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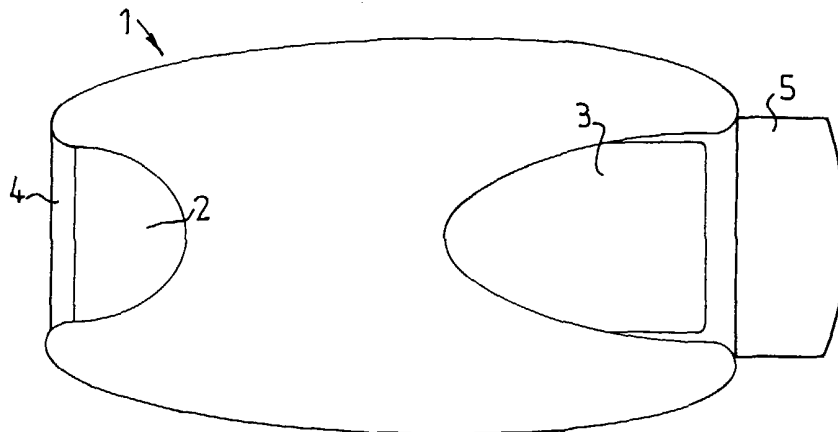
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A PORTABLE WIRELESS GATEWAY



(57) Abstract: A portable gateway is provided for constituting a wireless bridge between two wireless networks. The portable gateway (1) has at least one slot (2, 3), preferably two slots, for receiving an expansion card (4, 5) for providing wireless connectivity towards a selected wireless network. The gateway may be designed to be carried in a pocket or a briefcase, and can easily be adapted for communication towards any selected wireless network.



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A portable wireless gateway.

## TECHNICAL FIELD

The present invention relates to a gateway, and in particular to a gateway designed to constitute a wireless bridge between two wireless networks.

## BACKGROUND OF THE INVENTION AND PRIOR ART

Today, many types of different wireless networks exist. The different networks typically use different radio frequency transmission methods and specific communication protocols. Thus, when information is to be transmitted over two different networks from a transmitter to a receiver, the information must in most cases be translated or transcoded from a first format into a second format when the information is passed from the first network to the second network. Such a translation is usually performed by a so-called gateway. Hence, the gateway constitutes a communication bridge between the two different networks.

## SUMMARY

It is an object of the present invention to provide a new type of gateway enabling many new mobile applications, and for enhancing existing applications, by providing a bridge between different wireless communications environments.

This object and others are obtained by a portable gateway providing a wireless bridge between two wireless networks, in particular between a Bluetooth network and a Wireless Local Area Network (W LAN). The portable gateway may comprise a first wireless communication unit for communicating towards a first wireless network, a second wireless communication unit for communicating towards a second wireless network, and a format conversion unit for converting the format of

communicated signals between the formats used by the first and second wireless network, respectively.

According to the invention, the portable gateway has at least one slot, preferably two slots, for receiving an expansion card, sometimes referred to as a plug-in card, for providing wireless connectivity towards a selected wireless network. By way of example, the expansion card may be any of: a PC Card, a CompactFlash card and an SD (Secure Digital) card. By selecting one or two suitable expansion cards, the portable gateway may constitute a wireless bridge between any selected wireless networks.

The new applications, and the existing applications, may, in particular, include devices such as mobile phones, Personal Digital Assistants (PDA's), or other mobile devices, equipped with Wireless Application Protocol (WAP) and means for Bluetooth connectivity.

For these and other devices, the gateway as described herein will enable new mobile Internet applications, in particular such applications requiring transmission speeds in the range of approximately 100kbit/s to 1 Mbit/s. Also, future applications will involve even higher transmission speeds.

