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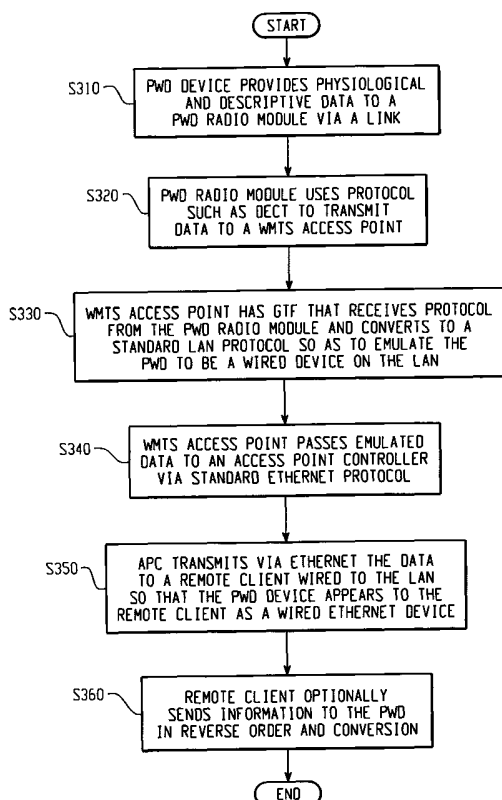
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(54) Title: INTERMEDIATE DISTRIBUTION FRAME (IDF) FOR MEDICAL DATA BY USING A SMART IP EMULATING  
DETECTION AP



(57) Abstract: An emulation Access Point, method and system for providing an Intermediate Distribution Frame (IDF) for transmission between a wireless device and a remote client on a wired Local Area Network (LAN) includes a protocol stack having a wireless device radio module adapted for communication with the wireless device. An emulation Access Point is adapted for communication with the wireless device radio module, and an Access Point Controller is adapted for communication with both the Access Point and a remote client. The emulation Access Point includes a Gateway Translation function (GTF) module that is adapted for receiving data from the wireless device radio module, the data being transmitted in a local protocol by a local protocol receiving unit, and translating the data to a standard protocol by the standard protocol unit that is transmitted to the remote client. The remote client sees an emulated wired device on the LAN instead of a wireless device from a WLAN. The emulation Access Point, while being adapted to receive a streamlined PWD, is also adapted to be permit communication from conventional PWDs to the remote client, so that hospitals, etc., won't have to completely replace their PWDs all at once.



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## INTERMEDIATE DISTRIBUTION FRAME (IDF) FOR MEDICAL DATA BY USING A SMART IP EMULATING DETECTION AP

### DESCRIPTION

The present invention relates to wireless based and Ethernet-Internet capable Access Point (AP) virtual medical devices, such as bedside monitors. More particularly, the present invention relates to an improvement in wireless medical telemetry systems (WMTS) transmission involving Access Point emulation.

5

There are known communication systems, such as wireless medical telemetry systems (WMTS), that are used to monitor patient physiological parameters, such as cardiac signals, over a relatively short distance via radio-frequency between the patient, who is wearing a transmitter, and a central monitoring site or station. The FCC has broadened the definition of WMTS to include the measurement and recording of physiological parameters and other patient related information via radiated bi-directional or uni-directional electromagnetic signals, and has limited WMTS users to authorized healthcare providers, including doctors, healthcare facilities, hospitals and other medical providers.

DECT (Digital Enhanced Cordless Telecommunication standard), which was originally adapted in Europe as a standard for replacing various analog and digital standards for items such as cordless telephones. DECT, which is a microcellular, digital mobile radio network that can be used for high subscribers densities, is well suited for use in buildings, particularly in hospitals where information must be exchanged quickly and accurately among non-stationary persons, such as doctors, nurses, patients, interns, specialists, etc.. DECT is also used in the United States with certain variations of standards adopted in Europe.

20

In the art, a wireless LAN bridge is considered to be a device that connects two networks that may use the same (or a different) Data Link Layer protocol (for example, layer 2 of the OSI model). LAN bridges have ports that connect two or more LANs that would otherwise be separate.

One of the ports of the bridge receives packets and re-transmits them on another port. In general, a bridge does not start transmission until it receives a complete packet.

Bridges, as compared with Access Points, (which connect multiple users to each other on a wireless LAN and to a wired network) are typically less expensive than Access Points as their primary function is to connect other networks. Access Points often require functions not required by bridges because APs provide authentication, de-authentication, association, disassociation, re-association, distribution, MAC service data unit delivery, integration, and privacy services. There is some overlap, for example, in the case of a WLAN bridge adapted to interface with an Ethernet network directly to a particular access point AP, whereby a WLAN bridge plugs into the Ethernet network and uses 802.11 to communicate with an Access Point that is within range.

In recent years, in an attempt to reduce bandwidth requirements, WMTS-DECT-based and Ethernet capable Access Points (APs) have been operating as a WLAN-LAN bridges, thereby shifting the emulation of upper layer functions to the low end devices, which pay the price in terms of bandwidth and power consumption.

For example, state of the art APs, especially "off-the-shelf" (OTS) APs, operate as WLAN-LAN bridges that cause the above mentioned services to be burdened on the low end devices. Present proprietary technology attempts to solve the problem but requires a limited scale AP and requires a cost-performance ineffective "Gateway" to provide the bridged gateway functionality. Moreover, the use of a bi-directional, cellular wireless technology such as DECT still does not reach significant cost-effectiveness. There have been other failed attempts to move the AP emulation to concentrators, which then become very complex to manage and scale. Alternatively, emulation burdens can be placed on a device-connected emulating transceiver, which not only fails to improve scalability but increases (rather than decreases) per-bed costs. Thus, there is a need in the art to overcome some of the problems previously mentioned.

