



US 20230231851A1

(19) **United States**

(12) **Patent Application Publication**  
**Kunz et al.**

(10) **Pub. No.: US 2023/0231851 A1**

(43) **Pub. Date: Jul. 20, 2023**

(54) **AUTHENTICATING A DEVICE NOT HAVING  
A SUBSCRIPTION IN A NETWORK**

**Publication Classification**

(51) **Int. Cl.**

**H04L 9/40** (2006.01)

**H04W 60/06** (2006.01)

**H04W 12/041** (2006.01)

(52) **U.S. Cl.**

CPC ..... **H04L 63/0892** (2013.01); **H04W 60/06**  
(2013.01); **H04W 12/041** (2021.01)

(57)

**ABSTRACT**

Apparatuses, methods, and systems are disclosed for accessing an NPN using external credentials. One apparatus in a mobile communication network includes a processor and a transceiver that receives a registration request for a UE. Here, the UE does not have a subscription with the mobile communication network. The processor identifies a service provider of the UE and controls the transceiver to send an authentication message to an AAA server of the identified service provider. The processor receives an authentication response containing a master session key from the AAA server in response to successful authentication of the UE and derives a set of security keys (e.g.,  $K_{AUSF}$ ,  $K_{SEAF}$ ) using the master session key.

(71) Applicant: **Lenovo (Singapore) Pte. Ltd.**, New  
Tech Park (SG)

(72) Inventors: **Andreas Kunz**, Ladenburg (DE);  
**Sheeba Backia Mary Baskaran**,  
Friedrichsdorf (DE); **Genadi Velez**,  
Darmstadt (DE)

(21) Appl. No.: **18/008,417**

(22) PCT Filed: **Jun. 4, 2021**

(86) PCT No.: **PCT/IB2021/054936**

§ 371 (c)(1),

(2) Date: **Dec. 5, 2022**

**Related U.S. Application Data**

(60) Provisional application No. 63/035,654, filed on Jun.  
5, 2020.