These and other mobile applications are enabled by using one wireless network, such as Bluetooth, as the carrier for the Internet access of the device by communicating to the gateway, which is, in turn accessing the Internet, by another wireless network, e.g. by means of a W LAN.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described in more detail and with reference to the accompanying drawings, in which:

- Fig. 1 is a view from above of a gateway.
- Fig. 2 is the view in Fig.1 of the gateway having its cover removed.
- Fig. 3 is a cross section of the gateway in Figs. 1 and 2.
- Fig. 4 is a schematic block diagram of a portable gateway.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1, a view from above of a portable gateway 1 is shown. The gateway 1 comprises two slots 2 and 3 for receiving an expansion card, also referred to as a plug-in card, for providing wireless connectivity. Each expansion card then constitutes a wireless communication unit for communicating towards a selectable wireless network. The expansion card is in this example a PC Card (PCMCIA), but may alternatively be a CompactFlash card or an SD (Secure Digital) card. The invention is thus not limited to any particular expansion card. In this example, each of the two slots 2 and 3 receives a PC Card 4 and 5, respectively. The PC Card slots are located on two different sides facing each other, and preferably, the gateway has an elongated shape. The size of the gateway 1 is preferably large enough for encompassing the PC Cards, but small enough to fit inside a pocket or a small briefcase. In a preferred embodiment, the gateway is designed as a thin, essentially rectangular, unit having the measures of only 142x78x28 mm.

In Fig. 2, the gateway 1 is shown with its cover being removed. Further, the gateway comprises a battery 6 and a control unit 7, as shown in Fig. 3.

The first PC Card 4 provides an interface towards a first wireless network, for example a Bluetooth network, and the second PC Card 5 provides an interface towards a second

wireless network, for example a W LAN network or a GSM/GPRS network or a UMTS network.

In another preferred embodiment, one of the interfaces towards the wireless networks is a wireless communication unit integrated in the portable gateway 1. Thus, the gateway may have only one slot for receiving an expansion card. For example, if the gateway is designed to always be connected to a Bluetooth network and to be connected to another wireless network, which may be selected, or if the gateway has some specific requirements, i.e. a smart card with a subscription identification module, SIM, or any specific security application, the gateway may have an integrated permanent communication unit providing an interface to the Bluetooth network, and only one expansion card slot for providing an interface to the other selectable wireless network.

Fig. 4 illustrates schematically a portable gateway in accordance with the invention. The portable gateway 400 comprises a first wireless communication unit 402, including an antenna 404, for communicating towards a first wireless network, not shown, and a second wireless communication unit 406, including an antenna 408, for communicating towards a second wireless network, likewise not shown. In one embodiment, each of the wireless communication units 402 and 406 may comprise a selectable expansion card, not shown in Fig. 4, inserted into a card slot as described above, for providing communication towards a corresponding selected wireless network. In another embodiment, one of the wireless communication units 402, 406 may be an integrated wireless communication unit for communication towards a predetermined wireless network. The antennas 404, 408 may be integrated with the communication units 402, 406 or may be separate antennas connected thereto.

The gateway 400 further comprises a format conversion unit 410 for converting the format of communicated signals between the formats used by the first and second wireless network, respectively. The format conversion typically involves transcoding of the signals. The battery 6 and the control unit 7 shown in Fig. 3 are not shown in Fig. 4.

For portable gateways between two wireless systems, undesired signal interference may in some circumstances occur between the signals from the two antennas 404, 408, being used for access to the two wireless networks. This may be the case if the two antennas are mounted in close proximity, e.g. if the gateway is using two expansion cards having integrated or extending antennas, in particular if one card is placed on top of the other. Thus, in the case when two expansion cards are used, such signal interference may be avoided, or at least reduced, by locating the expansion cards, with the antennas located on opposite sides of the portable gateway a maximum distance apart.

In the preferred embodiment of a gateway shown in Fig. 1, using two expansion cards, this is achieved by designing the slots in one plane, but with their entry slots maximally separated, resulting in a maximum distance between the antennas used for communication towards the two wireless networks.

