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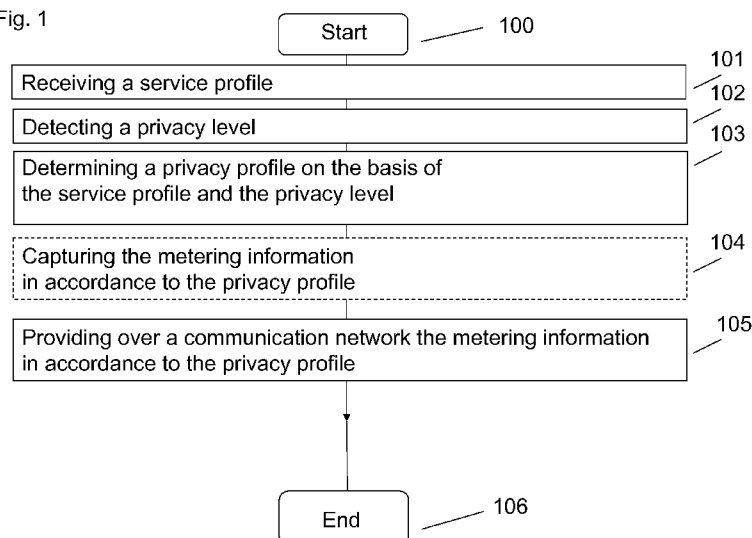
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(54) Title: METHOD, APPARATUS, AND SYSTEM FOR PROVIDING METERING INFORMATION

Fig. 1



(57) Abstract: The present invention refers to a method for providing metering information comprising the steps of receiving a service profile (101), detecting a privacy level (102), determining a privacy profile on the basis of the service profile and the detected privacy level (103), and providing over a communication network the metering information in accordance to the determined privacy profile (105). Furthermore, an apparatus and a system are suggested for providing metering information.

Description

Method, apparatus, and system for providing metering 5 information

The invention relates to a method, an apparatus, and a system for providing metering information.

10 Metering equipment, e.g., measuring domestic consumption of water, electricity, gas, heat etc., allows the aggregation of data on user habits and characteristics. These related data may for instance be subject of interest of a public utility company of the user. As well 3rd party service providers may
15 be interested in these data with regard to offering their services, e.g. to the user.

In the future metering equipment, such as for instance smart electrical meters, may have the ability to collect
20 information about the household electrical equipment of the user that is connected via the internal distribution circuits, or receive this information directly, if, e.g., equipment is plugged into the meter or metering equipment. In addition to metering a power consumption a type of device may
25 be determined by detecting and analyzing an electronic signature using, e. g., low frequency fast Fourier analysis with decimation and classification mechanisms. These may reveal the exact make and manufacture of the device(s) present in the user's household, or simply allow further
30 analysis and aggregation for access by a public utility company of the user or by 3rd parties. The home owner or business, e.g., the user of the home or the household, may or may not be willing to share this information even irrespective of a signed contract that may allow such
35 information to be aggregated and/or provided, e.g., to 3rd parties. Thus, the user may not wish to allow the aggregation, collection, and/or external provision of his/her

related data, possibly reveling the user's habits and characteristics.

Thus a wish may exist, not to monitor the user's metering
5 equipment beyond the information really needed, e.g., by a public utility company in view of an annual consumption or tariff options.

It is therefore a need in the prior art to provide a method,
10 apparatus, and system for enabling user controlled confidentiality of user data aggregated and provided by intelligent metering equipment.

This need is accomplished by the method, apparatus, and
15 system for providing metering information according to the features of the independent claims 1, 14, and 28 respectively. Further, depending claims refer to specific embodiments of the present invention.

20 According to an embodiment of the present invention there is provided a method for providing metering information comprising the steps:

- Receiving a service profile;
- Detecting a privacy level;
- 25 - Determining a privacy profile on the basis of the service profile and the detected privacy level;
- Providing over a communication network the metering information in accordance to the determined privacy profile.

