**SA WG2 Meeting #170 S2-2506303**

**25 – 29 Aug, 2025, Goteborg , SE**

**Source: Nokia, ATT, T\_Mobile US, Deutsche Telekom**

**Title:** **[WT#1.2.x] support of Fixed Wireless Access in 6G System**

**Document for: Approval**

**Agenda Item: 20.6.1.2**

**Work Item / Release: FS\_6G\_ARC/Rel-20**

*Abstract of the contribution: Proposes for a KI about* **support of fixed wireless access in 6G System**

# 1. Justifications

***Architectural Motivation:***

FWA is one of the key services supported by 5GS and is a commercial success, thus, it is important to properly support FWA in 6GS; FWA corresponds to a service with:

* having huge user plane throughput demands.
* With generally lower UE energy related constraints (not using batteries for power supply), thus these devices can afford long-lasting CONNECTED state (even if energy consumption reduction remains an overall goal) reducing the frequency of (IDLE 🡨🡪 CONNECTED) mode transitions and thus the frequency of CN processing and energy consuming procedures such as Service Request and paging.
* for which radio-mobility rarely takes place as the devices are not moving (“Fixed”). Both radio related signaling (radio measurement) and Core (paging) signaling might be optimized.

NOTE: Radio mobility events may take place even for static devices when e.g. lorries move on nearby roads; or base station energy saving techniques shut down cells; heavy rain occurs; seasonal tree leaf growth; additional base station sites added to the network; or cell site failures; or Tracking Area ID changes as cells get re-parented onto different CN nodes.

FWA service requires higher User Plane capacity (higher operator cost) that should be compensated by lower Control Plane signaling load (cost and energy consumption reduction).

FWA is addressed in (SA1) TR 22.870 clause 5.7.1.

***Gap Analysis:***

Many features already exist (e.g. the UE can be configured to not send radio measurement reports if the serving cell signal strength is high enough; paging escalation starting from last used gNB; and specific DNNs can be allocated that cause the selection of appropriate UPFs).

However, given the significant size (in % of total data traffic) of the current FWA market, it is appropriate to study (via a dedicated Key Issue KI) whether further optimizations that deal with the specific nature of FWA service are worthwhile developing in 6G.

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***Technical Impact:***

It is not expected that due to this KI any new NF or new reference points are defined. But considering specific capabilities / demands to support FWA, this KI may induce changes to existing services / interfaces (e.g., addition of parameters and/or specific behaviour of NFs). Specific 5GS/6GS interworking aspects may need to be considered (e.g. when due to failure of a 6G RAN a UE with FWA service would need mobility to 5GS).

With regards to User plane, it is assumed that a highly performant UP must be supported. There could be dedicated selection mechanism for Session Management and/or UP network functions. Aspects of these could include the use of FWA DNNs and/or slices with dedicated configuration e.g. for session handling timers, rate adaptations, etc….Optimized and dedicated policies could also be considered for FWA service.

# Annex A.X. WT Scope

##### Aspects that can be agreed directly

*Define a Sub WT1.2 dedicated to Fixed Wireless Access*

WT#1.2.x for Fixed Wireless Access in 6G:

* Study and determine how FWA will be identified in the RAN and in the CN NFs (e.g. at device level and/or network slice level).
* Study whether yes how network functions selection mechanism dedicated to FWA are needed for Session Management and/or UPF.
* Study whether and how policies could be optizimed (e.g. dedicated policies) for UE’s benefiting from FWA service This might include specific AM policy (e.g. RFSP Index) or SM policies
* Study signaling optimizations related with the specific nature of FWA service (e.g. FWA device specific configuration, reduction in signaling due to paging (e.g. paging to single cell or avoid paging by keeping in CM-CONNECTED state), reduction of IDLE to CONNECTED mode state transitions, proper dormancy timers in RAN nodes, specific timer for NAS, mobility optimization …).
* Aspects that require further discussions

Study and/or enhance the following aspects for fixed wireless access in 6G including

* Whether and how to come up with network architecture specially designed for FWA in 6G.
* Whether and how to come up with FWA architecture which supports ongoing lean architectural design efforts in 6G.
* Whether and how to enable interworking of 5G and 6G FWA services.

# 5.X Potential KI(s) Scope

Key Issue 1.2.x for Fixed Wireless Access in 6G:

* Study and determine how FWA will be identified in the RAN and in the CN NFs (e.g. at device level and/or network slice level).
* Study whether yes how network functions selection mechanism dedicated to FWA are needed for Session Management and/or UPF.
* Study whether and how policies could be optizimed (e.g. dedicated policies) for UE’s benefiting from FWA service This might include specific AM policy (e.g. RFSP Index) or SM policies
* Study signaling optimizations related with the specific nature of FWA service (e.g. FWA device specific configuration, reduction in signaling due to paging (e.g. paging to single cell or avoid paging by keeping in CM-CONNECTED state), reduction of IDLE to CONNECTED mode state transitions, proper dormancy timers in RAN nodes, specific timer for NAS, mobility optimization …).

# TU estimates and dependencies

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| --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate**  **(Study)** | **RAN Dependency**  **(Yes/No/Maybe)** | **Inter Work Tasks Dependency**  Editor’s Note: This column should highlight if WT#x is self-contained, or is depended on completion of other WTs |
| 1.2.x (FWA) | 2 | Yes | Any RAN work would be dependent upon CN identification of FWA devices. CN optimizations for FWA are not dependent upon RAN. |
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