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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 April 2016 (28.04.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/064544 A1

(51) International Patent Classification:
H04L 5/00 (2006.01) *H04W 72/00* (2009.01)

(21) International Application Number:
PCT/US2015/053081

(22) International Filing Date:
30 September 2015 (30.09.2015)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/068,416 24 October 2014 (24.10.2014) US
62/075,624 5 November 2014 (05.11.2014) US
14/869,152 29 September 2015 (29.09.2015) US

(71) Applicant: **QUALCOMM INCORPORATED** [US/US]; ATTN: International IP Administration, 5775 Morehouse Drive, San Diego, California 92121-1714 (US).

(72) Inventors: **DAMNJANOVIC, Jelena**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **YOO, Taesang**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **MALLIK, Siddhartha**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **DAMNJANOVIC, Aleksandar**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **CHENDAMARAI KANNAN, Arumugam**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **VAJAPEYAM, Madhavan, Srinivasan**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **MALLADI, Durga,Prasad**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **WEI, Yongbin**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **LUO, Tao**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US).

(74) Agent: **KRAFT, Aaron, J.**; Holland & Hart LLP, P.O. Box. 11583, Salt Lake City, Utah 84147 (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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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,

[Continued on next page]

(54) Title: FLEXIBLE MULTIPLEXING AND FEEDBACK FOR VARIABLE TRANSMISSION TIME INTERVALS

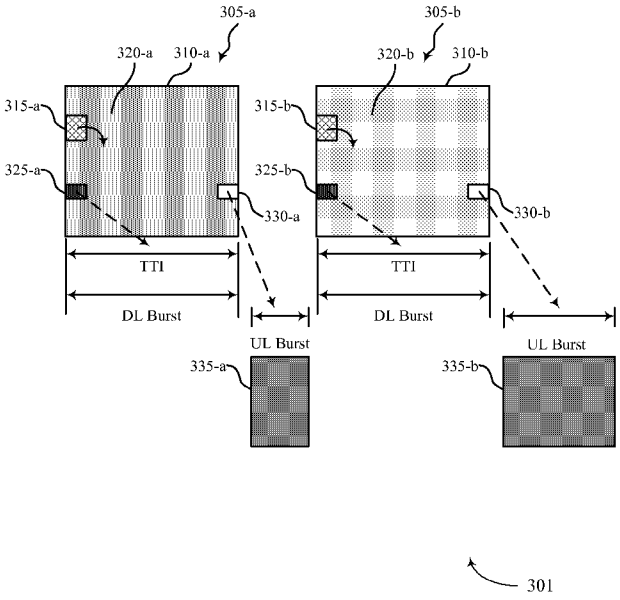

FIG. 3A

(57) Abstract: Methods, systems, and devices for wireless communication are described. A base station may employ a multiplexing configuration based on latency and efficiency considerations. The base station may transmit a resource grant, a signal indicating the length of a downlink (DL) transmission time interval (TTI), and a signal indicating the length of a subsequent uplink (UL) TTI to one or more user equipment (UEs). The base station may dynamically select a new multiplexing configuration by, for example, setting the length of an UL TTI to zero or assigning multiple UEs resources in the same DL TTI. Latency may also be reduced by employing block feedback, such as block hybrid automatic repeat request (HARQ) feedback. A UE may determine and transmit HARQ feedback for each transport block (TB) of a set of TBs, which may be based on a time duration of a downlink TTI.

WO 2016/064544 A1

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, 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))*