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The present invention provides for a highly efficient, scaleable, cost-effective, proprietary implementations, that would likely be based on industry standards such as, for example, ISO 11073/IEEE 1173.

According to the present invention, a wireless WMTS, DECT-based and Ethernet capable  
5 Access Point (AP) emulates a virtual medical device (VMD), so that overall bandwidth resulting from Ethernet and Internet compatibility is reduced to the extent that scalability and throughput is significantly improved over conventional APs. One of the many advantages of the present invention is that existing PWD (Patient Wearable Devices) can continue to operate in their current mode and communicate with the Access Point, so that customers can integrate newer PWDs  
10 compatible with the present invention while still being able to use their existing PWDs. The new PWDs, many of which will not need any conversion software because the Access Point is performing the emulation, will have reduced bandwidth and power requirements as compared to the older PWDs.

15

Fig. 1 is an illustration of a Data protocol model of communication between a convention wireless Patient Wearable Device (PWD) and a remote site attached to a wired LAN via an emulating Access Point according to the present invention.

Fig. 2 is an extended Data Protocol Model according to the present invention showing the  
20 Gateway Translation Function module when Patient Wearable Devices take advantage of the conversion capabilities of the emulating Access Point according to the present invention.

~~Figs. 3A and 3B~~ illustrates a method of operation according to the present invention.

Fig. 1 illustrates a model of a Data protocol model with a conventional Patient Wearable Device communicating with a remote site on a wired remote LAN via an emulating Access Point, according to the present invention.

In order to appreciate the advantages of the present invention, it is necessary to some  
5 describe some of the components and the functions of the Data Protocol Model shown in Fig. 1, as many of these components and functions are operative in the Data Protocol Model according to the present invention (and shown in Fig. 2). The PWD in Fig. 1 is conventional in the sense that it utilizes a great deal of bandwidth and power. However, the PWD in Fig. 2 is different in that any conversion/emulation actions are made at the Access Point, so that the wireless communication is  
10 transparent to the wired LAN, and the remote client thinks that the PWD is merely another node attached to the LAN. Thus the PWD's in Fig. 2, while appearing to be the same as the one on Fig. 1, differ in that they use less power and require less bandwidth than current PWDs. Yet to the remote client, the PWDs appear to be the same (a wired device) because the Access Point takes over the emulation. Thus, future WLANS may have both types of PWDs. However, it is expected  
15 that PWD manufacturers would not continue to duplicate circuitry that has now been made unnecessary by the nature of the emulating Access Point, as the PWDs could potentially substantially reduce their costs, as well as their size and required bandwidth use.

The protocol stack 105 provides data transport between the portable device (PWD or PBM) and a remote end point (such as a PIC) or a central database server. The protocol stack  
20 allows for data to be returned in the reverse direction at the same rate as sent in the forward direction. In addition, local control messages can be multiplexed across the various communication links. These protocols are split into three area, upper, lower and physical. The back haul system only has knowledge of the lower and physical layers.

A typical data transfer sequence from the portable device 105 though the WMTS 110 to  
25 the remote client 120 is as follows:

(1) Data is passed to the lower layer protocols for transport over the UDP (User Datagram Protocol), IP (Internet Protocol) or raw Ethernet data streams. UDP is a lightweight transport

normally built on top of that enhances performance from IP by not implementing some of the features of a heavyweight protocol, for example, by allowing individual packets to be dropped without retry, and/or for the packets to be received in a different order than transmitted.

(2) The header compression sub-module 108 compresses the UDP/IP/Ethernet headers into a light-weight header by removing static information that is already known to the AP.

(3) The high level packet is fragmented into a number of smaller packets for transmission across the DECT air link and is merged with any local control data. This fragmented packet information is then passed across a serial link between the portable device main board and the PWD radio module 107.

(4) The individual data packets are recovered by the PWD radio module 107 and control information that is to be used locally is then extracted. The data packets are then passed over the air to the access point through the DECT stack. The "ARQ" layer provides a retry mechanism for error correction.

(5) At the Access Point 110, the small DECT packets are combined to form the network packet. The lightweight header is then expanded back into the full UDP/IP and Ethernet MAC headers. The whole packet is then encapsulated into a Harmony UDP/IP frame and passed to the APC. Control data can also be exchanged between the APC and AP using the complaint UDP/IP frames.

(6) At the Access Point Controller (APC) 115, the packet is de-encapsulated and passed to the remote end point 120, via standard LAN protocols .

(7) The remote end point receives the data and uses it as required. From the perspective of the remote end point, the data appears to have originated from a portable device which is attached to the wired network.

It should be noted that when transmitting in the opposite direction from the PIC to the portable device, the protocol functions in the same manner.

At the time of manufacture, the device has a unique Ethernet address allocated to each radio module and each access point. The radio module (or access point) then uses a mapping rule,

such as using the low 20 bits of the Ethernet MAC address to calculate is unique radio identity. The Ethernet MAC address is registered in a normal way. The radio identity must be unique among all radio devices manufactured, but does not need to be registered with an external body.

Conventional WMTS is purely a network transport mechanism, and does not have any  
5 knowledge of the type of data being passed. All of the knowledge regarding the type of data passed is held by the applications running at either end point on the link. WMTS network transport is primarily intended to support IP protocols, as defined in STD 5 OF IEEE.

With regard to Dynamic data, the AP caches dynamic data that primarily allows it to resolve IP addresses into Ethernet address (i.e. routing tables). This information is passed between  
10 the APs during hand over, and could be corrupted during transmission. If this data cache is lost or corrupted then its contents can be refreshed from the network. The impact on WMTS is that data may be delayed while address resolution takes place. However, the fact that the wired networked is approximately 10,000 times faster than the wireless network means that this delay will have minimal or no impact at all on system performance.

