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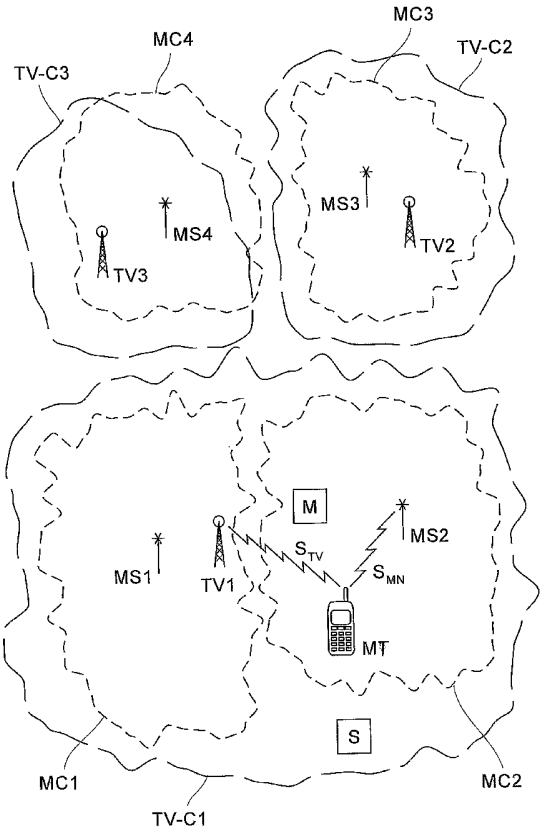
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[Continued on next page]

(54) Title: METHOD FOR POSITION LOCATION OF MOBILE UNITS USING BROADCAST TELEVISION SIGNALS



(57) Abstract: Method for the transfer of digital data to and from mobile terminals, where an identification of the position of the mobile terminal takes place, in particular by localisation in a GSM-cell, a UTMS-cell or other telephone cell, or by GPS-localisation based on signals from the mobile terminal. A unique code is transmitted from a ground-based TV-transmitter. This code is received by a mobile terminal and sent together with an ID-code for the mobile terminal over another transmission network, and received in a control unit. In the control unit, a determination of the geographic location of the ground-based TV-transmitter, to which the mobile terminal has signal connection, takes place. This initiates signal transmission to the mobile terminal from this TV-transmitter.

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METHOD FOR POSITION LOCATION OF MOBILE UNITS USING BROADCAST TELEVISION SIGNALS

The invention relates to a method as indicated in the introductory part of claim 1, for the transfer of data to and from mobile terminals. The term "mobile terminal", is taken to mean every kind of transportable unit that is capable of receiving wireless signals in a selective network. This applies in particular to handheld or vehicle-carried mobile phones and PDA devices with a communication facility.

Background

The invention is based on the technology described in Norwegian Patent 311477. There, a method is described for the transfer of digital data, especially video signals, from a transmitter to a single receiver or to a group of receivers, where alternative transmission channels are sought for finding a cost saving alternative, as it comprises software that can choose between different connections based on capacity and cost. A data signal with a query concerning transmission of a defined video signal is sent from a receiver to a transmitter. A data package, that constitutes a part of the signal, is transferred from the transmitter over a channel that is mainly chosen from optimal criterias based on capacity. A subsequent part of the signal is transferred, as a second data package, over a low-price communication channel such as an Internet channel. The received, non-consumed data is monitored in a buffer at the receiver. When registering non-consumed data (buffer) below a certain level at the receiver, a warning signal is sent from the receiver to the transmitter. When recieving this warning signal, the transmitter initiates transmission of an additional data package of the signal, over the high-price channel, and thereafter continues with transmission of an additional signal over the low-price channel. This switching transmission continues, saving transmission capacity over the high-cost connection, and simultaneously maintains transmission capacity, which provides satisfactory data content in the transferred signal.

It is suggested to combine mobile phone and TV broadcasting, for instance, in what is called the DVB (-T or -X) standard, for the transfer of music, film and other types of multimedia communication to mobile phones. However, this system has problems related to data capacity.

