**3GPP TSG-RAN3 Meeting #107-e *R3-200390***

**E-Meeting, 24 February – 6 March, 2020**

**Title:** (TP for WWC BL CR for TS 29.413) Support for interfacing trusted non-3GPP access networks to the 5GC

**Source:** Huawei, Telecom Italia, BT, Broadcom

**Agenda item:** 21.2.2

**Document for:** Other

# 1. Introduction

The support of trusted non-3GPP access network to the 5GC was discussed at RAN3#106 meeting, with the following remaining issue:

* *It is FFS on the detailed format of the TNAP ID, TNGF ID and TWIF ID.*

In addition, several agreements were made at SA2#136 meeting, inlcuding the TWIF or the TNGF co-existence with one or more local UPFs, user location information etc.

This contribution intends to address the above issues and provide TPs for TS 38.413 and TS 29.413.

# 2. Discussion

## 2.1 Encoding of TNGF ID, TWIF ID, TNAP ID and TWAP ID

At RAN3#106 meeting, the TNGF ID was agreed to be used to identify a TNGF for the trusted non-3GPP access network during NG interface setup and configuration update procedure.

Similarly, the TWIF ID was agreed to be used to identify a TWIF for the trusted WLAN access network during NG interface setup and configuration update procedure.

Regarding the exact format, it is proposed to take the similar format as N3IWF ID as follows, where the IE type is BIT STRING. In order to accomadate more nodes, it is suggested to define overall 32 bit string. And this IE should be extensible.

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| >>N3IWF ID | M |  | BIT STRING (SIZE(16)) |  |

While for TNAP ID and TWAP ID, the exact format has already defined as string in TS 29.571. Thus a reference can be added accordingly.

1. The IE type for the TNGF ID and TWIF ID is Bit String. And a reference to TS 29.571 is added for TNAP ID and TWAP ID.

## 2.2 Coexistence of TWIF/TNGF and UPF coexistence

* **TWIF identities parameter (for TWIF and UPF coexistence)**

As agreed in [1] at SA2#136 meeting, during the PDU session establishment via the trusted WLAN access network, the TWIF may include the TWIF identities parameter in the N2 Uplink NAS transport message and send it to the AMF in the 5GC.

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| *4.12b.2 Initial Registration & PDU Session Establishment* */\*\*Skip the unrevelant\*\*/*  If the TWIF is co-located with one or more local UPFs then:  - In step 20c (N2 Uplink NAS Transport), the TWIF may send a TWIF Identities parameter to AMF. The TWIF Identities parameter contains a list of identifiers (i.e. FQDNs or IP addresses) of N3 terminations supported by the TWIF.  - If received by the AMF, it shall forward it to the SMF when invoking Nsmf\_PDUSessionCreateSMContext i.e. at the establishment of the PDU Session. The SMF may use this information to select a local UPF for the PDU Session. |

The TWIF identities parameter contains a list of identifiers (i.e. FQDN or IP address) of N3 terminations supported by the TWIF, and it can be used by SMF as input to select a local UPF for the PDU session.

1. The TWIF identities parameter should be provided by the TWIF to the AMF in the Uplink NAS transport message.

* **TNGF identities parameter (for TNGF and UPF coexistence)**

As agreed in [2], during the PDU session establishment via the trusted non-3GPP access network, the TNGF may include the TNGF identities parameter in the N2 Uplink NAS transport message and send it to the AMF in the 5GC.

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| *4.12a.5 UE Requested PDU Session Establishment via Trusted non-3GPP Access* After the UE registers to 5GC via trusted non-3GPP access, the UE may request a PDU Session establishment by using the same procedure as the one specified in clause 4.12.5 for untrusted non-3GPP access, with the following modifications:  - The N3IWF in Figure 4.12.5-1 should be substituted with a TNGF and the Untrusted non-3GPP access should be substituted with a Trusted non-3GPP Access Point (TNAP).  - The TNGF may send a TNGF Identities parameter to AMF inside an N2 Uplink NAS Transport message. The TNGF Identities parameter contains a list of identifiers (i.e. FQDNs or IP addresses) of N3 terminations supported by the TNGF. If received by the AMF, it shall forward it to the SMF, which may use it as input to UPF selection.  */\*\*Skip the unrevelant\*\*/* |

The TNGF identities parameter contains a list of identifiers (i.e. FQDN or IP address) of N3 terminations supported by the TNGF, and it can be used by SMF as input for UPF selection.

1. The TNGF identities parameter should be provided by the TNGF to the AMF in the Uplink NAS transport message.

## 2.3 User location information

It was agreed at SA2#136bis meeting that the user location information for the Non-5G-Capable over WLAN (N5CW) device related to the trusted non-3GPP access includes the TWAP Identifier, N5CW device local IP address (used to reach the TWIF) and optionally UDP or TCP source port number (if NAT is detected) [3, 4].