15 Fig. 2 illustrates an extended data protocol model according to the present invention. Here, the portable device 205 communicates with a remote client 220 via a protocol stack 201 that includes a PWD radio module 207, a WMTS Access Point 210 and a Standard Access Point Controller 215.

WMTS Access Point 210 includes a Gateway Translation Function (GTF) module 212 that  
20 is required to provide format translations functions between a local protocol 212a of a device, and a standard protocol, for example IEEE 1073. Thus, the local protocol communicates with the device, and the standard protocol is used for communication in the network. Alternatively, with standardization, the local protocol may be replaced with a Standard WMTS AP protocol. The WMTS Access Point 210 typically receives information from the PWD via DECT, and  
25 communicates with the remote client 220 via Ethernet, which is typically wired Ethernet. However, the present invention is not limited to wired Ethernet, or a wired network, and totally wireless network could be used, and/or wireless Ethernet. It is envisioned that there may be

WLANs with old-style PWDs that provide emulation and much lighter, smaller and less expensive PWDs that have their emulation performed by the AP.

The Gateway Translation Function Module 212 according to the present invention emulates the upper layered functions of the network so that Ethernet packets can be sent from the PWD to the remote client end-to-end without the PWD devices being loaded down with emulation capabilities. The prior art PWD devices needed to emulated transmission into a standard protocol for transmission through standard WLAN-LAN bridges. For the most part, standard WLAN-LAN bridges merely allow the information to pass through without any manipulation/conversion.

An advantage of the present invention is that the local PWD devices do not need as much bandwidth to emulate the upper layer Ethernet functions because the GTF will convert their protocol into standard protocol at the WMTS Access Point. Nor do the local devices need as much power as the complexity of their transmission is reduced. Thus, the WMTS Access Point of the present invention operates as a Virtual Medical Device that performs the emulation instead of having every single PWD device have such capabilities engineered into them.

The standard protocol in the GTF may comprise or be based on a bona fide medical device industry standard in the case of wireless medical devices communicating with a remote LAN via, for example, DECT, to an emulating AP. A less costly alternative is also to provide Ethernet-Internet compatible low-end telemetric device bridging capability, where for example, the device may communicate using TCP/IP and the network uses Ethernet.

~~Figs. 3A and 3B~~ illustrates a method of operation according to the present invention. It should be understood that certain protocols, such as DECT and Ethernet, are chosen for explanatory purposes and the claimed invention is in no way limited to such protocols or equivalents thereof, as any type of WLAN-LAN communication benefits from the advantages of the present invention. First, a PWD device periodically transmits (via a PWD radio module) physiological data in packets according to a local protocol, such as DECT transmissions via TDMA. Second, the information is received by a WMTS Access Point have a GTF module therein. At the GTF module, the local protocol is emulated (i.e. converted) into a standard

protocol such as IEEE 802.3. Third, the Access Point controller then provides the information to a remote client (such as a central site of a hospital) via Ethernet protocol. Thus, a WLAN to wired LAN transmission conversion has been made, as to the remote client, it appears that the PWD is a wired device on the network transmitting under standard Ethernet protocols.

5           The present invention also offers advantage in terms of scalability and increased throughput, as the burdens of emulation are removed from the devices. In the field of wireless medical telemetry, as the costs per PWD device go down, the greater will be the ability to afford to medically monitor more than just hospital/hospice patients. For example, anyone with a heart problem could potentially have a PWD device that would periodically transmit information to a  
10   remote network, and in the case that the physiological responses were out of range, anything from beeping to the patient to call their doctor to dispatching an ambulance is possible. However, so long as individual PWD device are required to emulate high level network capabilities to communicate with a remote site, this goal would remain elusive. The present invention provides a means to reduce the size, power consumption and bandwidth use of PWDs by off shifting the emulation to  
15   another part of the network, typically the Access Point.

          Various modifications may be made to the present invention by a person of ordinary skill in the art that lies within the spirit of the invention and the scope of the appended claims. For example, the transmission standards, such as DECT, could be substituted for a different standard according to need. The TDMA transmission could be replaced with CDMA, GSM, FMDA, etc.  
20   The PWD could, for example, use Bluetooth, or a version of 802.11, may or may not operate on UWB frequencies. The remote client is typically wired via Ethernet cable, such as Cat-5/Cat-5 (or another category according to need), but the network could be a fiber optic network that does not employ Ethernet, or for some unknown reason, uses Token Ring. The standards and protocols discussed were provided in accordance with a preferred operation of the invention, but do not limit  
25   the claimed invention to only those disclosed.

**CLAIMS**

Having thus described the preferred embodiments, the invention is now claimed to be:

1. A method for an Access Point to emulate a standard transmission protocol used in a Local Area Network (LAN) so as to permit Wireless Local Area Network devices to communicate  
5 with devices wired to a Local Area Network communications, comprising the steps of:

(a) transmitting by at least one wireless device at least a portion of a data packet to an Access Point of a Local Area Network, wherein the transmitting by said at least one wireless device according to a local protocol and does not emulate a protocol of the Local Area Network;

(b) receiving the transmission from the wireless device by an emulation Access Point  
10 comprising a Gateway Function Translation module, the emulation Access Point providing said at least a portion of a data packet to a Gateway Function Translation module;

(c) converting of said at least a portion of the data packet transmitted by the wireless device in local protocol of the Gateway Function Translation module to a standard operating protocol of the LAN, wherein the emulation Access Point forwards the at least a portion of the data packet  
15 converted to standard operating protocol to an Access Point Controller; and

(d) providing by the Access Point Controller said at least a portion of the data packet to a remote client via standard operating protocol, said Access Point Controller emulating sending the data to the remote client via standard protocol so that the remote client responds as if the at least a portion of the data packet sent by the wireless device appears to be from a wired device on the  
20 LAN.