This may also be the case, when using one expansion card for access to a selected wireless network, and an integrated or extending antenna for access to a predetermined wireless network, if the respective antennas are not located on opposite sides of the portable gateway.

Likewise, in the case when one expansion card is used, it is advantageous to arrange the antennas on opposite sides of the portable gateway, with a maximum distance apart.

The invention as described herein may be used for providing a wireless access method towards the Internet for mobile phones (or PDA's), which is fast, and can be charged at flat rate.

By providing this alternative method of Internet access, the device as described herein will enhance many new applications, such as WAP (over Bluetooth, including voice/audio), enable Music (MPEG-3), streaming Video and Image telephony (MPEG-4), in mobile phones (or PDA's), and many other Internet applications requiring 0.5-1 Mbit/s.

While the invention has been described with reference to specific exemplary embodiments, the description is only intended to illustrate the inventive concept and should not be taken as limiting the scope of the invention. Various alternatives, modifications and equivalents may be used without departing from the spirit of the invention, which is defined by the appended claims.

## CLAIMS

1. A gateway for providing a bridge between a first network and a second network, **characterised in** that the gateway is portable and provides a wireless bridge between the first and second networks, which are wireless networks, and that the gateway further comprises at least one expansion card slot for receiving an expansion card constituting a wireless interface towards one of the wireless networks.

2. A gateway according to claim 1, **characterised by** a first wireless communication unit for communicating towards the first wireless network, and a second wireless communication unit for communicating towards the second wireless network, wherein at least one of the first and second communication units comprises an expansion card.

3. A gateway according to claim 1 or 2, **characterised in** that the gateway comprises two expansion card slots for receiving two expansion cards, each constituting a wireless communication unit as an interface towards one of the wireless networks.

4. A gateway according to claim 1 or 2, **characterised in** that the gateway comprises one integrated communication unit as an interface towards a predetermined wireless network, and that the gateway further comprises one expansion card slot for receiving an expansion card constituting a wireless communication unit as an interface towards a selected wireless network.

5. A gateway according to any of claims 2 - 4, **characterised in** that each of the wireless communication units includes an



antenna, and that the two antennas are positioned on opposite sides of the gateway, thereby spacing the antennas apart maximally.

6. A gateway according to claim 5, wherein two expansion card slots are used for receiving two expansion cards, **characterised in** that the antennas of the expansion cards are spaced apart by placing the two expansion card slot entries on different sides of the gateway.

7. A gateway according to any of claims 1 - 6, **characterised in** that one of the wireless networks is a Bluetooth network, and the other is a Wireless Local Area Network.

8. A gateway according to any of claims 1 - 6, **characterised in** that one of the wireless networks is a cellular wireless network.

9. A gateway according to claim 8, **characterised in** that the cellular network is a GSM (Global System for Mobile communication), or a GPRS (General Packet Radio Service), or a UMTS (Universal Mobile Telecommunications System) network.

10. A gateway according to any of claims 1 - 9, **characterised in** that the expansion card(s) is any of: a PC Card, a CompactFlash card and an SD (Secure Digital) card.