30 The method advantageously allows providing of metering information according to a privacy profile, wherein the privacy profile may be determined on the basis of, e.g. a level of privacy or confidentiality a user may request and a
35 service profile related to at least one metering service a public utility company or a 3rd party may be interested in.

The service profile may be related to one or more than one metering services provided by and/or requested from a metering equipment, such as, e.g., a smart meter or a smart plug, in a building, house, domestic home and/or household. Metering services may include a metering of electric power, gas, district heat, and/or water consumption at a given point in time or on a repeated or cyclic timely base, and/or in case of events, such as on a request, a tariff switching, a network communication re-availability, a flow or a electric current and/or voltage threshold crossing, etc.. The service profile may include privacy information related to a confidentiality of the metering information, so as to characterize the grade of privacy a metering information may have. Metering services may be grouped into selectable privacy profiles assembling metering services of a same or a similar grade of confidentiality. The service profile may include information that an immediate provision of the metering information is requested. As well the service profile may comprise a point in time at and/or a time schedule according to which the metering information shall be provided.

A privacy level may represent a level of confidentiality a customer, e.g. a house owner or a resident, addressed in what follows as "user", may wish to have. E.g., such user may wish to have strict confidentiality, not allowing any metering information being accessed from outside the home, or allowing only reading out of, e.g., an annual electric power consumption once a year. A user may as well agree to provide more detailed metering information, e.g., a metering once an hour, or an almost persistent metering information monitoring, e.g., to receive better tariff options, or to use attractive applications, offered by the utility company,

e.g., saving of unnecessary costs by analysis of energy consumption tracing. The privacy level a user may want to have may change daily or hourly. E.g., a user may wish, not to provide any metering data during his/her absence from the home, in order not to generate data that may be used to derive an information, that the home is currently not used. A user may as well wish not to have metering information provided, that allows analysis such as to obtain the user's personal preferences and/or habits. Thus a user may specify the privacy level comprised in a spectrum between "no confidentiality" and "strict confidentiality"

On base of the service profile and the privacy level a privacy profile is determined. Such privacy profile may represent, indicate, and/or comprise those metering services assigned to the privacy level, the user wishes to have, e.g. at a certain point in time. Only metering data of those metering services permitted according to the privacy level configured by the user will accordingly be provided over a communication network.

The communication network may be any mobile or fixed network, operating on base of unicast, multicast and/or broadcast techniques, making use of optical, electrical, and/or radio based transmission, including, e.g., Ethernet, ATM, IP, xDSL, WLAN, WiFi, power distribution networks, cable, satellite and/or terrestrial antenna based broadcast and/or unicast networks.

With the determination of the privacy profile an activation of the selected grade of confidentiality and/or the related metering services may be automatically accomplished. Thus with specification of the privacy level by the user the metering services permitted according to the user's requested

confidentiality may advantageously be automatically activated.

According to another embodiment the step of determining
5 comprises selecting the privacy profile on the basis of the detected privacy level from a plurality of privacy profiles in the service profile.

A public utility company may advantageously define for smart
10 metering equipment positioned and/or installed in the distributed households of its customers a plurality of different privacy profiles, each privacy profile including a number of possibly different metering services, wherein for each of the plurality of different privacy profiles the
15 confidentiality of the plurality of the included metering services represents and is in line with one of different levels of confidentiality, the user may select from. The plurality of selectable privacy profiles may be included in the service profile. Thus a complex determination of a
20 privacy profile is advantageously simplified and reduced to a selection of the privacy profile in said plurality of privacy profiles meeting the confidentiality level the user requests. Once the privacy level is selected by the user, only metering data of services related to the assigned privacy profile will
25 be provided, e.g., over the communication network to a destination, which may be located outside the user's home or household.

In another embodiment the step of determining comprises
30 generating in the privacy profile at least one access right state on the basis of at least one information element of the service profile and on the basis of the detected privacy level.

An information element of the service profile may be related to or represent a single metering service. Such metering service, e.g., may be a capturing and/or a providing metering information of a water meter twice a day or according to any predefined time schedule and/or any other conditions. The information element may include a link to a metering device, an address of a metering device, addresses of a group of metering devices, a metering device type, a time schedule and/or point in time for providing a metering service and/or an event, according to which a capturing and/or providing of metering information is required.

