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(54) METHODS, APPARATUS AND SYSTEMS FOR PERFORMING MULTI-RADIO ACCESS TECHNOLOGY CARRIER AGGREGATION

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(58) Field of Classification Search

CPC . H04W 36/0066; H04W 36/14; H04W 24/02; H04W 24/08; H04W 24/10

See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

8,248,996 B2 8/2012 Li et al. 8,369,290 B2 2/2013 Xing et al. (Continued)

FOREIGN PATENT DOCUMENTS

CN 101867878 10/2010 EP 2242300 10/2010 (Continued)

OTHER PUBLICATIONS

"Taiwanese Examination Notification", Taiwanese Application No. 105111404, Dec. 20, 2016, 6 pages.

(Continued)

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(57) ABSTRACT

A method of managing carrier aggregation for a multi-radio access technology (RAT) wireless transmitter/receiver unit (WTRU) is disclosed. The method may include: receiving, by the WRTU over a primary channel associated with a RAT of a first type, provisioning information for provisioning a supplementary channel associated with a RAT of a second type; establishing the supplementary channel associated with the RAT of the second type based on the received provisioning information; and wirelessly exchanging, by the WRTU, first data associated with a communication over the primary channel via the RAT of the first type, while wireless exchanging second data associated with the communication over the supplementary channel via the RAT of the second type

18 Claims, 13 Drawing Sheets

