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(54) **COMMUNICATION SYSTEM WITH A BEAMFORMED CONTROL CHANNEL AND METHOD OF SYSTEM CONTROL**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,203,010 * 4/1993 Felix et al. 455/438
5,487,174 * 1/1996 Persson 455/33.2
5,628,052 * 5/1997 DeSantis et al. 455/562
5,649,293 * 7/1997 Reed 69/19.2
5,710,982 * 1/1998 Laborde et al. 455/69
5,887,261 * 3/1999 Csapo et al. 455/450
5,907,809 * 5/1999 Molnar et al. 455/456
5,907,816 * 5/1999 Newman et al. 455/562
5,960,350 * 9/1999 Schorman et al. 455/450
6,091,788 * 7/2000 Keskitalo et al. 375/347
6,131,034 * 10/2000 McLaughlin et al. 455/450

* cited by examiner

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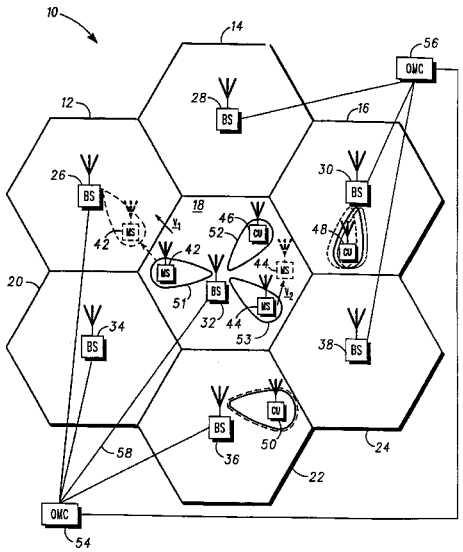
(57) **ABSTRACT**

To reduce interference in a communication system **(10)**, a communication unit **(42–50)** is arranged to initiate establishment of a radio frequency communication with a base station **(26–38)** by transmitting a system access request on a dedicated, wide area control channel. Upon receipt of the system access request, a base station **(32)** of the communication system of FIG. **1** responds by forming a narrowbeam control channel to the communication unit and transmitting system control information to the communication unit on the narrowbeam control channel, the system control information transmitted from the array of antenna elements and arranged to identify a narrowbeam communication resource for use in the radio communication. The communication unit **(42–50)**, upon receiving the system control information, then configures itself to utilise the narrowbeam communication resource for the radio communication.

9 Claims, 5 Drawing Sheets