2. The method according to claim 1, further comprising:

(e) the remote client providing a response to the wireless device that is transmitted to the wireless device in reverse order of steps (a) to (d).

25

3. The method according to claim 1, wherein the at least one wireless device recited in step (a) comprises a Patient Wearable Device (PWD) for monitoring physiological responses of a patient.

5           4. The method according to claim 3, wherein a second Patient Wearable Device emulates a standard protocol of the LAN before transmitting to the emulation Access Point.

5. The method according to claim 3, wherein the PWD comprises a heart monitor.

10           6. The method according to claim 3, wherein the PWD comprises a blood pressure monitor.

7. The method according to claim 1, wherein the local protocol comprises a Wireless Medical Telemetry System (WMTS)/ Digital Enhanced Cordless Telecommunications (DECT)  
15   standard of wireless transmission.

8. The method according to claim 7, wherein the DECT is transmitted via one of TDMA, CDMA, FDMA. GSM.

20           9.     The method according to claim 1, wherein the local protocol comprises an IEEE 802.11 wireless protocol.

10. The method according to claim 1, wherein the standard protocol comprises Ethernet protocol.

25

11. The method according to claim 1, wherein the standard protocol comprises fiber optic communication protocol.

12. An emulation Access Point for providing an Intermediate Distribution Frame (IDF) for transmission between a wireless device and a remote client on a wired Local Area Network (LAN), comprising:

5        a protocol stack 201 comprising a wireless device radio module 207 adapted for communication with a wireless device, an Access Point 210 adapted for communication with the wireless device radio module 207, and an Access Point Controller 215 adapted for communication with both the Access Point 210 and a remote client 220;

      wherein the Access Point comprises a Gateway Translation function (GTF) module that is  
10       adapted for receiving data transmitted in a local protocol by a local protocol receiving unit 212a from the wireless device radio module 207, and translating the data to a standard protocol by the standard protocol unit 212b that is transmitted to the remote client.

13. The emulation Access Point according to claim 11, wherein the standard protocol unit  
15       translates the local protocol into an Ethernet protocol.

14. The emulation Access Point according to claim 11, wherein the standard protocol unit translates the local protocol into an IEEE 1073 protocol.

20       15. The emulation Access Point according to claim 11, wherein the remote client is wired to a LAN, and said Access Point performs WLAN-LAN communication by emulating LAN standard protocol translated by the GTF.

16. The emulation Access Point according to claim 11, wherein the local protocol  
25       comprises Wireless Medical Telemetry/Digital Enhanced Cordless Telecommunications (WMTS/DECT).

17. The emulation Access Point according to claim 11, wherein the local protocol comprises wireless transmissions according to IEEE 802.11.

18. A WMTS/DECT medical monitoring system that is adapted for a Wireless-LAN  
5 communicating with a wired-LAN, comprising:

a plurality of wireless patient wearable devices (PWD) that monitor a physiological response of a patient;

at least one or more of the plurality of PWDs having a respective PWD radio module for transmitting/receiving data, wherein the PWDs transmit using a local protocol to a remote client  
10 that is wired to a LAN and communicates via a standard protocol comprising one of an Ethernet protocol and IEEE 1073 medical protocol, wherein the PWD radio module does not emulate the standard protocol; and

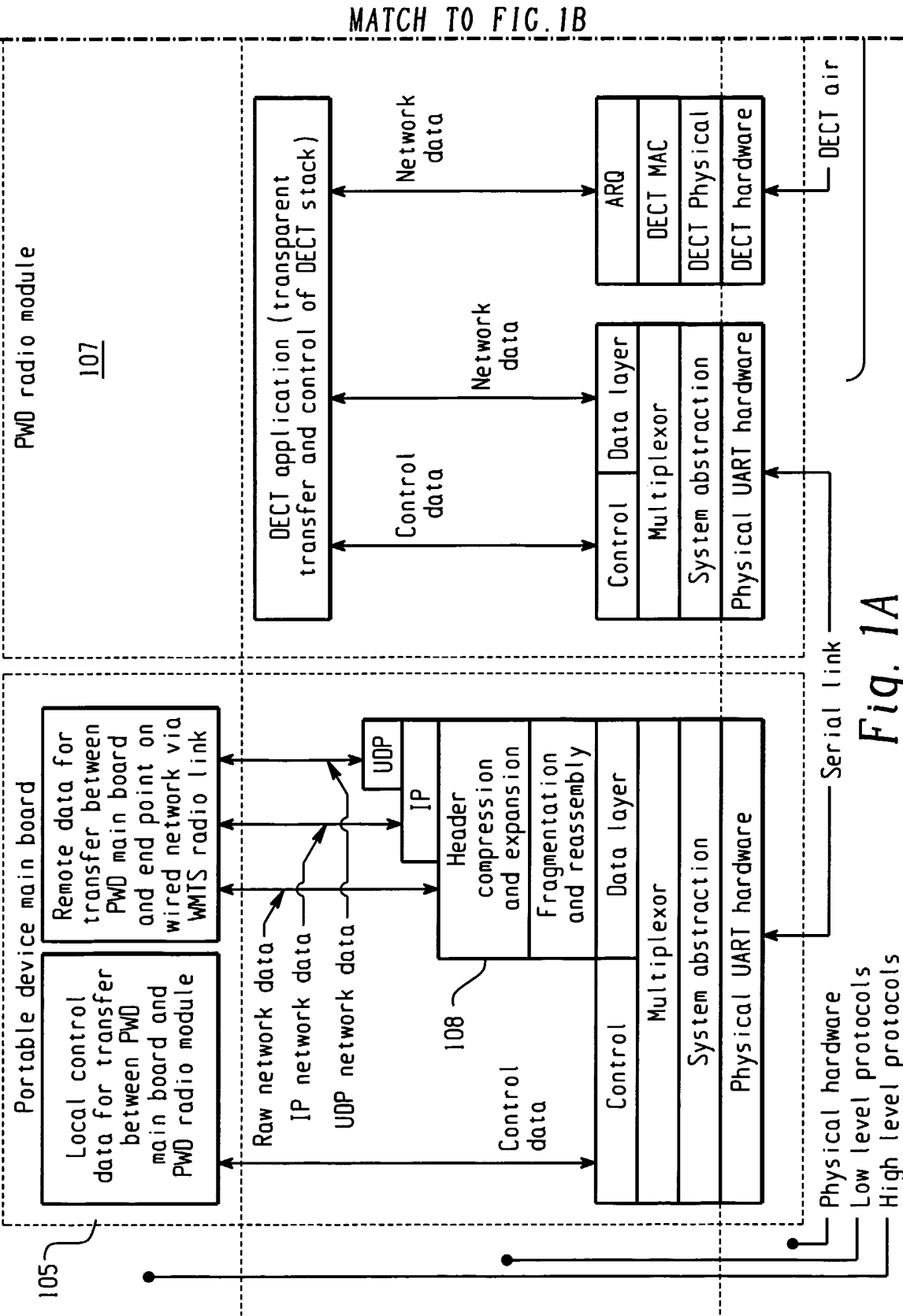
a Wireless Medical Telemetry System (WMTS) emulation Access Point for receiving the standard protocol transmissions from said at least one or more PWD radio modules Access Point  
15 further comprising a Gateway Translation Function Module (GTF) that translates the local protocol used by the PWD radio modules into standard protocol used by the remote client 220.