Such single metering service may advantageously be assigned an access right state, which may, e.g., be "allowed", "not allowed", "allowed under restrictions", "allowed under conditions" according to the privacy level detected.

The single metering service may then be provided according to its assigned access right state, in case requested or due according to a time schedule, an event, and/or conditions. Thus an easy generation, construction and/or usage of the privacy profile is enabled in presence of at least one information element in the service profile.

According to another embodiment of the invention the method is provided, wherein a portion of the metering information is associated to the at least one information element.

Advantageously a single information element contained in the service profile, which may refer to a metering information to be captured by a metering equipment can be assigned an access right state of the privacy profile according to the privacy level selected by the user. For the assignment the information element may include a confidentiality indicating attribute, which may be evaluated and/or considered, when assigning the access right state. Thus a metering service

represented and/or assigned by the information element may be provided according to the access right state as portion of the provided metering information. In case the access right state indicates, that the represented and/or assigned
5 metering service is not permitted, said portion may not be included into the metering information.

According to a further embodiment of the invention the method is provided, wherein the at least one information element is
10 associated with at least one device signature service.

A device signature service may comprise a detection and /or identification and/or reporting of a device or device type detected in a household, a power consumption/voltage/current
15 profile characterizing a device or a device type, a detection of a plurality of such devices, an inclusion or transfer of device signatures and/or device types detected and provided by an intelligent plug or other appropriate home network equipment. Equipment capable of detection of a device, as for
20 example a washing machine model y of manufacturer x, a device type, e.g. washing machine, and/or a device signature, e.g. electric characteristics caused by use of said device, thus is advantageously treated as special form of metering equipment with respect to the user's confidentiality
25 requirements. Intelligent plugs as well as smart meter equipment may be capable of detecting and/or providing data of the at least one device signature service. A number of expected signatures of a device may be provided, e.g. as part of the service profile, over the communication network to the
30 metering equipment, in which case the metering equipment may compare a measured electrical signature with locally available expected signatures, and may identify an assigned device or device type. Otherwise the metering equipment may provide over the network the signature as measured, e.g. in

form of the provided metering information, in which case a central and/or external determination of the device or device type may be done. The latter determination may for instance be provided by applications and/or an application platform of the user's public utility company or by any 3rd party application platform.

According to a further embodiment of the invention the method is provided, wherein the service profile is associated with at least one device signature service.

Thus the service profile may allow or provide an association, e.g. via a reference, pointer, link, or name, to at least one device signature service.

According to a further embodiment the method comprises the step of capturing the metering information in accordance to the privacy profile.

Advantageously metering information as specified in the service profile may not be captured, if the metering information will not be permitted to be provided, e.g., over the communication network due to the privacy profile and/or an assigned access right state in the privacy profile. Consequently metering information, not permitted to be provided, will not be generated at all, thus advantageously increasing the confidentiality of the user's data.

According to yet another embodiment the method comprises the steps:

- Adapting the privacy level responsive to at least one of
 - o a manual input at a metering equipment;
 - o an infrared input to a metering equipment;
 - o a radio frequency input to a metering equipment;

- o a privacy level message received by a metering equipment; and
- Re-determining the privacy profile on the basis of the service profile and the adapted privacy level.

5

The privacy level may result from local input to a metering equipment. E.g., the metering equipment may have an electromechanical switch with two positions "privacy on " and "privacy off". Also more than two switch positions reflecting different privacy levels may analogously be provided. Thus the user may simply select the privacy level he/she requests, e.g., via a physical input directly at the metering equipment. Further, input via infrared, radio frequency or messages may be available alternatively or in addition to the physical input. This provides the advantage, that, even if the metering equipment is locked and/or physically inaccessible by the user, as expected in apartment houses, the user can activate and/or select the privacy level according the user's needs locally or remotely. In the same manner an adaptation of the privacy level may be done at any time on request or automatically according to a user defined schedule.

In the course of the adaptation of the privacy level a new determination, i. e. a re-determination, of the privacy profile on base of the adapted privacy level may be automatically provided.

