

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
18 July 2019 (18.07.2019)



(10) International Publication Number
WO 2019/139903 A1

- (51) **International Patent Classification:**
H04W 48/18 (2009.01) *H04W 76/00* (2018.01)
- (21) **International Application Number:**
PCT/US2019/012705
- (22) **International Filing Date:**
08 January 2019 (08.01.2019)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
62/616,687 12 January 2018 (12.01.2018) US
62/653,817 06 April 2018 (06.04.2018) US
62/716,516 09 August 2018 (09.08.2018) US
- (71) **Applicant: IDAC HOLDINGS, INC.** [US/US]; 200 Bellevue Parkway, Suite 300, Wilmington, Delaware 19809 (US).
- (72) **Inventors: WATFA, Mahmoud;** 7162 De Pontoise, Saint Leonard, Québec H1S 2B3 (CA). **AGHILI, Behrouz;** 2 Huntington Quadrangle, 4th Floor, South Wing, Melville, New York 11747-4508 (US). **AHMAD, Saad;** 1000 Sherbrooke Street West, 10th Floor, Montreal, Québec H3A 3G4 (CA). **SHI, Xiaoyan;** 1000 Sherbrooke Street West, 10 Floor, Montreal, Québec H3A 3G4 (CA). **OLVERA-HER-**

NANDEZ, Ulises; Shoreditch Business Center, 64 Great Eastern Street, London EC2A 3QR (GB).

(74) **Agent: KELLNER, Steven M.;** Volpe and Koenig, P.C., 30 S. 17th Street, Suite 1800, Philadelphia, Pennsylvania 19103 (US).

(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

(54) **Title:** METHODS FOR PROTOCOL ENHANCEMENTS IN 5G NAS

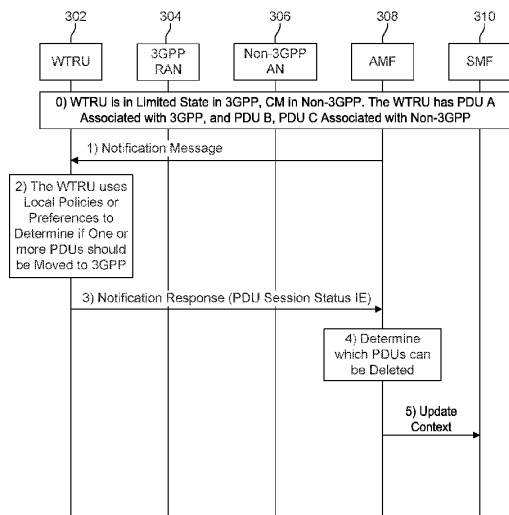


FIG. 3

(57) **Abstract:** Methods, systems, and apparatuses for protocol data unit (PDU) session management over different access technologies (ATs) are disclosed. A wireless transmit/receive unit (WTRU) may receive a first message from a network over a first access technology. The first message may include an indication for the WTRU to reestablish resources for one or more protocol data unit (PDU) sessions over a second access technology. The WTRU may determine that a PDU session of the one or more PDU sessions is locally deactivated by the WTRU. The WTRU may determine that it is in a limited service state associated with the second access technology. The WTRU may send a second message via the first access technology. The second message may include a PDU session status information element (IE) indicating the PDU session is locally deactivated such that the network releases the PDU session.

[Continued on next page]

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*