



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

(10) **Patent No.:** **US 6,418,317 B1**  
(45) **Date of Patent:** **Jul. 9, 2002**

(54) **METHOD AND SYSTEM FOR MANAGING FREQUENCIES ALLOCATED TO A BASE STATION**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/452,566**

(22) Filed: **Dec. 1, 1999**

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

(52) **U.S. Cl.** ..... **455/450; 455/62; 455/452; 455/509**

(58) **Field of Search** ..... 455/446, 450, 455/451, 452, 453, 447, 509, 62

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,280,630	A	*	1/1994	Wang	.....	455/450
5,490,137	A	*	2/1996	Hulsebosch et al.	.....	455/450
5,666,655	A	*	9/1997	Ishikawa et al.	.....	455/450
5,701,590	A		12/1997	Fujinami	.....	455/62
5,737,705	A	*	4/1998	Ruppel et al.	.....	455/452
5,898,928	A	*	4/1999	Karlsson et al.	.....	455/450
6,295,453	B1	*	9/2001	Desgagne et al.	.....	455/450

**FOREIGN PATENT DOCUMENTS**

EP	0 817 521 A2	6/1997
EP	1022921	1/2000
WO	WO 9713388	4/1997
WO	WO 9732444	9/1997
WO	WO 98/48586	4/1998
WO	WO 98/56204	6/1998
WO	WO 9905878	2/1999
WO	WO 0060896	10/2000

**OTHER PUBLICATIONS**

International Search Report, PCT/SE00/02270, dated May 28, 2001.

\* cited by examiner

*Primary Examiner*—William Trost

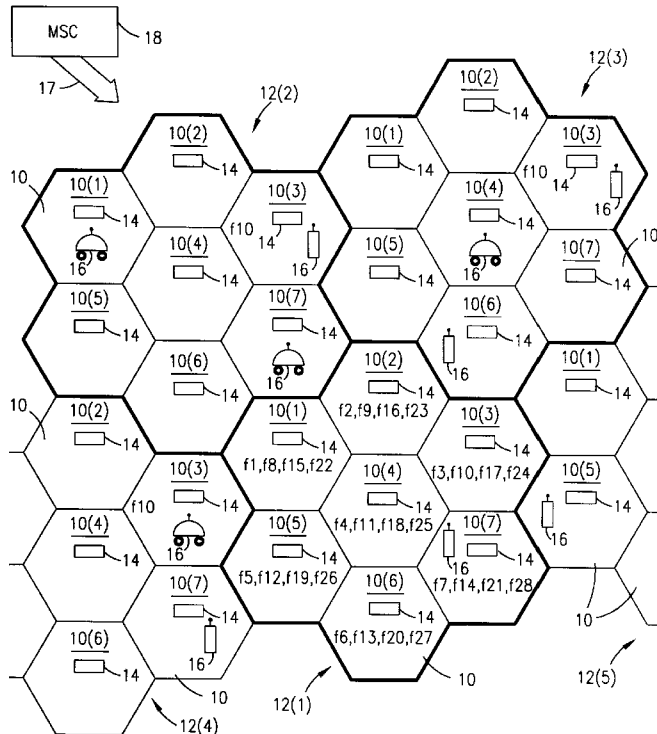
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(57) **ABSTRACT**

The present invention is a method and system for managing frequencies allocated to a cell within a cellular network to assign certain ones of those allocated frequencies for use by channel equipment within that cell. The method measures at least one quality metric for each of the allocated frequencies. At least one measured quality metric for the unassigned frequencies are compared against at least one quality metric for the assigned frequencies. An unassigned frequency is swapped for an assigned frequency based upon the comparison step. Additionally, a voting step is used to indicate that either the unassigned frequency or the assigned frequency has a higher signal quality for communication.