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| *5.6.2 Interaction between AMF and SMF* */\*\*Skip the unrevelant\*\*/*  The User Location Information may correspond to  - In the case of 3GPP access: Cell-Id. The AMF includes only the Primary Cell-Id even if it had received also the Cell-Id of the Primary cell in the Secondary RAN node from NG-RAN.  - In the case of Untrusted non-3GPP access: a UE local IP address (used to reach the N3IWF) and optionally UDP or TCP source port number (if NAT is detected).  - In the case of Trusted non-3GPP access: TNAP/TWAP Identifier, a UE/N5CW device local IP address (used to reach the TNGF/TWIF) and optionally UDP or TCP source port number (if NAT is detected).  The TNAP Identifier shall include the SSID of the access point to which the UE is attached and shall include at least one of the following elements, unless otherwise determined by the TWAN operator's policies:  - the BSSID (see IEEE Std 802.11-2012 [106]);  - civic address information of the TNAP to which the UE is attached.  The TWAP Identifier shall include the SSID of the access point to which the NC5W is attached. The TWAP Identifier shall also include at least one of the following elements, unless otherwise determined by the TWAN operator's policies:  - the BSSID (see IEEE Std 802.11-2012 [106]);  - civic address information of the TWAP to which the UE is attached.  NOTE 1: The SSID can be the same for several TNAPs/TWAPs and SSID only may not provide a location, but it might be sufficient for charging purposes.  NOTE 2: the BSSID associated with a TNAP/TWAP is assumed to be static.  - In the case of W-5GAN access: The User Location Information for W-5GAN is defined in TS 23.316 [84].  */\*\*Skip the unrevelant\*\*/* |

Therefore, the user location information for the Non-5G-Capable over WLAN (N5CW) device related to the trusted non-3GPP access should be included in TS 38.413.

1. The user location information for the N5CW device should include the TWAP ID, IP address and Port number.

# 3. Conclusion

This contribution discusses the further RAN impact to support the trusted non-3GPP access networks connecting to 5GC. Based on the discussion in this paper, the following proposals are proposed.

1. The IE type for the TNGF ID and TWIF ID is Bit String. And a reference to TS 29.571 is added for TNAP ID and TWAP ID.
2. The TWIF identities parameter should be provided by the TWIF to the AMF in the Uplink NAS transport message.
3. The TNGF identities parameter should be provided by the TNGF to the AMF in the Uplink NAS transport message.
4. The user location information for the N5CW device should include the TWAP ID, IP address and Port number.

# 4. Reference

1. S2-1912094, TWIF co-located with UPF, Motorola Mobility, Lenovo, Broadcom.
2. S2-1912095, TNGF co-located with UPF, Motorola Mobility, Lenovo, Broadcom.
3. S2-2001008, TS 23.501 – correction on user location information, Huawei, HiSilicon.
4. S2-2001059, Support of TNAP identifier when the trusted access does not correspond to WLAN, Nokia, Nokia Shanghai Bell.

# 5. Annex – TP

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| **1st Change** |

3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5G-RG 5G Residential Gateway

FN-RG Fixed Network Residential Gateway

N3IWF Non-3GPP InterWorking Function

TNAP Trusted Non-3GPP Access Point

TNGF Trusted Non-3GPP Gateway Function

TWAP Trusted WLAN Access Point

TWIF Trusted WLAN Interworking Function

W-AGF Wireline Access Gateway Function

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| **2nd Change** |

5.3 Exceptions for NGAP message contents and information element coding when used for non-3GPP access

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DOWNLINK NAS TRANSPORT message:

- the following IEs shall be ignored, when received:

- *RAN Paging Priority* IE

- *MobilityRestriction List* IE

- *Index to RAT/Frequency Selection Priority* IE

UPLINK NAS TRANSPORT message:

- *W-AGF Identity List* IE: the information given within this IE between the W-AGF and the AMF contains a list of identifiers of N3 terminations at W-AGF as specified in TS 23.316 [x].

- *TNGF Identity List* IE: the information given within this IE between the TNGF and the AMF contains a list of identifiers of N3 terminations at TNGF as specified in TS 23.502 [4].

- *TWIF Identity List* IE: the information given within this IE between the TWIF and the AMF contains a list of identifiers of N3 terminations at TWIF as specified in TS 23.502 [4].

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The *User Location Information* IE in the applicable NGAP messages between the N3IWF and the AMF includes the IP address and port number as specified in TS 38.413 [2].

The *User Location Information* IE in the applicable NGAP messages between the TNGF and the AMF includes the TNAP ID, IP address and port number as specified in TS 38.413 [2].

The *User Location Information* IE in the applicable NGAP messages between the TWIF and the AMF includes the TWAP ID, IP address and port number as specified in TS 38.413 [2].

The *User Location Information* IE in the applicable NGAP messages between the W-AGF and the AMF includes the Global Line Identifier or the Global Cable Identifier as specified in TS 38.413 [2].