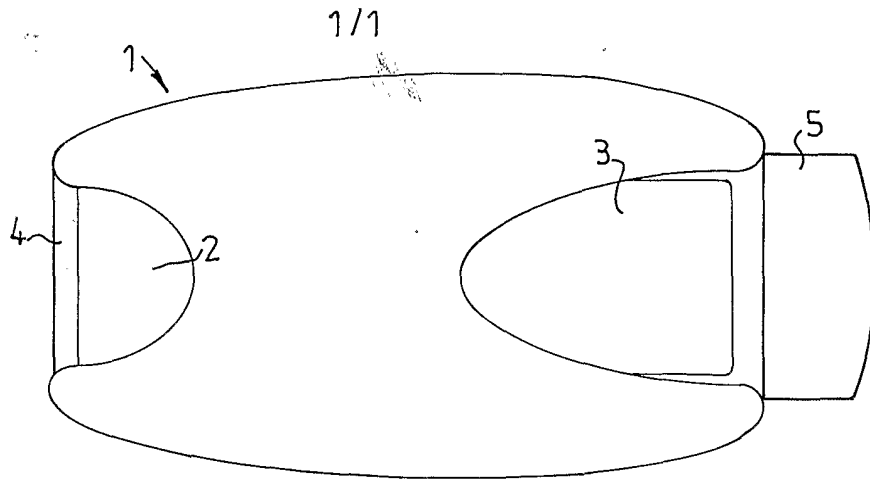


FIG. 1

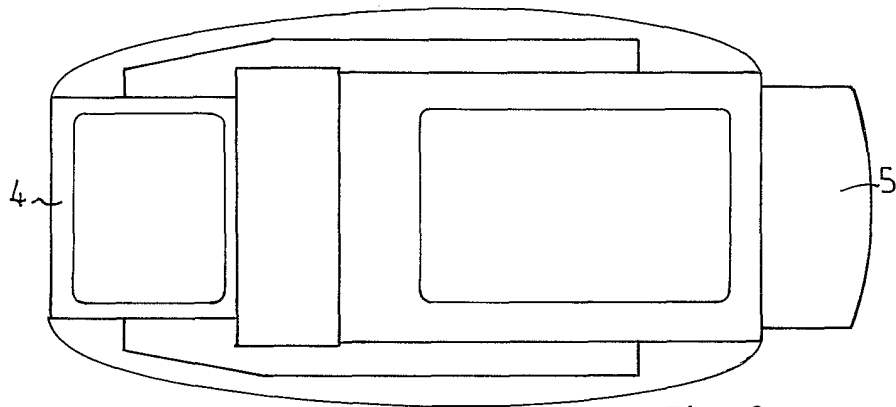


FIG. 2

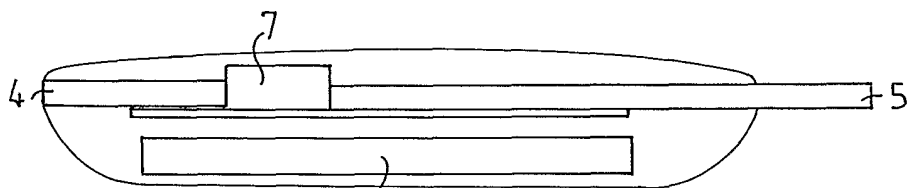


FIG. 3

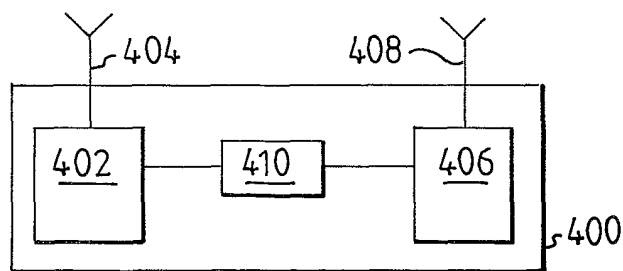


FIG. 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02058

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 0103392 A1 (KONINKLIJKE PHILIPS ELECTRONICS N.V.), 11 January 2001 (11.01.01), abstract --	1-4,7-10
A	WO 9933226 A1 (COVELEY ET AL), 1 July 1999 (01.07.99), page 1, line 25 - page 3, line 28 --	1-10
A	EP 0300350 A2 (MATSUSHITA ELECTRIC INDUSTRIAL CO LTD), 25 January 1989 (25.01.89), column 1, line 15 - column 2, line 30 --	1-10
A	A 9701940 A1 (PHILIPS NORDEN AB), 16 January 1997 (16.01.97), abstract --	1-10

 Further documents are listed in the continuation of Box C. See patent family annex.

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International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

06/11/01

International application No.

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A	5968123	A	19/10/99	NONE		