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(54) **DEVICE FOR WIRELESS COMMUNICATION**

(57) The claimed technical solution relates to the field of wireless communication and can be used in the field of mobile communication and Internet access to provide maximum communication quality in modem data transmission networks (GSM, 3G, 4G, Wi-Fi, WiMax, etc.) and to protect the user against the harmful effects of electromagnetic radiation as well. In the device for wireless communication comprising an active radiating element, a

passive element and a USB cable, the active radiating element is an integrated radio modem with a transceiver and a transmitting and receiving antenna both being built therein. The integrated radio modem is placed in the device so as to produce, together with the passive element, a directional diagram necessary for a maximum signal to arrive at the built-in transmitting and receiving antenna of the integrated radio modem.

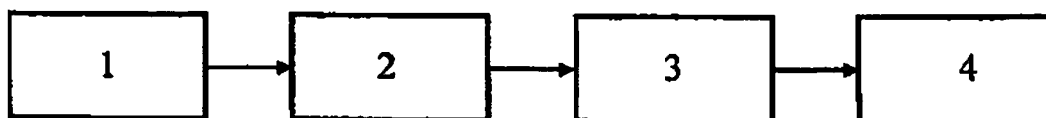


FIG. 1

Description

[0001] The claimed technical solution relates to the field of wireless communication and can be used preferably in the field of mobile communication and Internet access.

[0002] At the current state of information technologies for digital data transmission, the humankind is practically at the end of tethers of wired networks. Real breakthroughs in the field of data transmission are impossible without development of principally new devices and methods of functioning thereof. At present, there are wireless information transmission technologies which represent a direction that can give progress in the field of data transmission and Internet access.

[0003] Recently, wireless communication devices increasingly force wired communication out. From one hand, it is associated with improvement in integration and reduction in the cost of radio-frequency components, that is, radio transceivers, antennas, etc., and from the other hand, it is associated with increase in the cost of materials and labor consumption for organization of wired communication.

[0004] The wireless network technology is used where installation of wired networks is difficult, impossible or economically unprofitable. Further, only wireless technologies can provide data transmission at mobiles being in motion.

[0005] The experience of operating wireless networks shows that their quality of work significantly depends upon gains of subscriber antennas of users. Directional antennas make it possible not only to improve the power of a radio link but to improve its operational reliability as well.

[0006] All wireless communication devices use antennas to receive and transmit radio signals. One of basic antenna characteristics is a directional diagram which determines a characteristic of spatial distribution of an electromagnetic field irradiated or received by an antenna.

[0007] An electromagnetic field strength indoors is significantly higher than that is outdoors. An essential portion of the signal energy is absorbed by wood or brick walls; especially strong absorption takes place in buildings with reinforced concrete walls.

[0008] The patent search performed did not reveal similar solutions close to the claimed technical solution.

[0009] It is an object of the claimed technical solution to provide maximum communication quality in modem data transmission networks (GSM, 3G, 4G, Wi-Fi, WiMax, etc.) and to protect a user against the harmful effects of electromagnetic radiation as well.

[0010] Said object is accomplished by technical solution considering two variants - with one passive member and with several passive elements.

[0011] Said object is accomplished by that:

variant 1: in a device for wireless communication, comprising an active radiating element, a passive

element and a USB cable, the active radiating element is an integrated radio modem with a transceiver and a transmitting and receiving antenna both being built therein, wherein the integrated radio modem is placed in the device so as to produce, together with the passive element, a directional diagram necessary for a maximum signal to arrive at the built-in transmitting and receiving antenna of the integrated radio modem, wherein the radio modem is connected to terminal equipment by means of a USB cable.

variant 2: in a device for wireless communication, comprising an active radiating element, several passive elements and a USB cable, the active radiating element is an integrated radio modem with a transceiver and a transmitting and receiving antenna both being built therein, wherein the integrated radio modem is placed in the device so as to produce, together with the passive elements, a directional diagram necessary for a maximum signal to arrive at the built-in transmitting and receiving antenna of the integrated radio modem, wherein the radio modem is connected to terminal equipment by means of a USB cable.

[0012] At the same time, the integrated radio modem in any one of the claimed devices, both with one passive element and with several passive elements, can be connected to any terminal equipment, for example, to a computer or a hub or a mobile telephone or a communicator, by means of the USB cable.

[0013] The claimed technical solution is novel because it is characterized by presence of a novel combination of features absent in all prior art technical items of similar purpose.