Metering information already captured and in the process of being provided over the network, may be blocked, excluded from being provided and/or discarded, if not to be provided according to the adapted privacy level.

According to a further embodiment the method comprises the step of providing the privacy level via at least one of

- o a mechanical indication at a metering equipment;
- o an optical display at a metering equipment;
- o an infrared signal by a metering equipment;
- o a radio frequency signal by a metering equipment;
- 5 o a message provided by a metering equipment;

Thus the advantage is provided, that particularly a user, who has adapted his/her privacy level, is able to receive a reaction and/or indication, that helps the user to verify, that the privacy
10 level is set according to his request, in particular, that an adapted privacy level is set according to the user's request. The functionality of verification of the privacy level may also be available without any preceding adaptation of the privacy level.

15 According to another embodiment the method comprises the step of receiving a request from the communication network to provide the metering information, wherein the providing over the communication network of the metering information is responsive to the request.

20 Advantageously, e.g., a public utility company may request to receive metering information at any time according to and/or responsive to a request provided over the communication network. The request may, e.g., be due to a change of the
25 user in or of an apartment or due to a time schedule for example related to tariff defined periods, e.g. once a year, at tariff switching, e.g., between a day and a night tariff. The source of the request may be a part of the communication network or the request may originate from outside the
30 communication network.

It is a further embodiment, that the method comprises the steps:

- Receiving external metering information; and

- Filtering the external metering information in accordance to the privacy profile, wherein the provided metering information comprises the filtered external metering information.

5

External metering information may be provided by further metering equipment as for instance smart meters and intelligent plugs. The external metering information may be generated by metering equipment, that has no direct access to the communication network or that is not permitted to use its direct access to the communication network for provision of its metering data, but may be communicatively coupled to a metering or other equipment with access to the communication network. Such coupling may be provided via radio frequency or infrared light, via local cabling, via telephone networks, and/or LAN, or any other type of communicative coupling.

The external metering information may then advantageously be provided according to a configuration, according to a configured time schedule, or at any time on request by a metering equipment with access to the communication network. Thus the number of interfaces of metering equipment of a household to the communication network and/or the number of interfaces to house- or household -external destinations can be kept small, despite a presence of numerous metering equipments in the house or the household. The privacy profile related evaluation or determination, if a metering information is permitted to be provided over the communication network, can be executed centrally, e.g. in the metering equipment with direct access to the communication network. Thus advantageously the complexity of privacy and/or confidentiality of the user's metering data can be kept away from the majority of smart plugs and smart metering equipment in the house and/or household.

Advantageously, according to another embodiment of the invention dependent metering equipment, i.e. dependent modules or dependent smart meters, that are configured to provide the external metering information may be activated and/or deactivated according to the privacy profile. Thus metering information, that will not be needed, will not be generated and provided as the external metering information by these metering equipments.

According to a further embodiment the method comprises the step of providing the metering information to at least two destinations via the communication network.

One of the at least two destinations may be user defined allowing control and verification of privacy functionality of the smart metering equipment. Thus the user can be informed, e.g., whenever a metering equipment with access to the communication network provides metering information over the network.

According to a further embodiment of the invention the method is provided, wherein the service profile, an element of the service profile, an access right state attribute assigned to the element, the privacy profile, and/or a request for providing metering information are defined according to an ETSI M2M standard, in particular according to a version of ETSI TS 102 690.

According to another embodiment of the invention the method is provided, wherein the service profile is received from the communication network.

Thus a maximum of flexibility with respect to changes and/or updates of metering services to be considered and a maximum of cost efficiency may be achieved, e.g., due to a possibility of a remote provisioning of the service profile.

5

According to a further embodiment of the present invention there is provided an apparatus for providing metering information, comprising:

- Receiving means for receiving a service profile;
- 10 - Detecting means for detecting a privacy level;
- Determining means for determining a privacy profile on the basis of the service profile and the detected privacy level;
- Providing means for providing over a communication network
15 the metering information in accordance to the determined privacy profile.

