAN 		
Solution #2	<ul style="list-style-type: none"> a) Can we assume that a 5G-RG may act as a TNAP with respect to the TNGF i.e. that the 5G RG has an established Ta reference point with the TNGF (Ta requirements are documented in clause 4.2.8.3.2 of TS 23.501) b) Can (5G-RG+TNAP) and TNGF be administrated by two different operators? (3GPP does not define protocols to be run over Ta, does BBF/CableLabs plan to create such specifications?) c) To support QoS differentiation, the solution assumes an SLA between the RG's 5GC (underlay 5GS) and the UE's 5GC (Overlay 5GS where N3IWF/TNGF is located) or network configuration (in case of single operator for overlay and underlay networks) to control the following: <ul style="list-style-type: none"> 1) the mapping between the DSCP markings for the IPsec child SAs between the UE and the N3IWF/TNGF (markings defined at TNGF/ N3IWF in the overlay 5GS) and the corresponding QoS expected on the 5G RG's underlay network,. 2) The non-alteration of the DSCP field on NWu/NWt is also assumed to be governed by an SLA and by transport-level arrangements that are outside of 3GPP scope. 	5G UE	<p>CableLabs consider the solution as feasible and beneficial.</p> <p><u>CableLabs feedback on 3GPP questions:</u></p> <ul style="list-style-type: none"> a) Yes, 5G-RG as TNAP is considered relevant scenario. b) Currently, CableLabs does not have a specification for Ta interface across different operators. CableLabs sees both scenarios (single operator or inter-operator) are relevant. Based on 3GPP progress, CableLabs could discuss necessary work on Ta interface. c) Technically feasible.
Solution #3	<ul style="list-style-type: none"> a) Can we assume that a 5G-RG can act as a TWAP with respect to the TWIF in the overlay network i.e. the 5G RG has an established Yw reference point with the TWIF (Yw requirements are documented in clause 4.2.8.5.4 of TS 23.501) 	N5CW	<p>CableLabs consider this solution as feasible.</p> <p><u>CableLabs feedbacks on 3GPP questions:</u></p> <ul style="list-style-type: none"> a) Yes, scenario could be relevant.

	<p>b) Can (5G-RG+TNAP) and TNGF be administrated by two different operators? (3GPP does not define protocols to be run over Yw, does BBF/CableLabs plan to create such specifications?)</p> <p>c) Can similar QoS differentiation settings as described above for solution 2 (bullet 2c) apply in this case?</p> <p>d) Can we assume that 5G-RG can discover a TWIF (from same or different operator) and that an IPSec tunnel is established between them (preconfigured or on-the-fly).</p>		<p>b) Currently, CableLabs does not have a specification for Yw interface across different operators.</p> <p>c) Yes.</p> <p>d) Preconfigured option works in a single operator scenario.</p>
Solution #4	<p>a) Assumes administrative settings on the 5G-RG can group non-3GPP devices to non-3GPP device category based on MAC addresses and/or physical Ethernet ports and/or separate WLAN SSIDs and/or separate VLAN(s). b) Assumes 5G-RG includes non-3GPP device category in PDU Session modification Request to requests the session policy for non-3GPP devices behind it. c) Assumes 5G-RG is configured with a port number range used for the packets of the non-3GPP device category when the packets are transferred in the 5GS. When the 5G-RG receives UL packets from the non-3GPP devices within the category, the 5G-RG modifies the port number of the packets of non-3GPP device category accordingly, in order for the UPF to monitor or detect the packets of non-3GPP device category.</p>	NAUN3	CableLabs consider this solution as complicated due to deployment considerations.
Solution #5	<p>a) Assumes during L2 connection establishment with a UE (5GC capable), the 5G-RG may send its 5G-GUTI to the TNGF over Ta in an AAA message. b) Same questions as a) and b) and c) for solution 2 above.</p>	5G UE	CableLabs consider this solution as complicated due to deployment considerations.
Solution #6	<p>a) Assumes 5G-RG may apply to the AF for a virtual identifier. How can a 5G-RG interact with AF (assuming operator deployed AF)? The 5G-RG then uses the virtual identifier to run a registration procedure on behalf of the device</p>	NAUN3	CableLabs consider this solution as complicated due to deployment considerations.
Solution #7	<p>a) Assumes 5G-RG is able to enforce QoS in the non-3GPP network at customer premises based on per QoS-flow Non-</p>	AUN3, NAUN3	CableLabs consider this solution as feasible and complementary to other solutions.

