



US005299198A

United States Patent [19]

[11] Patent Number: **5,299,198**

Kay et al.

[45] Date of Patent: **Mar. 29, 1994**

[54] **METHOD AND APPARATUS FOR EXPLOITATION OF VOICE INACTIVITY TO INCREASE THE CAPACITY OF A TIME DIVISION MULTIPLE ACCESS RADIO COMMUNICATIONS SYSTEM**

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[21] Appl. No.: **622,232**

[22] Filed: **Dec. 6, 1990**

[51] Int. Cl.⁵ **H04J 3/16**

[52] U.S. Cl. **370/95.3; 455/33.1**

[58] Field of Search **370/95.3, 77, 104.1, 370/60, 94.1; 455/33, 103, 214, 33.1, 33.2, 33.3, 33.4**

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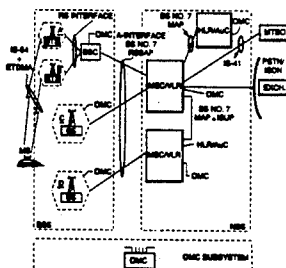
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[57] ABSTRACT

A mobile telephone system multiplexes plural voice traffic channels on a single carrier using a TDMA protocol. The capacity of the mobile telephone system is increased by assigning voice traffic capacity, not on a conversation basis, but on a speech spurt basis. In order to avoid compromising the voice transmission capacity, control signals (for the allocation and deallocation of both forward and reverse traffic channels) are sent using multiple diversity, i.e. both time and frequency. In addition, to increase the number of available control channels, a control channel comprises a sub-divided portion of an otherwise equivalent voice traffic slot. For reverse allocation requests, which are transmitted over a contention access channel, power diversity is used in addition to time and frequency diversity.

69 Claims, 33 Drawing Sheets



MSC	MOBILE SWITCHING CENTER	BTS	BASE TRANSMITTER STATION
HLR	HOME LOCATION REGISTER		
AUC	AUTHENTICATION CENTER		
VLR	VISITOR LOCATION REGISTER		
PTN	PUBLIC SWITCHED TELEPHONE NETWORK	MTBC	MOBILE TELEPHONE SWITCHING OFFICE
ISDN	INTEGRATED SERVICES DIGITAL NETWORK		
MAP	MOBILE APPLICATION PART (ISDN ?)		
BS	BASE STATION		
BSC	BASE STATION CONTROLLER		
MS	MOBILE STATION		
OC	OPERATIONS & MAINTENANCE CENTER		
ISUP	ISDN SUBSCRIBER USER PART (ISDN ?)		
RS	RADIO SUBSYSTEM		
BSS	BASE STATION SUBSYSTEM		
NSS	NETWORK SUBSYSTEM		