Pursuant to another embodiment said determining means comprises selecting means for selecting the privacy profile
20 on the basis of the detected privacy level from a plurality of privacy profiles in the service profile.

Pursuant to another embodiment said determining means comprises generating means for generating in the privacy
25 profile at least one access right state on the basis of at least one information element of the service profile and on the basis of the detected privacy level.

Pursuant to another embodiment a portion of the metering
30 information is associated to said at least one information element.

Said portion of the metering information may be associated by said providing means to said at least one information element.

5 According to a further embodiment said at least one information element is associated with at least one device signature service.

10 Said at least one information element may be associated by said generating means with the at least one device signature service.

According to a further embodiment said service profile is associated with at least one device signature service.

15 Thus the service profile may allow or provide an association, e.g. via a reference, pointer, link, or name, to the at least one device signature service. Said service profile may be associated by said determining means with the at least one device signature service.

20

Pursuant to another embodiment said apparatus further comprises capturing means for capturing the metering information in accordance to the privacy profile.

25 Pursuant to a further embodiment said apparatus comprises adapting means for adapting the privacy level responsive to at least one of

- o a manual input at a metering equipment;
- o an infrared input to a metering equipment;
- 30 o a radio frequency input to a metering equipment;
- o a privacy level message received by a metering equipment;

wherein the determining means is adapted to re-determine the privacy profile on base of the service profile and the adapted privacy level.

- 5 Pursuant to another embodiment said apparatus comprises providing means for providing the privacy level via at least one of
- o a mechanical indication at a metering equipment;
 - o an optical display at a metering equipment;
 - 10 o an infrared signal by a metering equipment;
 - o a radio frequency signal by a metering equipment;
 - o a message provided by a metering equipment.

Pursuant to a further embodiment said apparatus comprises
15 receiving means for receiving a request from the communication network to provide the metering information, wherein the providing over the communication network of the metering information is responsive to the request.

- 20 Pursuant to another embodiment said apparatus comprises:
- Receiving means for receiving external metering information;
 - Filtering means for filtering the external metering information in accordance to the privacy profile, wherein
25 the provided metering information comprises the filtered external metering information.

According to yet another embodiment said providing means are adapted to provide the metering information to at least two
30 destinations via the communication network.

Pursuant to another embodiment of the invention said apparatus is provided, wherein the service profile, an element of the service profile, an access right state

attribute assigned to the element, a privacy profile, and/or a request for providing metering information are defined according to an ETSI M2M standard, in particular according to a version of ETSI TS 102 690.

5

Pursuant to another embodiment said service profile is received from the communication network.

For this purpose said receiving means may have a direct
10 interface to said communication network.

Pursuant to another embodiment said apparatus is a or is part of a metering equipment. Such metering equipment may in particular be a smart meter or a smart plug or any device
15 capable of producing, generating, processing and forwarding metering data.

According to a further embodiment of the invention a system for providing metering information is provided comprising
20 said apparatus and further comprising at least one of:

- a water metering module, in particular a warm and/or cold water metering module, communicatively coupled to the apparatus;
- a domestic wastewater metering module communicatively
25 coupled to the apparatus;
- a rainwater and/or drinking water production metering module communicatively coupled to the apparatus;
- a gas consumption and/or production metering module communicatively coupled to the apparatus;
- 30 - an electricity consumption and/or production metering module communicatively coupled to the apparatus;
- a district heating metering module communicatively coupled to the apparatus;

- a smart card reader communicatively coupled to the apparatus;
- a central service control logic, in particular according to an ETSI M2M standard as for instance according to a version of ETSI TS 102 690, providing the service profile and/or receiving the metering information;
- a terminal connected to the communication network adapted to send a message to the apparatus and/or receive a message provided by the apparatus, wherein said message may in particular be related to and/or usable for providing a privacy level, receiving a privacy level, providing an external metering information and/or receiving the provided metering information.