19. The system according to claim 18, wherein the local protocol transmitted by the PWDs comprises a WMTS/DECT standard using one of TDMA, FDMA, CDMA and GSM.

20

20. The system according to claim 18, wherein the local protocol transmitted by the PWDs comprises 802.11.

21. The system according to claim 20, wherein wireless transmissions utilize an Ultra-  
25 Wide Band UWB frequency.



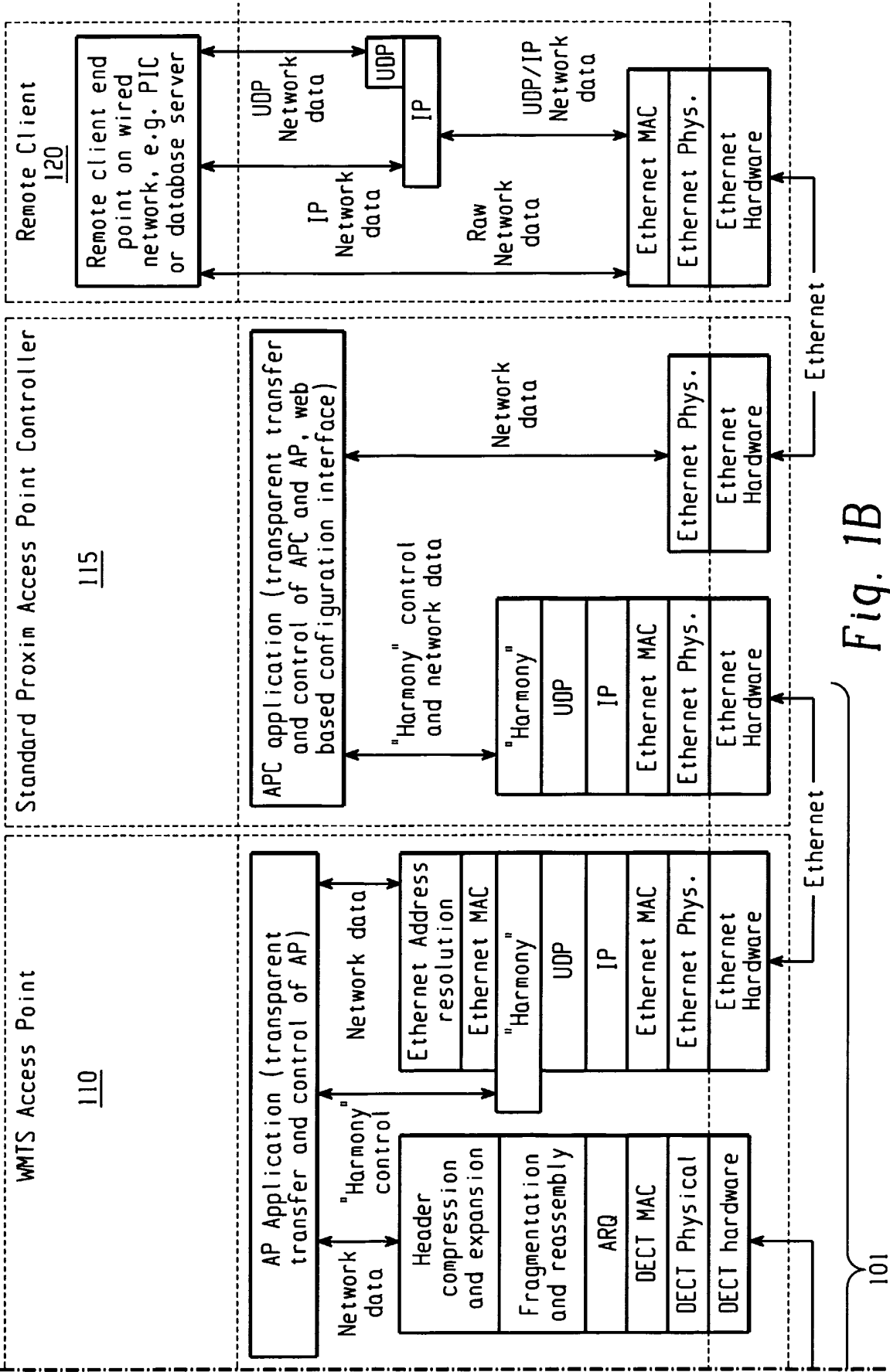
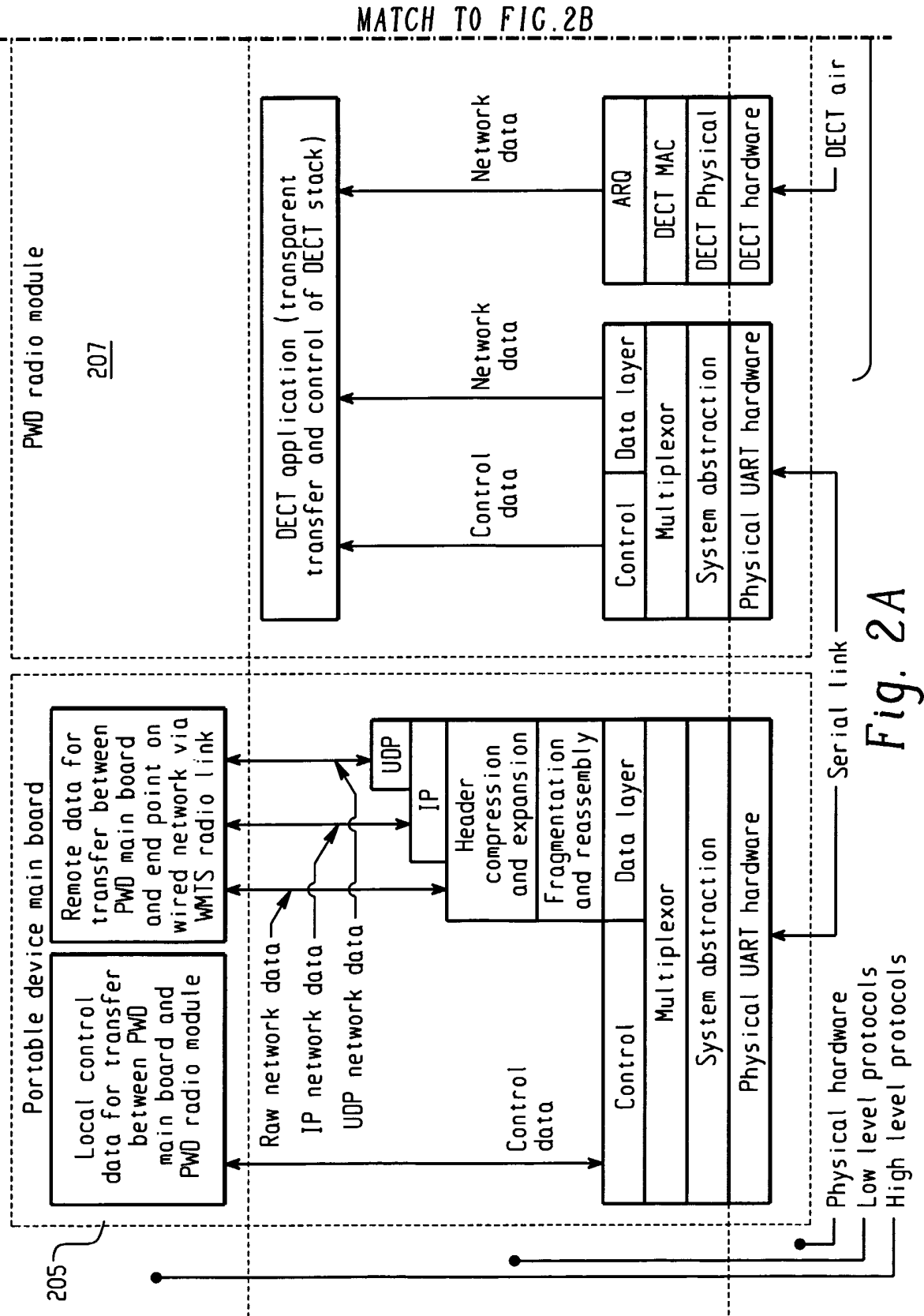