It has also been suggested to combine this with the GPRS/UTMS and the WLAN system, for transfer of video signals. But until now, these suggestions have not provided successful transmission with satisfactory bandwidth for the consumer market.

Object

The main object of the invention is therefore to provide a method for transferring data signals to mobile phones, resulting in lower price, maintaining the quality of the transmission, and which makes it possible to selectively reach the separate receiver with one-way communication.

It is a further object to provide a mobile terminal and a control unit, which can be used for implementing this method.

The Invention

The invention is stated in claim 1, and claims 2-5 state particularly advantageous embodiments.

Furthermore, claims 6 and 7 define a new mobile terminal intended for performing this method, and claim 8 defines a control unit for controlling the communication in the transmission system.

With such method and apparatus, it is possible to receive DVB signals, instead of TV signals, and to download a video to a mobile terminal, at the lowest possible price, whilst retaining quality.

Such one-way service can be used as a complement to two-way mobile phones, for instance for:

- offering QoS (quality transmission) by sending the traffic alternately through both networks,
- being an alternative for random traffic to the mobile terminal, for reducing the transmission costs.

The limited resource, which is constituted by the frequencies, can be employed effectively by transmitting a one-way signal only on the transmitter which is in the area where the mobile terminal is located, and where it can receive. Hence, the transmitting costs are reduced. It is not necessary to transmit over a nationwide network, but only over the DVB-cell in which the mobile terminal is known to be located.

The combination of knowledge about a mobile terminal, the carrying person, and the geographic position of the person, as well as the velocity of the person when travelling in a vehicle, makes it possible to distribute personalised information, for instance an advertisement. This can accordingly be transmitted over a one-way network.

Example

The invention is described in further detail below, with reference to the drawing which illustrates a network structure arranged for implementing the invention.

The network structure in the example comprises four mobile network transmitters MS1, MS2, MS3 and MS4, which each forms a cell MC1, MC2, MC3 and MC4. It may be a GSM network, a UTMS network, or some other mobile network. In practice, the cells will cover a substantial part of a region, in particular a country, and a central M will have contact with all the cells in the network, and contain information about where a given mobile terminal MT is located. It may also be a WLAN network.

At the same time, the mobile terminal MT can receive signals in a DVB-cell. In the example, three ground-based transmitters TV1, TV2, TV3, with corresponding TV-cells TV-C1, TV-C2, TV-C3 are shown.

A mobile terminal MT can have contact with transmitters in both networks. The TV network will send out signals with a unique ID-code for the relevant network. When the mobile terminal receives this code, it can transmit information about the code over the mobile network, to the mobile central M, which then transfers a message to the central unit S. The transfer between the central M and the central unit S often takes place via Internet.

In the central unit S, it can be determined in which TV-cell the mobile terminal mt is located, on the basis of stored information. This may, for instance, happen with the aid of a look up table that correlates the different numbers with information about geographic location.

When the central unit S knows where the mobile terminal MT is located, and that it is able to receive signals, it may start transmission over the DVB-T or DVB-X channel.

The transmission can be controlled in such a way that it partially takes place over the DVB-T or -X channel, and partially over the ordinary mobile channel. Because DVB-T or -X can run with substantially lower cost than the mobile network, a cost reduction can be obtained in this manner. The invention makes it possible to commercially utilize the spare bandwith.

Accordingly, this means that a user of a mobile terminal MT in a certain location can acquire the identification of the nearest TV-transmitter and transfer it, together with information about its own identity, to the central unit S, as an instruction that implies that transmission over the signal path S-TV is desired.

The unique identification acquired by the mobile terminal can be the IP-address (or correspondingly) it gets when logging onto the Internet through a GPRS/UTMS or a WLAN system. This address does not change until the customer logs off.

The transition from one transmission system to another can occur without notice. This means that a ground-based TV network can run such a transmission system whithout having a special agreement with the provider of the mobile service.