[0014] The essence of the claimed technical solution is explained by drawings in the form of block diagrams in Figs. 1 - 2 that show embodiments of devices

[0015] Fig. 1 is an embodiment of a device with one passive element, wherein terminal equipment is, for example, a computer.

[0016] The device for wireless communication comprises: a passive radiating element, for example, a reflector 1; an active radiating element which is an integrated modem 2; and a USB cable 3 provided with a connector for coupling to terminal equipment, for example, a computer 4.

[0017] Fig. 2 is an embodiment of a device with several passive elements, wherein terminal equipment is, for example, a communicator.

[0018] The device comprises: passive radiating elements, for example, a reflector 1 and a director 2; an active radiating element which is an integrated modem 3; and a USB cable 4 provided with a connector for coupling to terminal equipment, for example, a communicator 5.

[0019] In a working position, the active radiating element being the integrated radio modem is placed in the device so as to produce, together with one or more pas-

sive elements, a directional diagram necessary for a maximum off the-air signal to arrive at the built-in transmitting and receiving antenna of the integrated radio modem, and the device is coupled by means of the USB cable to terminal equipment (see Figs 1, 2).

[0020] Let us consider operation of the wireless communication device of Fig. 1 and Fig. 2.

[0021] A high-frequency signal from a transmitter generates an electromagnetic field that has different strengths in various places of space. Let us arrange the claimed device (Figs 1, 2), for example, within a dwelling at a place where a magnetic field strength is maximum. This place is determined experimentally from (hardware or software) indicator readings of terminal equipment and the most frequently not coincides with a location of the terminal equipment and an operator's position. The electromagnetic field amplified and concentrated by the claimed device gets on an internal antenna of the integrated radio modem and is converted into a USB signal therein. The converted signal is transmitted through the flexible USB cable into the terminal equipment, for example, to a computer or a hub or a mobile telephone or a communicator.

[0022] When coupling one passive element (Fig. 1), a signal strength has a gain of 3 to 5 dB relative to an anisotropic emitter.

[0023] When coupling two or more passive elements (Fig. 2), the received signal strength essentially increases (by 3 to 5 dB relative to the device with one passive element), and such the device has an extended field of application.

[0024] The solution of the problem posed, exactly, concerning with provision for maximum communication quality in modem data transmission networks, is accomplished due to arrangement of the active radiating element being the integrated modem within an area of maximum electromagnetic field strength.

[0025] The technical result to be achieved in modem data transmission networks (GSM, 3G, 4G, Wi-Fi, WiMax, etc.) during implementation of the claimed utility model consists in provision for maximum communication quality and also in broadening a "coverage" area of networks, in increasing a number of places where mobile Internet access can be used, and in minimizing HF energy losses due to use of the USB cable.

[0026] In addition, each variant of the claimed device provides protection of a user against the harmful effects of electromagnetic radiation, because the integrated radio modem is placed not in the terminal equipment directly but is side-shifted from a user for a distance allowing reduction in the harmful effects of electromagnetic radiation, and is shielded from a human by one or more passive elements.

[0027] The claimed technical solution minimizes HF energy losses due to use of the USB cable.

[0028] Implementation of each variant of the claimed wireless communication device makes it possible to use any integrated radio modems without intervention into

structures thereof, because many integrated radio modems have no socket for coupling an external antenna. A method of coupling an integrated modem to terminal equipment extends the application sphere of the claimed utility model.

[0029] Such the device is rapidly and easily installed, does not require intervention into structures of the integrated radio modems, and is available for any user of terminal equipment.

[0030] The possibility of industrial applicability of the claimed technical solution is confirmed by a successful result of test using the claimed device that can be manufactured by prior art technical means; in the Applicant's opinion, this testifies for compliance of the device with the "industrial applicability" criterion.

[0031] The claimed technical solution has experimentally confirmed the possibility to accomplish the assumed result.

[0032] The present technical solution can find both domestic and industrial use.