Fig. 1B



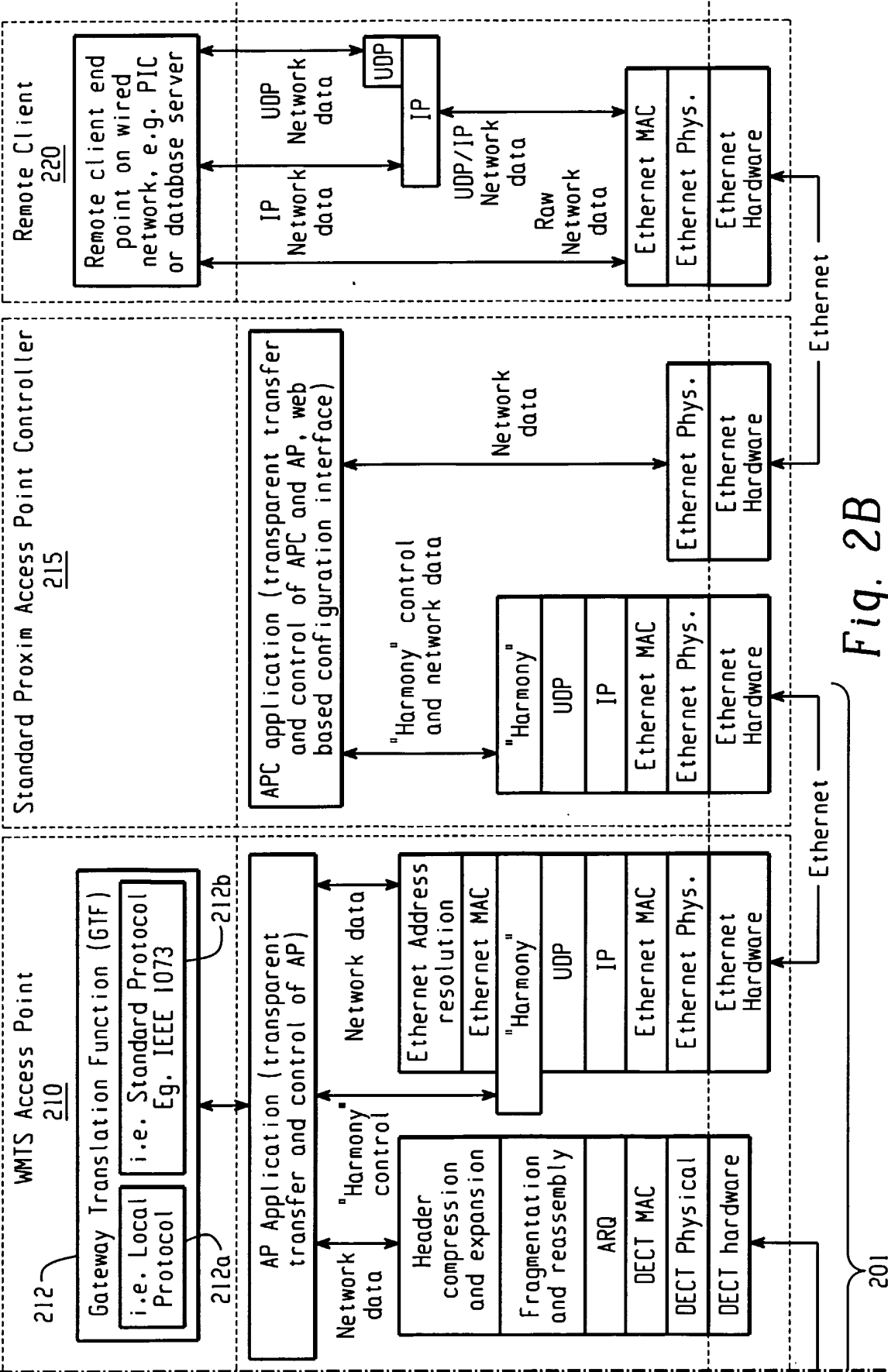
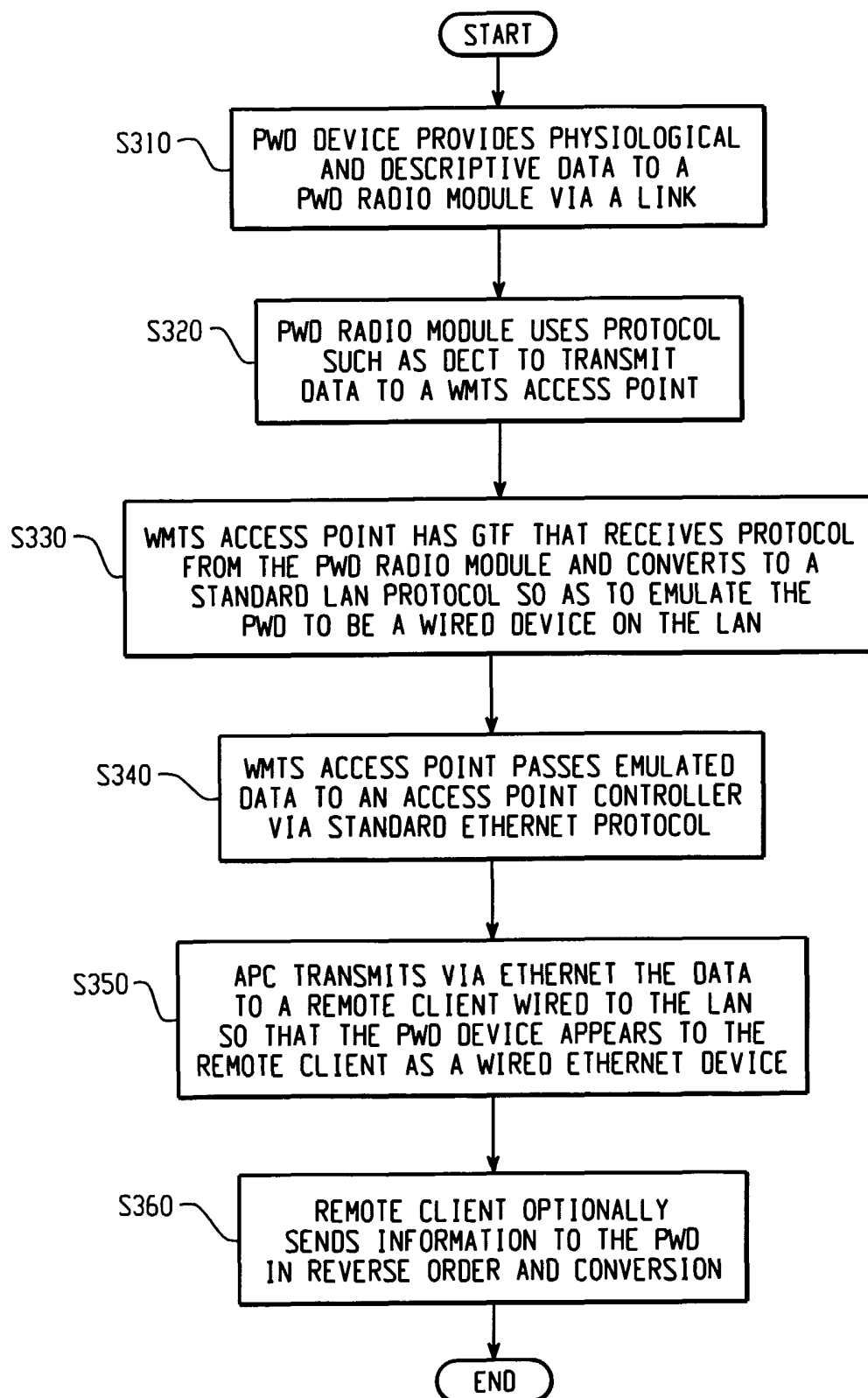


