



US006708032B2

(12) **United States Patent**  
**Willingham et al.**

(10) **Patent No.:** **US 6,708,032 B2**  
(45) **Date of Patent:** **\*Mar. 16, 2004**

(54)	<b>BASE STATION HAND-OFF MECHANISM FOR CELLULAR COMMUNICATION SYSTEM</b>	5,559,806 A	9/1996	Kurby et al. ....	370/95.3
		5,566,355 A	* 10/1996	Kanai .....	445/25
		5,596,333 A	1/1997	Bruckert .....	342/547
		5,603,089 A	2/1997	Searle et al. ....	455/507
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		5,615,409 A	3/1997	Forssem et al. ....	455/33.1
		5,893,033 A	* 4/1999	Keskitalo et al. ....	455/437
		5,913,168 A	* 6/1999	Moreau et al. ....	455/441
		6,038,459 A	3/2000	Searle et al. ....	455/562
		6,091,788 A	7/2000	Keskitalo et al. ....	455/561
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		6,151,502 A	11/2000	Padovani et al. ....	455/442
( * )	Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 401 days.	6,163,696 A	12/2000	Bi et al. ....	455/436
		6,167,286 A	12/2000	Ward et al. ....	455/562
		6,240,290 B1	* 5/2001	Willingham et al. ....	455/436
		6,353,601 B1	* 3/2002	Siira .....	370/331
		6,463,301 B1	* 10/2002	Bevan et al. ....	455/562.1
	This patent is subject to a terminal dis- claimer.	6,580,910 B1	* 6/2003	Mazur et al. ....	455/440

\* cited by examiner

(21) Appl. No.: **09/866,343**

(22) Filed: **May 24, 2001**

(65) **Prior Publication Data**

US 2001/0027103 A1 Oct. 4, 2001

**Related U.S. Application Data**

(63) Continuation of application No. 09/262,462, filed on Mar. 4, 1999, now Pat. No. 6,240,290.

(51) **Int. Cl.**<sup>7</sup> ..... **H04Q 7/20**

(52) **U.S. Cl.** ..... **455/436; 455/438; 455/439;**  
**455/442**

(58) **Field of Search** ..... **455/436, 437,**  
**455/438, 439, 440, 441, 562.1, 25, 450,**  
**524, 456.1, 443, 444, 442; 342/368, 371,**  
**372, 432**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,327,575 A \* 7/1994 Menich et al. .... 455/437

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(57) **ABSTRACT**

A channel hand-off control mechanism for a cellular communication network uses the same channels employed for communications between base stations of adjacent cells and a mobile transceiver, as the mobile transceiver moves between those cells, in order to locate the mobile transceiver relative to the base stations, so that the acquiring base station may readily place a narrowbeam channel on the mobile transceiver at hand-off. Each base station employs a phased array antenna, which allows the base station to controllably define its antenna coverage pattern with respect to any mobile transceiver, so as to minimize interference from one or more other transceivers, reducing frequency reuse distance.

**11 Claims, 5 Drawing Sheets**

