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## (12) United States Patent

Yamaura et al.

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### (54) RADIO COMMUNICATION METHOD, RADIO COMMUNICATION SYSTEM, RADIO COMMUNICATION BASE STATION, RADIO COMMUNICATION TERMINAL STATION, AND RADIO COMMUNICATION PROGRAM

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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 2080 days.

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(51) Int. Cl.

**H04J 11/00** (2006.01)

(52) **U.S. Cl.** ...... **370/206**; 370/208; 455/63.3

See application file for complete search history.

### (56) References Cited

### U.S. PATENT DOCUMENTS

6,298,035	B1 *	10/2001	Heiskala	 370/206
6,442,220	B1*	8/2002	Sihlbom	 375/343

### FOREIGN PATENT DOCUMENTS

JP	7-202751	8/1995
JР	7-245574	9/1995
JР	10-247897	9/1998
JP	11-8604	1/1999
JР	2000-115834	4/2000
JР	2001-203664	7/2001
Љ	2001-274767	10/2001
JР	2001-285181	10/2001
Љ	2001-285927	10/2001

#### OTHER PUBLICATIONS

Patent Abstracts of Japan, JP 09-046307, Feb. 14, 1997. Yasushi Yamao, et al., "Time diffusion M-ary code modulation and demodulation system suitable for slow speed digital signal transmission", Information and Communication Engineers National Conven-

\* cited by examiner

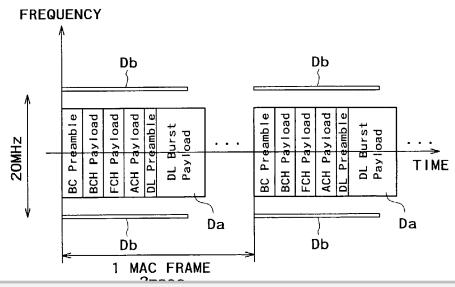
Primary Examiner—Jayanti K Patel Assistant Examiner—Jung Park (74) Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, L.L.P.

## (57) ABSTRACT

tion Lecture Memoirs, Mar. 6, 1988, 3 pages.

A radio communication method for exchanging information between a base station and a terminal station. The method includes: communicating the information between the base station and the terminal station by multi-carrier signals by OFDM modulation scheme including plural subcarriers within a bandwidth, communicating control signals in addition to the information between the base station and the terminal station, and wherein part of the control signals addressed to the terminal station from the base station is transmitted by one or more specific subcarriers in the bandwidth for the multi-carrier signals.