Fig. 2B

MATCH TO FIG. 2A

*Fig. 3*

# INTERNATIONAL SEARCH REPORT

International Application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04L12/28 A61B5/00

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)  
IPC 7 H04L A61B

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

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

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 616 606 B1 (PETERSEN ERIC G ET AL) 9 September 2003 (2003-09-09)	1-3, 5-13, 15-17
Y	abstract  figures 2,4 column 5, line 44 - line 48 column 6, line 52 - column 7, line 7 column 1, line 20 - line 24 column 7, line 58 - line 65 column 2, line 55 - line 63 column 4, line 65 - column 5, line 19 column 3, line 66 - column 4, line 2 ----- -/--	4,14, 18-21

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*A\* document defining the general state of the art which is not considered to be of particular relevance
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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2005/050057

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 944 659 A (FLACH ET AL) 31 August 1999 (1999-08-31)	1-3,5,6, 8,10-13, 15 19
A	abstract column 1, line 16 - line 31 column 7, line 14 - line 36 column 9, line 18 - line 25 column 9, line 40 - column 10, line 14 column 18, line 3 - line 19 tables 1,2 -----	
X	US 6 659 947 B1 (CARTER SCOTT J ET AL) 9 December 2003 (2003-12-09)	1-3, 5-10,12, 13,15-17
A	column 1, line 45 - line 51  column 7, line 59 - column 8, line 25 column 5, line 18 - line 21 column 11, line 62 - column 12, line 55 column 3, line 31 - line 38 column 7, line 16 - line 20 column 8, line 22 - line 26 -----	4,14, 18-20
Y	MEDICAL INFORMATION BUS (MIB) COMMITTEE OF THE IEEE ENGINEERING IN MEDICINE AND BIOLOGY SOCIETY: "IEEE Std 1073-1996, IEEE Standard for Medical Device Communications?Overview and Framework" IEEE STANDARD, 3 October 1996 (1996-10-03), pages 1-19, XP002324852 NEW YORK, USA paragraphs 'B.2.!', 'B.4.!' ; figures B.2,B.4 -----	4,14, 18-21
A	STEVE WARREN, JIANCHU YAO, RYAN SCHMITZ, LUKE NAGL: "Wearable Telemonitoring Systems Designed with Interoperability in Mind" PROCEEDINGS OF THE 25TH ANNUAL INTERNATIONAL CONFERENCE OF THE IEEE EMBS, 17 September 2003 (2003-09-17), pages 3736-3739, XP002324635 CANCUN, MEXICO the whole document -----	4,14, 18-21
A	JIANCHU YAO, RYAN SCHMITZ, STEVE WARREN: "A Wearable Standards-Based Point-of-Care System for Home Use" PROCEEDINGS OF THE 25TH ANNUAL INTERNATIONAL CONFERENCE OF THE IEEE EMBS, 17 September 2003 (2003-09-17), pages 3732-3735, XP002324636 CANCOON, MEXICO the whole document -----	4,14, 18-21
	----- -/--	

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB2005/050057

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>S. CASNER; CISCO SYSTEMS; V. JACOBSON; CISCO SYSTEMS: "RFC 2508, Compressing IP/UDP/RTP Headers for Low-Speed Serial Links" INTERNET ENGINEERING TASK FORCE (IETF) INTERNET SOCIETY (ISOC), February 1999 (1999-02), pages 1-25, XP015008291 GENEVA, SWITZERLAND the whole document</p>	1-21
A	<p>WO 02/11397 A (TELEFONAKTIEBOLAGET LM ERICSSON AB ; KARAGIANNIS, GEORGIOS) 7 February 2002 (2002-02-07) page 5, line 15 - line 19 page 1, line 21 - page 2, line 22</p>	1,4,8

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2005/050057

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6616606	B1	09-09-2003	AU 6465401 A	03-12-2001
			EP 1404213 A2	07-04-2004
			WO 0189362 A2	29-11-2001
			US 2003206116 A1	06-11-2003
			US 2002013517 A1	31-01-2002
			US 2002013518 A1	31-01-2002
<hr/>				
US 5944659	A	31-08-1999	AU 3129297 A	21-01-1998
			WO 9800056 A1	08-01-1998
			US 6213942 B1	10-04-2001
			US 6589170 B1	08-07-2003
			US 2001023315 A1	20-09-2001
			US 2001034475 A1	25-10-2001
			AU 7116896 A	05-06-1997
			WO 9718639 A1	22-05-1997
			US 5748103 A	05-05-1998
			US 5767791 A	16-06-1998
<hr/>				
US 6659947	B1	09-12-2003	US 2004109429 A1	10-06-2004
			US 2004170154 A1	02-09-2004
<hr/>				
WO 0211397	A	07-02-2002	WO 0211397 A1	07-02-2002
			AU 6831900 A	13-02-2002
			EP 1303963 A1	23-04-2003
			JP 2004517514 T	10-06-2004
			TW 527805 B	11-04-2003
<hr/>				