**34 Claims, 6 Drawing Sheets**



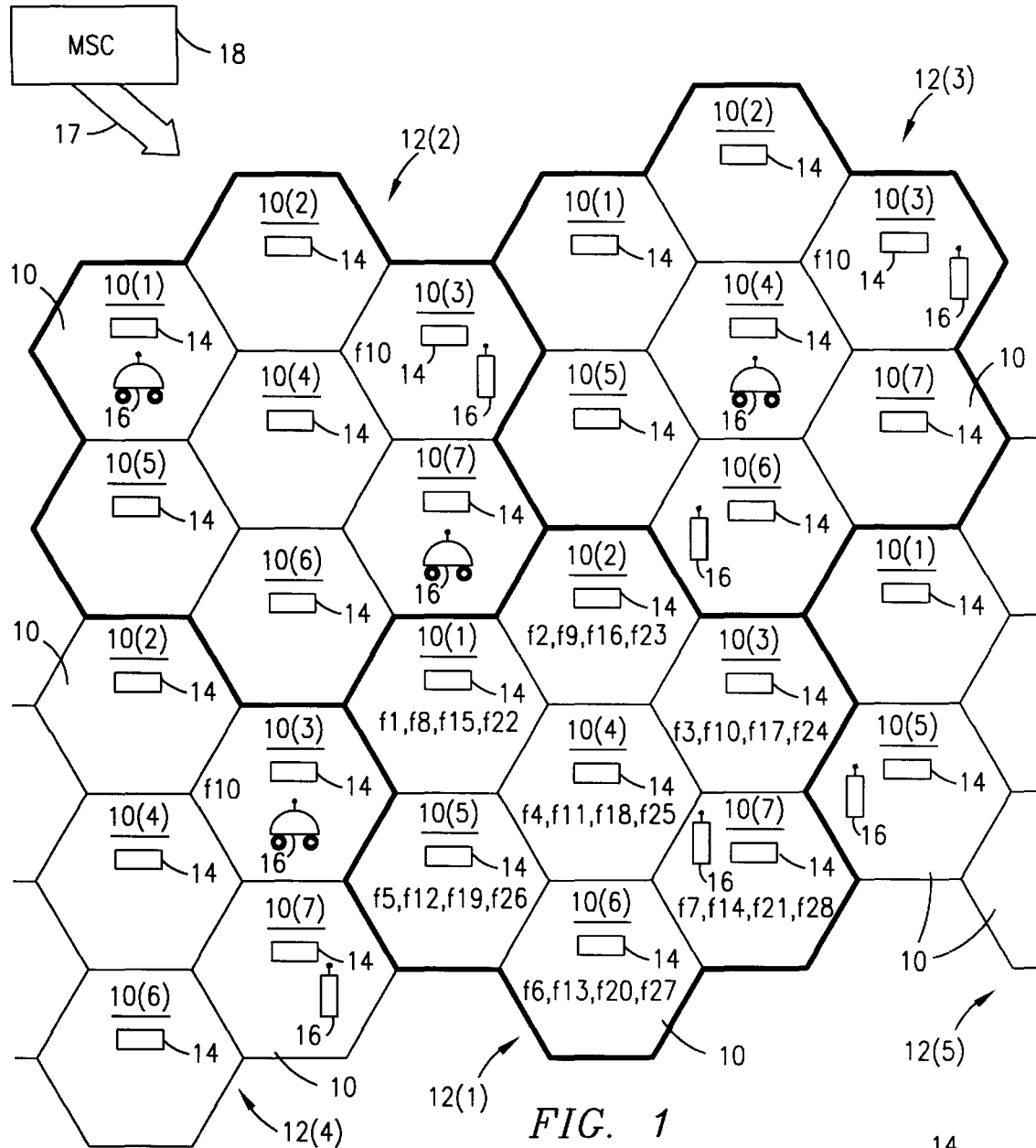


FIG. 1

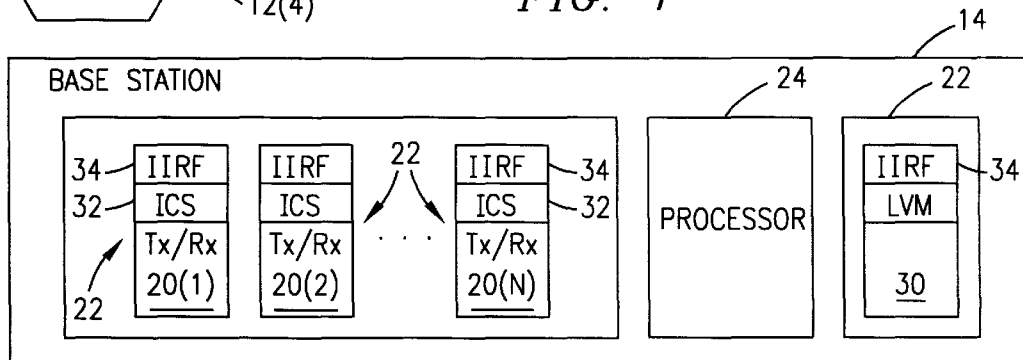


FIG. 2

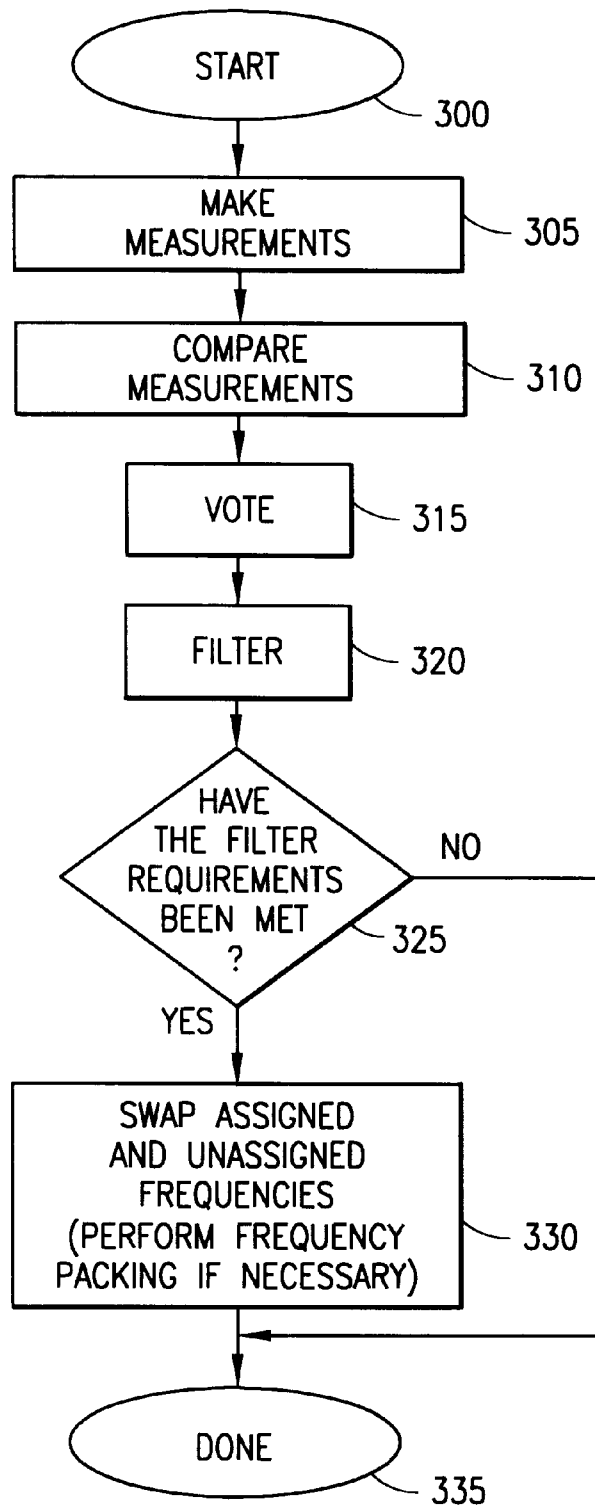


FIG. 3

400 FREQUENCY	405 INTERFERENCE (dBm)	410 USE	415 ASSIGNED
F1		USED	ASSIGNED
F8		USED	ASSIGNED
F15	-117	IDLE	ASSIGNED
F22	-106	IDLE	ASSIGNED
F29	-110		UNASSIGNED
F36	-105		UNASSIGNED
F43	-118		UNASSIGNED
F50	-95		UNASSIGNED

*FIG. 4*

		USED		510 IDLE	
ASSIGNED		F1	F8	F15	F22 ← 505
UNASSIGNED					
F29				-1	+1
F36				-1	-1
515 → F43				-1	+1
F50				-1	-1

500 ↑

Note: +3dB hysteresis added to each unassigned interference measurement before voting

**FIG. 5A**

		USED		510 IDLE	
ASSIGNED		F1	F8	F15	F22 ← 505
UNASSIGNED					
F29		+2	-6	+2	-4
F36		-8	-8	-6	-6
515 → F43		+6	+6	+8	+6
F50		-8	-8	-6	-4

500 ↑

**FIG. 5B**

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