Embodiments of the invention are shown and illustrated in the following figures:

Fig.1 presents a flow diagram showing essential method steps;

Fig.2 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to an apparatus receiving a service profile and providing metering information;

Fig.3 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to different possibilities of adapting a privacy level;

Fig.4 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to different possibilities of providing a privacy level information and/or indication;

Fig.5 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to receiving a request to provide a metering information;

Fig.6 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to receiving and filtering of external metering information and providing the filtered external metering information;

Fig.7 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to providing the metering information to two destinations over a communication network;

Fig.8 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to an metering equipment;

Fig.9 presents a simplified block diagram of a embodiment for illustration of an metering equipment with external modules, remote privacy control and remote web browser access;

The making and using of presently preferred embodiments are discussed in detail below. It should be appreciated, however, that the present invention provides many applicable inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed are merely illustrative of specific way to make and use the invention, and do not limit the scope of the invention. Moreover, same reference signs refer to same technical features, if not stated otherwise. As far as "may" is used in this application, it means the possibility of doing so as well as the actual technical implementation.

Fig.1 presents a flow diagram showing essential method steps. After a start (step 100) a service profile is received in a step 101. The service profile may be received from a communication network. It may also be received from a local memory, from a locally connected device, e.g., a PC, notebook, server or storage unit, portable memory such as a USB mass storage device or a versatile optical storage medium, such as a CD, DVD, BD. As well the service profile may be received from a local smart card reader. The service profile may also be provided in form of, as part of and/or together with a program download or a configuration file of a device. The service profile may comprise at least one metering service, comprising for example a scheduled, event driven, and/or conditional reading out a metering device, such as a water, gas, electric consumption meter. In general the service profile may as well provide for each metering service an indication of a grade of confidentiality of the metering service. The service profile may comprise a link, e.g. an HTTP-link, to the at least one metering service.

In a step 102 a privacy level is detected. For the detection of the privacy level a position of a locally available switch a user has access to may be read out. Detection of the privacy level may be independent of receipt of the service profile. Thus the detection may be in advance or after receiving the service profile. The privacy level may represent a user's request and/or selection for a grade of confidentiality he/she wants to have in view of the metering services possibly requested from, supported by, and/or provided by the metering equipment in the user's house or household. A highest grade of confidentiality may disable provision of any metering data. The switch may be a physical switch collocated with a metering equipment. It may also be a physical switch separate from the metering equipment, but connected or in communication with the metering equipment.

In a step 103 a privacy profile is determined on the basis of the service profile and the detected privacy level. This

determination may be done, when each of the service profile and the detected privacy level are available. The privacy profile may comprise and/or indicate all metering services addressed or included in the service profile, that are
5 compliant with the detected privacy level. Each of these services may comprise the type of the service, e.g., read out the electricity consumption meter, and details describing the service more completely, such as a time schedule and/or events that may cause the start of the service. The
10 description of such service may comprise an indication of the grade of confidentiality a service provider has assigned to the metering service. The determination of the privacy profile may lead to an empty privacy profile, if due to a requested high privacy level no service in the service
15 profile can be found, that is compliant with the requested privacy level. Determining of the privacy profile may also lead to including a service form the service profile with a modified service description. According to the requested privacy level a read out schedule with high frequency, e.g.
20 hourly provision of the metering information, might be changed to a schedule with lower frequency, e.g. once a month or once per year. The service description may also comprise at least one destination address, the metering information assigned to such service is to be delivered to. As well more
25 than one destination addresses may be present in the service description.

In an optional step 104 the metering information to be provided may be captured according to the privacy profile.
30 This provides the advantage, that only such metering information is requested and captured, that will be provided. Thus resources, such as e.g. performance, bandwidth, memory, are not unnecessarily used, loaded or blocked. As well no data are generated and/or accumulated and/or stored, that are
35 not permitted to be provided due to confidentiality aspects, e.g., a confidentiality requested by the user.

In a step 105 metering information in accordance to the privacy profile is provided over a communication network. Such metering information in advance of the providing may have to be requested from other equipment or simply to be
5 read out of a local memory. The provision of the metering information will be according to the at least one destination address. Depending on the service description a fall back address may be used, if communication to a first address is not possible, as well a replication or broadcast/multicast of
10 the metering information to a multitude of addresses may be supported according to the service description.