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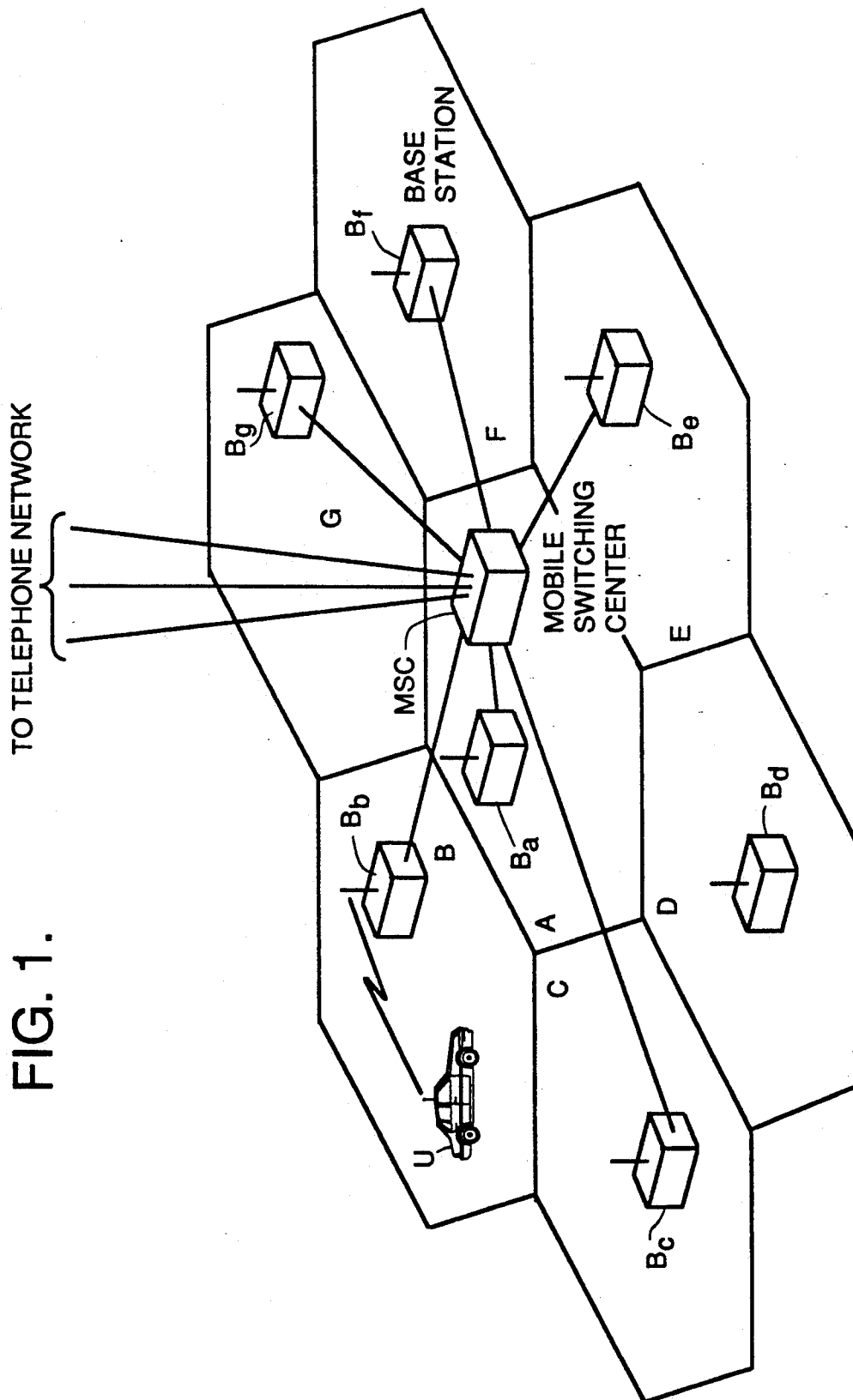


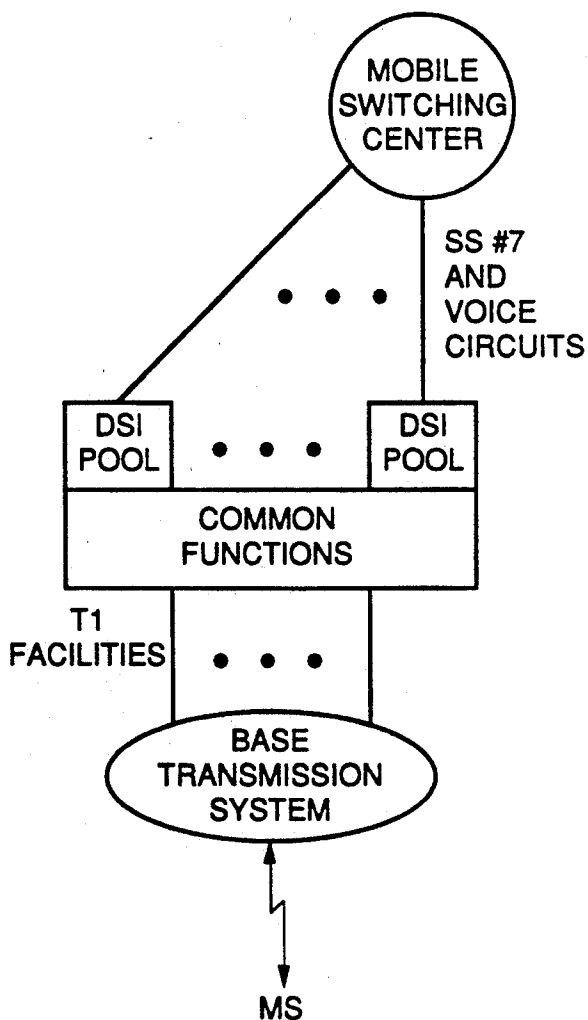
FIG. 1.

