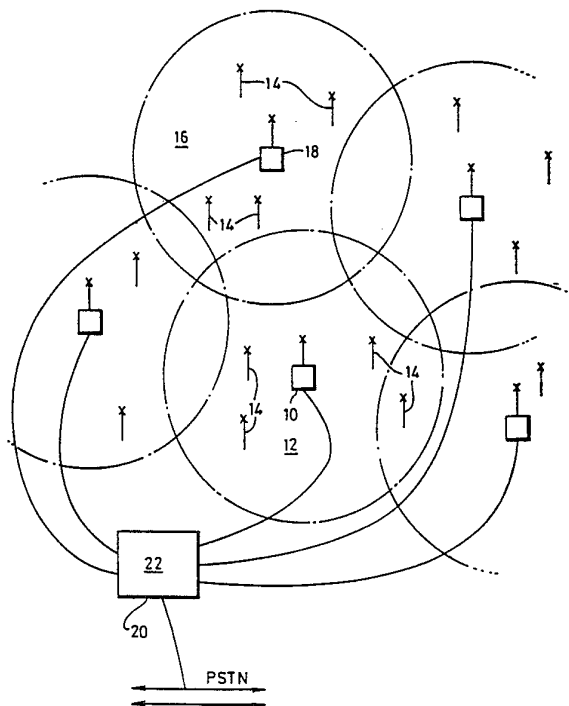


<p>(51) International Patent Classification ⁵ : H04Q 7/04, H04B 7/26</p>	<p>A1</p>	<p>(11) International Publication Number: WO 93/16566 (43) International Publication Date: 19 August 1993 (19.08.93)</p>
<p>(21) International Application Number: PCT/GB93/00235 (22) International Filing Date: 4 February 1993 (04.02.93) (30) Priority data: 9202461.1 5 February 1992 (05.02.92) GB (71) Applicant (for all designated States except US): GEC-MARCONI LIMITED [GB/GB]; The Grove, Warren Lane, Stanmore, Middlesex HA7 4LY (GB). (72) Inventor; and (75) Inventor/Applicant (for US only) : HOLLIS, John [GB/GB]; Upalong, Standon Road, Little Hadham, Nr. Ware, Herts SG11 2DD (GB). (74) Agent: ELLIOTT, Frank, Edward; GEC Patent Dept, Waterhouse Lane, Chelmsford, Essex CM1 2QX (GB).</p>		<p>(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>

(54) Title: PRIVATE TRUNKED MOBILE RADIO SYSTEM



(57) Abstract

A trunked private mobile radio system provides on demand an open channel communication between a plurality of designated mobile radio terminals of the system.

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PRIVATE TRUNKED MOBILE RADIO SYSTEM

This invention concerns private mobile radio (PMR) systems such as those used by Military and Law Enforcement Agencies. PMR systems are known and generally comprise a base station and a plurality of mobile terminals. Each base station serves a particular area and can communicate with mobile terminals within its area and with other similar base stations serving respective areas through switching centers. The mobile terminals can communicate with each other via the respective base stations or directly.

There is an increasing reliance on such PMR systems and, with increased use, there is a need more efficiently to utilise the limited radio spectrum. Narrow band channels enable more efficient utilisation but it has been recognised that significant advantages are obtained by "trunking" i.e. where traffic communication channels are only allocated and used whilst a call is in progress. This is similar to a telephone communication system. DTI document MPT 1318 describes such advantages and indicates that the carrying capacity of a channel within a "trunked" group greater than 10 can approach 0.9E (erlang). The "erlang" is a measure of channel loading (see MPT 1318 pages 16-19).

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A trunking technique, as described in MPT 1327 (and associated documents MPT 1343 and MPT 1347), requires the mobile radio terminals to relax to a control channel over which channel call control messages are passed. In this way, a mobile radio terminal may be directed to a particular communication channel when a call is made. Similarly, when a call is terminated, the radio terminal releases the communication channel and relaxes to the control channel. The same communication channel is then available to other users.

The technique of call control is similar to that of telephony and inevitably has a delay which may be of the order of 500m secs. This, coupled with a probability of a delay in acquiring a radio channel if all resources are actually in use, is causing concern as, without discipline, speech or word clipping may result. The problem of the 'Don't Shoot' command becoming 'Shoot' is one aspect of such a problem. Currently, this problem is largely avoided by the communications being undertaken over an 'Open', all available, channel. There is therefore no call set up delay and, as all units are permanently tuned to the channel, there is a comfort to everyone in that all communications are received.

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The Shoot/Don't Shoot problem, along with the comfort aspect, is causing significant concern in the organisations defining future radio communication strategies for the Military and Law Enforcement Agencies. It is believed however that, in accordance with the disclosure herein, an open channel capability can be achieved with a trunking system and still maintain the channel efficiencies for one to one communications on an "on demand" basis. Further, in recognition of the requirement to support covert operations and/or any 'low probability of detection' communications, encrypted communications and 'frequency agile' techniques can be incorporated. Such a system is described below.

The communications requirements of a PMR system according to the present invention can be summarised to be:-

- a) One to one private calls.
- b) Group, or conference calls.
- c) Open channel all available communications.

Requirements (a) and (b) are supported by the MPT 1327 systems described above and are established by similar

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