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Singh et al.

(54) DATA COMMUNICATION NETWORK TO PROVIDE HOP COUNT DATA FOR USER EQUIPMENT SELECTION OF A WIRELESS RELAY

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See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

2013/0215872	A1*	8/2013	Johansson	H04B 7/0404
				370/335
2014/0198708	A1*	7/2014	Lee	H04W 76/14
				370/312
(Continued)				

FOREIGN PATENT DOCUMENTS

EP 1826951 8/2007 WO 2014112834 7/2014 (Continued)

OTHER PUBLICATIONS

"Addition of establishment cause for mobile-originating VoLTE calls and network indication in SIB2;" 3GPP TSG-RAN WG2 Meeting #92; Nov. 16, 2015; 8 pages; Version 12.7.0; Nokia Networks; Anaheim, U.S.A.

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(57) ABSTRACT

A data communication network to provide hop count data for User Equipment (UE) selection of a wireless relay. The data communication network comprises a macro base station and a plurality of wireless relays that serve UEs. The wireless relays receive a hop count, and in response, increment their individual hop count and wirelessly broadcast individual relay Long Term Evolution (LTE) System Information Blocks (SIBs) indicating their individual hop counts. The wireless relays receive wireless UE attachments responsive to the relay LTE SIB broadcasts of their individual hop counts.

18 Claims, 7 Drawing Sheets