Claims

1. Method for the transfer of digital data to and from mobile terminals, where an identification of the position of the mobile terminal takes place, in particular by localisation based on information about the position of a ground-based TV-transmitter, **characterized in** that

- a unique code is transmitted from a ground-based TV-transmitter, in the vicinity of the mobile unit,
- this code is received by a mobile terminal and is transmitted together with an ID-code for the mobile terminal over another transmission network, for reception in a control unit,
- a determination of the geographic location of the ground-based TV-transmitter, with which the mobile terminal is in contact, takes place in the control unit, based on pre-stored information about the TV-transmitter, and
- signal transmission to the mobile terminal is initiated from this TV-transmitter.

2. Method according to claim 1, **characterized in** that splitting of the transmission takes place, so that transmission takes place both over a one-way, and a two-way connection.

3. Method according to claim 2, **characterized in** that transmission over the split signal path uses the qualities of a low-cost communication channel, and a high-cost communication channel, for reducing the costs.

4. Method according to any one of claims 1 to 3, **characterized in** that transmission over the network with one-way communication, is used for distributing selective messages, such as advertisements, to the separate receivers, according to their geographic location.

5. Method according to claim 4, **characterized in** that the distributed messages are selected on the basis of information about location, based on location information from a GPS system, and based on pre-defined information about the location of the ground-transmitters of the TV-network.

6. Mobile terminal for implementing the method according to any one of claims 1 to 5, with a two-way communication circuit, **characterized in** that it comprises a receiver for receiving a one-way data signal from a DVB-T or -X network.

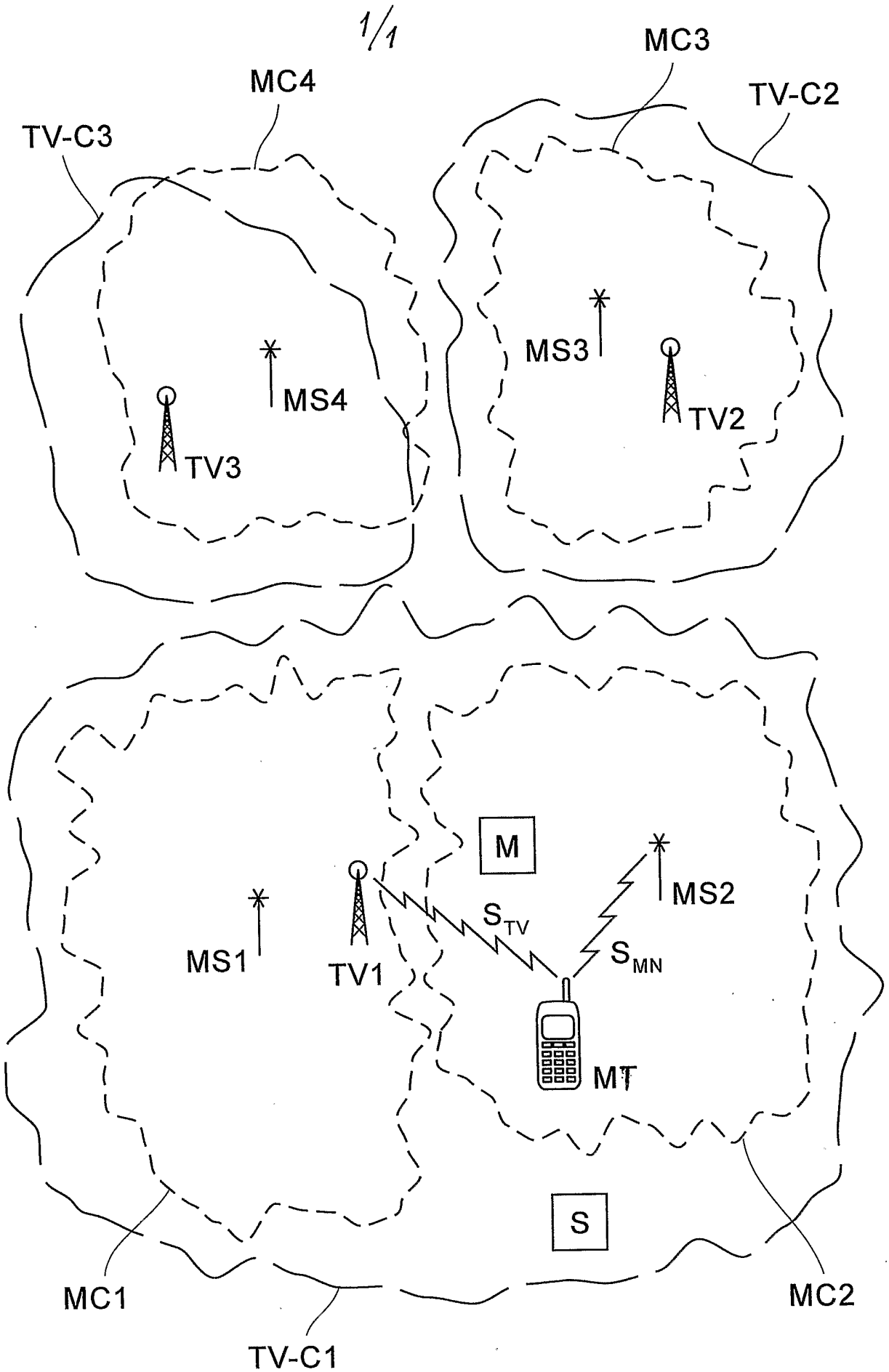
7. Mobile terminal according to claim 6, **characterized in**

