**SA WG2 Meeting #152e** **S2-220**

**August 17th – 26th, 2022; Elbonia**   **(revision of S2-220)**

**Title:** **[draft]** LS on solutions for 5WWC\_Ph2 Key Issue 1

**Response to:**

**Release:** Rel-18

**Work Item:** 5WWC\_Ph2

**Source:** Nokia, Will be SA2

**To:** BBF, CABLELABS

**Cc:** SA3

**Contact Person:**

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**Send any reply LS to:** **3GPP Liaisons Coordinator,** [**mailto:3GPPLiaison@etsi.org**](mailto:3GPPLiaison@etsi.org)

**Attachments:** TR 23700-17 whose latest version is on 3GPP web site

**1. Overall Description:**

3GPP SA2 is having a 5WWC\_Ph2 Study on 5WWC enhancements for 3GPP Rel18; as part of this study, a Key Issue (KI1) studies “**How to support differentiated services (e.g. QoS and charging) for the same and different Non-3GPP devices, and UEs connected behind a 5G-RG**”;

(TNAP, TWAP, TNGF and TWIF are defined in TS 23.501 ; AUN3 refers to 5GC-Authenticable NON 3GPP device while NUAN3 refers to NON 5GC-Authenticable NON 3GPP device)

SA2 would like to ask BBF / CableLabs feedback about potential impacts to 5G RG and AGF of candidate solutions for Key Issue 1 within TR 23700-17

* Solution 1:
  1. 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)
  2. Assumes the 5G-RG is configured (by TR-69, or via PCF/URSP or both) to associate each group with PDU Session characteristics such as DNN/ S-NSSAI
  3. Assumes that a non-3GPP device can be enforced/authorized to use a certain SSID or Ethernet port or VLAN
* Solution 2:
  1. Can we assume that a 5G-RG may act as a TNAP with respect to the TNGF i.e. 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)
  2. 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?)
  3. To support QoS differentiation, the mapping rules between the RG's 5GC (underlay 5GS) and the UE's 5GC (Overlay 5GS where N3IWF/TNGF is located) are assumed to be governed by an SLA (or network configuration in case of single operator) including:

1) 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.

* Solution 3:
  1. 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)
  2. 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?)
  3. Can similar QoS differentiation settings as described above for solution 2 apply in this case?
  4. Can we assume that 5G-RG can discover TWIF (from same or different operator) and an IPSec tunnel is established between them (preconfigured or on-the-fly).
* Solution 4:
  1. 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).
  2. Assumes 5G-RG includes non-3GPP device category in PDU Session modification Request to requests the session policy for non-3GPP devices behind it.
* Solution 5:
  1. Assumes during L2 connection establishment with UE (5GC capable), the 5G-RG may send 5G-GUTI to the TNGF over Ta in an AAA message
  2. (same questions as a) and b) for solution 2 above)
* Solution 6:
  1. Assumes 5G-RG may apply to the AF for a virtual identifier. How can 5G-RG interact with AF (assuming operator deployed AF)?
  2. The 5G-RG then uses the virtual identifier to run a registration procedure on behalf of the device
* Solution 7:
  1. Assumes 5G-RG is able to enforce QoS in the non-3GPP network at customer premises based on per QoS-flow Non-3GPP QoS assistance information received from 5GC over NAS. The Non-3GPP QoS assistance information may contains: QoS characteristics, GFBR/MFBR (if applicable), ARP, Periodicity).
* Solution 8:
  1. 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 where data forwarding is that of an Ethernet PDU Session type.
* Solution 9:
  1. Assumes 5G-RG sends the 5G-RG GUTI to the UE via ANQP
  2. Same questions as for solution 5 above.
* Solution 20:
  1. 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).
  2. For 5GC capable UE behind 5G-RG: 5G-RG sends User ID and associated IP address + ports to the SMF through the AMF via NAS

In both cases a) and b) above the 5GC uses UE/device identifier and associated Ip address + ports to determine relevant QoS rules

* 1. 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 for 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.
* Solution 21:
  1. It is assumed that the 5G-RG can provide a list of non-3GPP devices to the ACS, with host name, MAC address and IP address for each device 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.
* Solution 22:
  1. 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.
  2. 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.
* Solution 23:
  1. A Default non-3GPP network delay budget is configured in the 5GC (UDR).
  2. 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.
* Solution 24:
  1. It assumes that based on local-configuration 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.
* Solution 25:
  1. Assumes each AUN3 device (authenticable non-3GPP device) has its own NAS connection (own NAS security context in the AMF and with the 5G-RG) and its own NGAP connection separate from that of the 5G-RG.
  2. 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.
  3. Note: How The solution works in case of FN-RG seems not described.

**2. Actions:**

**To BBF, CABLELABS:**

**ACTION:**  SA2 kindly asks BBF, CABLELABS to provide feedback to the assumptions above, answer to the questions above and to provide any feedback on solutions to Key Issue 1 within 5WWC\_Ph2 TR 23.700-17

**To SA3:**

**ACTION:**  SA2 kindly asks SA3 to provide security feedback to the assumptions and solutions above

**3. Date of Next TSG-SA WG2 Meetings:**

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|  | DATES | LOCATION | CTRY |
| SA2#153e | October, 10-14th | Elbonia | Any (e-meeting) |
| SA2#154 | November, 14-18th | To be determined | Canada |