### 17 Claims, 25 Drawing Sheets





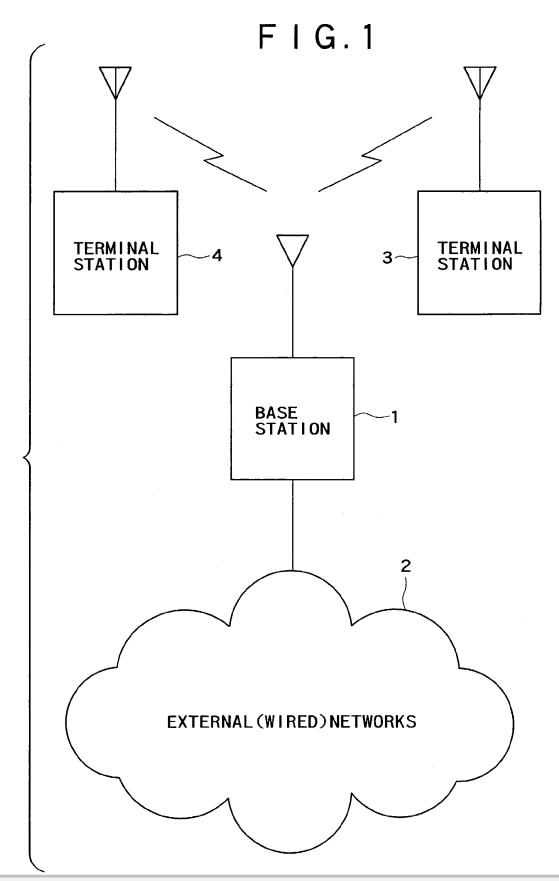




FIG.2

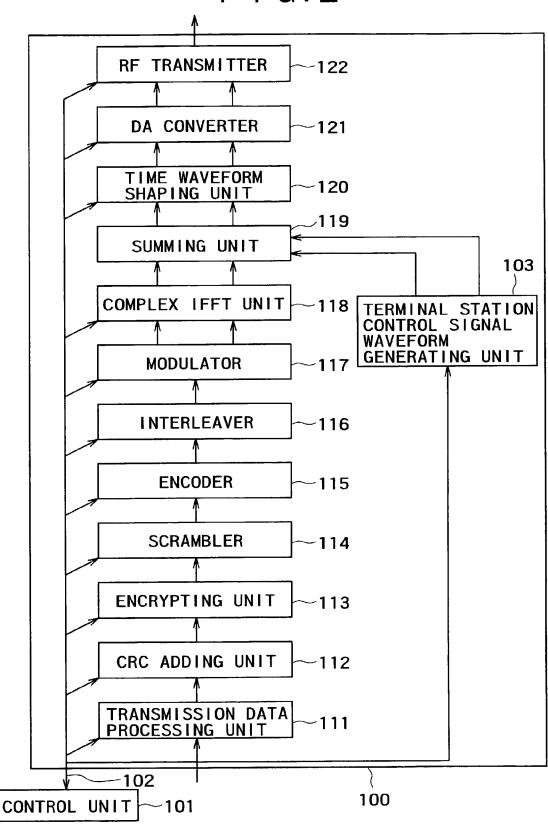
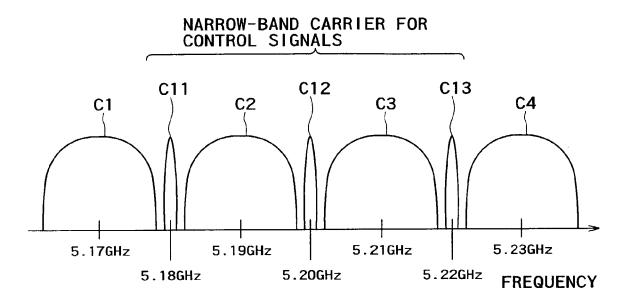
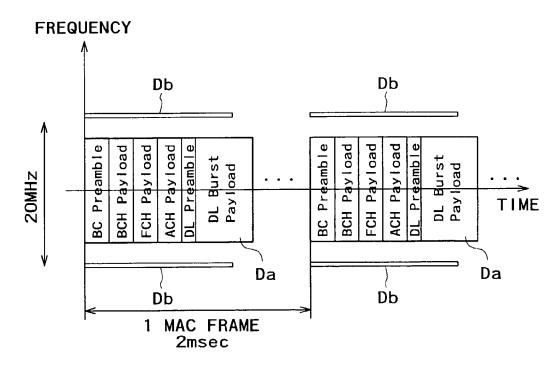




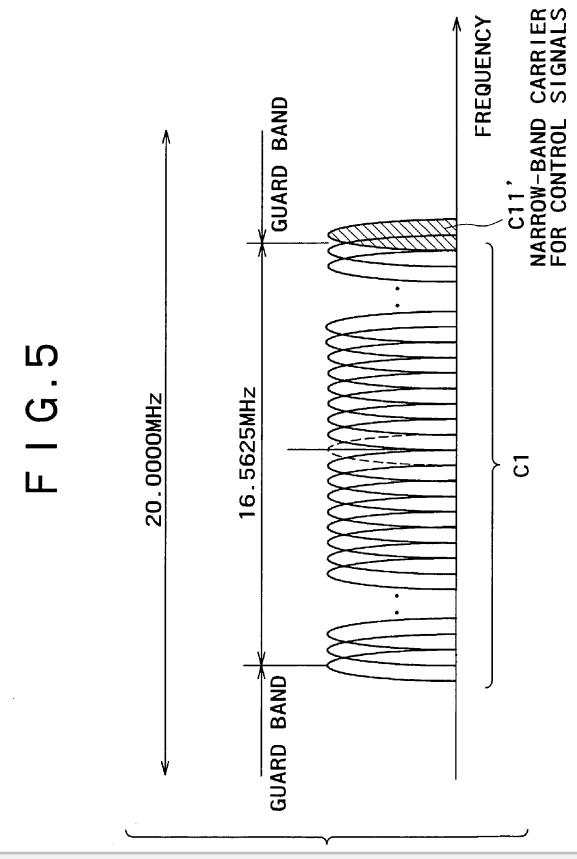
FIG.3



F I G. 4







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