Claims

1. A device for wireless communication, comprising an active radiating element, a passive element and a USB cable, wherein the active radiating element is an integrated radio modem with a transceiver and a transmitting and receiving antenna both being built therein, wherein the integrated radio modem is placed in the device so as to produce, together with the passive element, a directional diagram necessary for a maximum signal to arrive at the built-in transmitting and receiving antenna of the radio modem, wherein the radio modem is connected to terminal equipment by means of a USB cable.
2. A device for wireless communication, comprising an active radiating element, several passive elements and a USB cable, wherein the active radiating element is an integrated radio modem with a transceiver and a transmitting and receiving antenna both being built therein, wherein the integrated radio modem is placed in the device so as to produce, together with the passive elements, a directional diagram necessary for a maximum signal to arrive at the built-in transmitting and receiving antenna of the radio modem, wherein the radio modem is connected to terminal equipment by means of a USB cable.

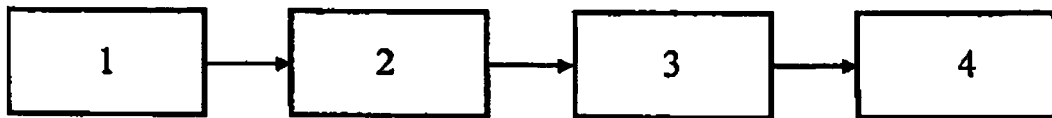


FIG. 1

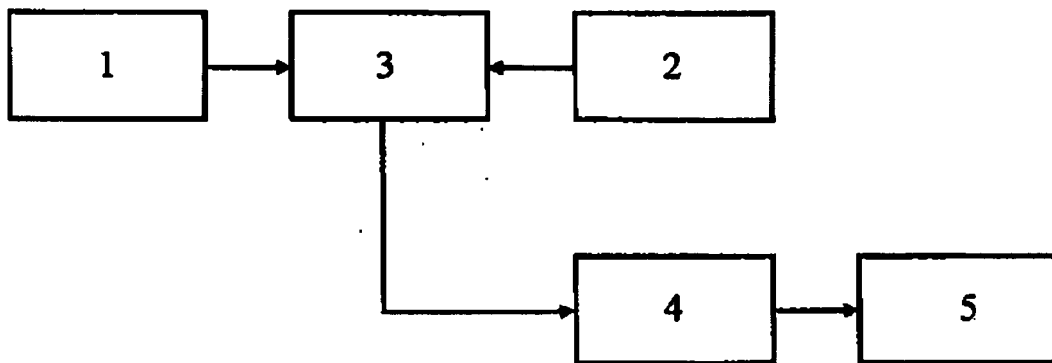


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/RU 2011/000418

A. CLASSIFICATION OF SUBJECT MATTER H01Q 19/00 (2006.01); H04B 7/02 (2006.01) 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) G01R 19/00, 33/00, G06F 3/00, 13/00, H01Q 1/00, 1/36, 1/44, 3/00, 3/24, 3/44, 15/00, 17/00, 19/00, 21/00, 23/00, 25/00, H03H 1/00, 11/00, 19/00, H04B 1/00, 1/18, 1/38, 5/00, 7/00, 7/02 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 practicable, search terms used) DWPI, Esp@senet, K-PION, PAJ, RUPTO, USPTO, WIPO		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2340691 A (UNIVERSITY OF BRISTOL) 23.02.2000, the abstract, p. 6, par. 2	1-2
Y	US 4700197 A (CANADIAN PATENTS & DEVELOPMENT LTD.) 13.10.1987, the abstract, col. 1, lines 6-12, col. 2, lines 5-21, col. 5, lines 21-33, fig. 5a, 5b, 5c	1-2
Y	JP 2004171427 A (SOURCENEXT CORP) 17.06.2004, the abstract	1-2
A	DE 4401819 A1 (FUBA HANS KOLBE & CO) 27.07.1995	1-2
A	RU 46390 U1 (GOSUDARSTVENNOE OBRAZOVATELNOE UCHREZHDENIE VYSSHEGO PROFESSIONALNOGO OBRAZOVANIYA "MOSKOVSKY GOSUDARSTVENNY INSTITUT ELEKTRONNOI TEKHNIKI (TEKHNICJESKY UNIVERSITET)") 27.06.2005 ./..	1-2
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 27 October 2011 (27.10.2011)		Date of mailing of the international search report 02 November 2011 (02.11.2011)
Name and mailing address of the ISA/ RU		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/RU 2011/000418

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	RU 90899 U1 (OBSHESTVO S OGRANICHENNOI OTVETSTVENNOSTJU "PROMYSHLENNAYA KOMPANIYA "ILMA") 20.01.2010	1-2

Form PCT/ISA/210 (continuation of second sheet) (April 2005)