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Case Docket No. PHB 34,306

THE COMMISSIONER OF PATENTS AND TRADEMARKS, Washington, D.C. 20231

Enclosed for filing is the patent application of Inventor(s):  
BERNARD HUNT

For: RADIO COMMUNICATION SYSTEM

**ENCLOSED ARE:**

- Appointment of Associates;
- Information Disclosure Statement, Form PTO-1449 and copies of documents listed therein;
- Preliminary Amendment;
- Specification (12 Pages of Specification, Claims, & Abstract);
- Declaration and Power of Attorney:  
(1 Page of a  fully executed  unsigned Declaration);
- Drawing (3 sheets of  informal  formal sheets);
- Certified copy of GREAT BRITAIN application Serial No.9827182.8;
- Authorization Pursuant to 37 CFR §1.136(a)(3)
- Other: ;
- Assignment to U.S. PHILIPS CORPORATION.

12/06/99  
13675 U.S. PTO

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09/455124  
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FEE COMPUTATION


CLAIMS AS FILED				
FOR	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE - \$760.00
Total Claims	12 - 20 =	0	X \$18 =	0.00
Independent Claims	4 - 3 =	1	X \$78 =	78.00
Multiple Dependent Claims, if any			\$260 =	0.00
TOTAL FILING FEE . . . . .				\$838.00

Please charge Deposit Account No. 14-1270 in the amount of the total filing fee indicated above, plus any deficiencies. The Commissioner is also hereby authorized to charge any other fees which may be required, except the issue fee, or credit any overpayment to Account No. 14-1270.

Amend the specification by inserting before the first line as a centered heading --Cross Reference to Related Applications--; and insert below that as a new paragraph --This is a continuation-in-part of application Serial No. , filed , which is herein incorporated by reference--.

CERTIFICATE OF EXPRESS MAILING

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

BERNARD HUNT

PHB 34,306

Serial No.

Group Art Unit

Filed: CONCURRENTLY

Examiner:

Title: RADIO COMMUNICATION SYSTEM

Honorable Commissioner of Patents and Trademarks  
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APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:


**DICRAN HALAJIAN**

**(Registration No. 39,703)**

c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully



Jack E. Haken, Reg. 26,902  
Attorney of Record

Dated at Tarrytown, New York  
this 3<sup>RD</sup> day of December, 1999.  
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653027-423460

## DESCRIPTION

**RADIO COMMUNICATION SYSTEM**

5           The present invention relates to a method of operating a radio communication system, and further relates to such a system and to primary and secondary stations for use in such a system. While the present specification describes a system with particular reference to the emerging Universal Mobile Telecommunication System (UMTS), it is to be understood  
10       that such techniques are equally applicable to use in other mobile radio systems.

          In a radio communication system it is generally required to be able to exchange signalling messages between a Mobile Station (MS) and a Base  
15       Station (BS). Downlink signalling (from BS to MS) is usually realised by using a physical broadcast channel of the BS to address any MS in its coverage area. Since only one transmitter (the BS) uses this broadcast channel there is no access problem.

          In contrast, uplink signalling (from MS to BS) requires more detailed  
20       considerations. If the MS already has an uplink channel assigned to it, for voice or data services, this signalling can be achieved by piggy-backing, in which the signalling messages are attached to data packets being sent from the MS to the BS. However, if there is no uplink channel assigned to the MS piggy-backing is not possible. In this case a fast uplink signalling mechanism  
25       should be available for the establishment, or re-establishment, of a new uplink channel.

          In conventional systems, for example those operating to the Global System for Mobile communication (GSM) standard, fast uplink signalling is enabled by the provision of a random access channel using a slotted ALOHA  
30       or similar protocol. However, such a scheme works satisfactorily only with a low traffic load, and is not believed to be capable of handling the requirements imposed by third-generation telecommunications standards such as UMTS.

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To meet these requirements one UMTS embodiment includes a dedicated signalling channel, which comprises frames including a time slot for each MS registered with the controlling BS. If a MS requires a service from the BS it transmits a request in its allocated slot then waits for an acknowledgement from the BS setting up the required service. Parameters which characterise the performance of the signalling channel include the false alarm rate (where the BS erroneously identifies a MS as requesting a service), the missed detection rate (where the BS does not detect a request from a MS), and the delay between a request for a service by the MS and the provision of that service by the BS.

An object of the present invention is to improve the efficiency of the method by which a MS requests resources from a BS.

According to a first aspect of the present invention there is provided a method of operating a radio communication system, comprising a secondary station transmitting a request for resources to a primary station in a time slot allocated to the secondary station, characterised by the secondary station re-transmitting the request in at least a majority of its allocated time slots until an acknowledgement is received from the primary station.

This scheme improves the typical time for a response by the primary station to a request by a secondary station. Because there is no possibility of requests from different secondary stations colliding, a secondary station can retransmit requests in each allocated time slot. In contrast, in prior art systems a secondary station has to wait at least long enough for the primary station to have received, processed and acknowledged a request before it is able to retransmit.

Further, the primary station can improve the accuracy with which it determines whether a request was sent by a particular secondary station if the received signal strength is close to the detection threshold by examining the received signals in multiple time slots allocated to the secondary station in question.

According to a second aspect of the present invention there is provided a radio communication system comprising a primary station and a plurality of secondary stations, the primary station having means for allocating a time slot for a secondary station to transmit a request for resources to the primary station, characterised in that the secondary station has means for re-transmitting the request in at least a majority of its allocated time slots until it receives an acknowledgement from the primary station.

According to a third aspect of the present invention there is provided a primary station for use in a radio communication system, the primary station having means for allocating time slots to secondary stations for requesting resources, characterised in that the primary station has combining means for determining from a combination of received signals in a plurality of successive time slots allocated to the secondary station whether the secondary station has transmitted a request for resources.

According to a fourth aspect of the present invention there is provided a secondary station for use in a radio communication system including a primary station having means for allocating a time slot for the secondary station to transmit a request for resources to the primary station, characterised in that means are provided for re-transmitting the request in at least a majority of the allocated time slots until an acknowledgement is received from the primary station.

The present invention is based upon the recognition, not present in the prior art, that in a system having time slots allocated to a secondary station for requesting resources, improved performance can be obtained by the secondary station repeating the request until an acknowledgement is received.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a block schematic diagram of a radio communication system;

Figure 2 illustrates a possible frame format for a dedicated uplink signalling channel;

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