- that the two receiver-circuits are arranged to perform an integration of received signals, as a first data package, which consistutes a part of the signal, is transmitted from the sender over a channel with especially high capacity,
- that a subsequent part of the signal is transmitted as a second data package over a mobile network,

- that a monitoring of the received, non-consumed data is performed in a buffer in the mobile terminal,
- that registration of a non-consumed data (buffer), when below a certain level at the receiver, enables a warning signal to be sent to the transmitter,
- that the transmitter, when receiving this warning signal, initiates transmission of an additional data package of the signal to the receiver, over the channel with high capacity, to thereafter continue transmission of an additional signal over the narrow band channel, and
- that this alternating transmission continues, to save transmission capacity over the broad band connection, and simultaneously maintain a transmission capacity that provides satisfactory data content in the transmitted signal.

8. Control unit for implementing the method according to claim 1, **characterized in** that it comprises
- an arrangement that transmits a unique code for each cell over a ground-based TV-network, such as a DVB-T or -X cell,
- an arrangement that can receive information from a mobile terminal (MT) over the Internet, with a unique code that provides information about the geographic location of a transmission tower,
- a device for storing the identity (IP-address) of mobile terminals,
- a device for storing the unique code, so that it may be compared to information about the geographic location of the TV-towers,
- a device for storing information about connected mobile terminals (MT), and
- a device for controlling the transmission between the two channels.

9. Control unit according to claim 8, **characterized in** that it is arranged to distribute the transmission of data, which shall be transmitted to a certain receiver, in such way that a cost-optimal distribution of the data transmission is achieved.



KORRIGERT VERSJON
CORRECTED VERSION

INTERNATIONAL SEARCH REPORT

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PCT/NO 2004/000139

A. CLASSIFICATION OF SUBJECT MATTER

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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: H04N, H04H, H04L, 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)

EPO-INTERNAL, WPI DATA, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02063865 A2 (ROSUM CORPORATION), 15 August 2002 (15.08.2002), sections [0013]; [0053]-[0055], abstract ---	1-9
A	WO 9933076 A1 (REBHAN, R ET AL), 1 July 1999 (01.07.1999), page 4, line 6 - page 5, line 30, abstract ---	1-9
A	TUTTLEBEE, W ET AL: Broadcasting and mobile telecommunications: Interworking - not convergence. EBU Technical Review, January 2003. Retrieved on 2004-09-17 from the Internet: http://www.ebu.ch/trev_293-tuttlebee.pdf Especially page 2, line 1 - line 31, figures 1,4 and abstract ---	1-9

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

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
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PCT/NO 2004/000139

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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