	3GPP QoS assistance information received from 5GC over NAS. The Non-3GPP QoS assistance information may contain: QoS characteristics, GBR/MGBR (if applicable), ARP, Periodicity).		Capabilities of 5GS exposure and policy /QoS coordination between AF and PCF for non-3GPP devices are considered beneficial.
Solution #8	a) The 5G RG or AGF (in case of FN RG) may be configured (e.g. via URSP) to request a PDU Session of a new "Combo IP + Ethernet PDU" Type. Based on a SMF indication to the PSA UPF that a N4 (PDU) Session is of "Combo Ethernet + IP" type, the PSA (UPF) acts as the first hop router of the devices in the customer premises regarding the handling of the layers below IP. The 5G RG has to support a new PDU session type whereas data forwarding is that of an Ethernet PDU Session type.	NAUN3	CableLabs consider this solution as technically feasible and beneficial to NAUN3 device(s) for operator deployments where 5G-RG functions in bridge mode.
Solution #9	a) Assumes 5G-RG sends the 5G-RG GUTI to the UE via ANQP. B) Same questions as for solution 5 above.	5G UE	CableLabs consider this solution as complicated due to deployment considerations.
Solution #20	a) For non-3GPP device behind 5G-RG: Assumes 5G-RG can report to 5GC (over NAS SM) the associated non-3GPP device's identifier (MAC address, SUPI/SUCI) and a port range (+IP address). Port range is used if RG is using IPv4 with NAT. b) For 5GC capable UE behind 5G-RG: 5G-RG sends User ID and associated IP address + ports range to the SMF through the AMF via NAS. Port range is used if RG is using IPv4 with NAT. In both cases a) and b) above the 5GC uses UE/device identifier and associated IP address + ports to determine relevant QoS rules. c) the TNGF sends the QoS information corresponding to UE's QoS flows to 5G-RG through the Ta interface (can it work in multi operator environment). Then 5G-RG stores the QoS information related with the UE and performs PDU session modification procedure to its own (underlay) 5GC network in order to request the QoS in the underlay's network for the UE's data flow.	5G UE, AUN3, NAUN3	CableLabs consider this solution as complicated due to deployment consideration. <u>CableLabs Questions:</u> <ul style="list-style-type: none"> - In Fig. 6.20.2.2-1, what is relationship between 5G-RG 5GC and UE 5GC? Are they different PLMNs/operators or same? - How does 5G-RG differentiate non-3GPP device and 5G UE (between 6.20.2.1 and 6.20.2.2)?
Solution #21	a) assumes that the 5G-RG can provide a list of non-3GPP devices to the ACS, with	NAUN3	CableLabs consider this solution as technically feasible and beneficial.

	for each device a host name, MAC address and IP address and that the ACS can make this information available to an AF; The operator may integrate a web portal with the AF ; the end-user (e.g. the person that owns the subscription for the RG) can login to this web portal and associate the devices (and their IP traffic) with specific Qos requirements. b) Assumes that if RG is using IPv4 with NAT, it associates a distinct port range to each device and provides this information to ACS.		This is considered to enhance/complement Sol#1.
Solution #22	<p>a) It assumes 5G-RG encapsulates the data traffic of the AUN3 device within GTP-U or GRE datagrams, each one containing the Traffic Identifier that corresponds to this AUN3 device.</p> <p>b) The 5G-RG requests from SMF to authenticate the AUN3 device and to determine whether the AUN3 device is authorized to connect to the 5G-RG and share its PDU Session. For this purpose, the 5G-RG sends a new 5GSM message to SMF, called PDU Session Third-Party Authentication Request message. The "Third-Party" signifies that the authentication request is not for the 5G-RG but for another device operating behind the 5G-RG.</p>	AUN3	<p>CableLabs consider NSWO extensions to wireline as a beneficial capability.</p> <p><u>CableLabs feedbacks on 3GPP questions:</u></p> <p>a) CableLabs does not consider GTP-U or GRE encapsulation capability by 5G-RG</p> <p>b) CableLabs consider a solution based on direct SWa from 5G-RG, as captured in EN, may simplify the solution and remove additional complexity from this assumption.</p>
Solution #23	<p>a) A Default non-3GPP network delay budget is configured in the 5GC (UDR). b) The 5G-RG may use the UE requested PDU Session Modification procedure to request/overwrite the (default) non-3GPP delay budget for a set of packet filters.</p>	AUN3, NAUN3	CableLabs consider this solution as technically feasible and complementary to other solutions.
Solution #24	<p>a) It assumes that <u>based on local-configuration</u> the 5G-RG is able to map the traffic from NAUN3 (non-authenticable non-3GPP device) devices to a PDU session/QoS Flow of the 5G-RG.</p>	NAUN3	CableLabs consider this solution as feasible/beneficial and could be an example/extension of solution #1.
Solution #25	<p>a) Assumes each AUN3 device (authenticable non-3GPP device) has its own NAS connection via the 5G-RG (own NAS security context in the AMF</p>	AUN3	CableLabs consider this solution as feasible and beneficial, and it is consistent with the architecture of serving N5GC devices behind RG

	<p>and with the 5G-RG) and its own NGAP connection that is separate from the NGAP connection for the 5G-RG.</p> <p>b) This means that the interface between the 5G RG and the AGF allows to support multiple NGAP connections associated with the same 5G RG (potentially one for the 5G RG itself and one per AUN3 device). The 5G RG is also assumed to be able to associate NAS signaling received from the AGF with the relevant AUN3 device.</p> <p>c) Note: How The solution works in case of FN-RG seems not described.</p>		<p>in R16. CableLabs could initiate a work to specify necessary requirements on 5G-RG to support multiple NGAP connections/NAS signalling.</p> <p>NOTE: When NSWO capability is made available to UE and AUN3 devices behind 5G-RG, CableLabs could also specify the support of SWa interface on 5G-RG.</p> <p><u>CableLabs feedbacks on questions:</u></p> <p>a) Technically feasible.</p> <p>b) Technically feasible.</p> <p>c) In case of FN-RG, W-AGF could perform registration and establish individual NAS signalling for each AUN3 device behind the RG as shown in TS 23.316 clause 4.10a.</p>
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Sincerely

Yunjung Yi
 Director of Wireless Standardization
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