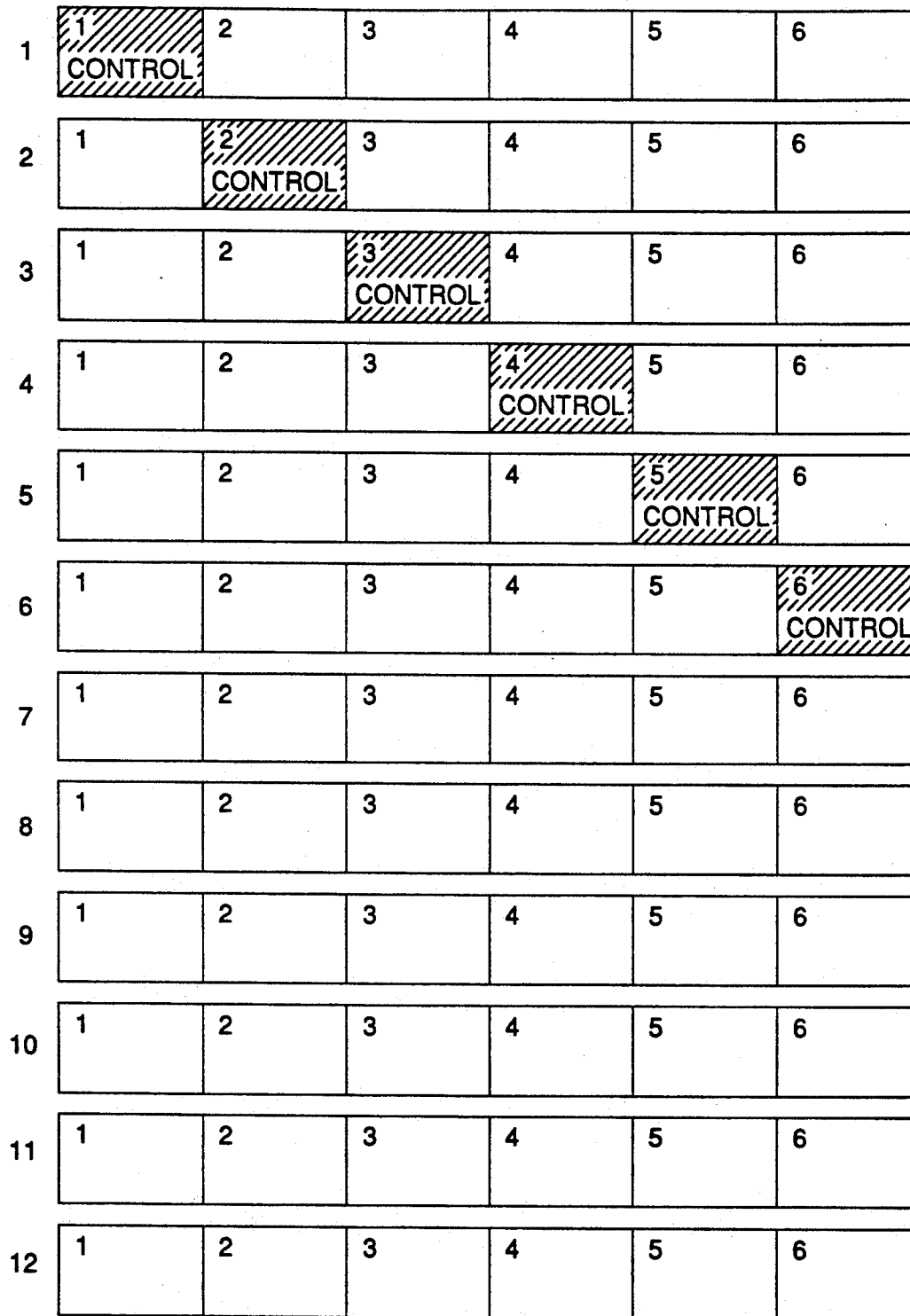
FORWARD FRAMES

	SLOT 1	SLOT 2	SLOT 3	SLOT 4	SLOT 5	SLOT 6
FRAME 1	MS 15	MS 11	MS 21	MS 4	MS 1	MS 22
2	MS 15	MS 11	MS 21	MS 4		MS 22
3	MS 15	MS 11	MS 21	MS 4	MS 19	MS 22
4	MS 15		MS 21	MS 4	MS 19	MS 22
5	MS 15	MS 8	MS 21	MS 4	MS 19	MS 22
6	MS 15	MS 8		MS 4	MS 19	
7	MS 2	MS 8		MS 4	MS 19	
8	MS 2	MS 8	MS 32	MS 4	MS 19	
9	MS 2	MS 8	MS 32	MS 4	MS 19	MS 15

FIG. 2.

FIG. 3.





ONE DSI GROUP
12 RF CHANNELS
72 SLOTS
6 CONTROL SLOTS
66 USER SLOTS

FIG. 4.

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