The method ends with step 106.

15 **Fig.2** presents a simplified block diagram of an embodiment for illustration of an information flow assigned to an apparatus 200 receiving a service profile 201 and providing metering information 202. The service profile 201 is provided over a communication network 203 and received by a receiving
20 means 204 of the apparatus 200. Receiving means 204 may for instance comprise an Ethernet based interface and the communication network may be an IP based network. Thus the service profile 201 may be transmitted as Ethernet based and/or IP based message to the receiving means 204. Via a
25 communication relationship 210 the service profile 201 or essential parts thereof are provided to a determining means 207 of the apparatus 200 by the receiving means 204.

Apparatus 200 may comprise a manual input unit for a manual
30 input 220, e.g. a switch, allowing a user to configure locally the grade of confidentiality, he/she wishes to be guaranteed. For this purpose the manual input shows 2 positions, indicated with Level 0 and Level 1, which may represent two alternative privacy levels, the user may select
35 locally at the apparatus 200. Due to the mechanical character of the manual input unit it may be at the same time also a mechanical indication showing the user's selected privacy level via the selectable positions Level 0 and Level 1.

Position Level 0 may represent, that no privacy is requested. Position Level 1 may represent, that privacy is requested. As depicted, Level 1, i.e. privacy required, has been selected by the user. The privacy level is detected by a detecting
5 means 206 of the apparatus and provided to the determining means 207 via a communication relationship 211. The detected privacy level may be provided by the detecting means 206 on event of a change of the position of the manual input or/and it may be provided repeatedly on a timely basis or/and it may
10 be provided on request of the determining means 207.

Once the determining means 207 has available the service profile 201 or its relevant parts and the detected privacy level, the determining means 207 determines a privacy profile
15 on the basis of the service profile 201 or its relevant parts and the detected privacy level. For example the service profile 201 may comprise as information elements a first service of a daily providing of the electric power consumption of the user's household, a second service
20 providing the electric power consumption of the user's household annually and in the event of a changing price, and a third service providing signatures of electrical equipment in the user's household, the latter, e.g., in order to advice the user, with respect to reducing the energy consumption or
25 updating possibly ineffective electrical devices in the user's household. These services may have indicated their assigned confidentiality within the service profile 201. Thus the first and the third service may be marked in their service descriptions as being assigned to privacy level 0,
30 whereas the second service may be marked analogously as being assigned to privacy level 1. In this case the determining means 207 will determine a privacy profile on the basis of the service profile and the detected privacy level, i.e. Level 1, which solely comprises the second service.
35 Accordingly the apparatus 200 will provide metering information once a year, e.g., at the end of a year, and when being informed of points in time, at which a price change occurs.

At these points in time, the apparatus 200 may receive information 213 comprising a read-out electrical power consumption, which is provided to a capturing means 208 of the apparatus 200, from where it may be provided via a communication relationship 214 to the determining means 207, which may check an intermediate change of the privacy profile and forward the captured read-out electrical power consumption via a communication relationship to a providing means 205 of the apparatus 200. The providing means 205 provides the captured read-out electrical power consumption as the provided metering information 202 over the communication network 203, e.g., to a network address of the public utility company providing the electric power for the user's household. The providing means 205 may comprise a further Ethernet interface to the communication network 203. Thus the provided metering information 202 may be transmitted as Ethernet based and/or IP based message by the providing means 205. As option the receiving means 204 and the providing means 205 may use a common interface to the communication network, e.g. a common Ethernet interface.

The mentioned communication relationships may be bus, message, and/or signal based, preferably, but not necessarily allowing a message based communication between the structural elements of the apparatus 200.

Fig.3 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to different possibilities of adapting a privacy level. As depicted in Fig. 2 the manual input 220 at the manual input unit may be used for adapting the privacy level, in which case the detecting means 206 may detect the adapted privacy level, and provide this information to the determining means 207 for re-determining the privacy profile. Thus the detecting means 206 also acts as an adapting means for adapting the privacy level responsive to a manual input 220 at the apparatus 200. Fig. 3 illustrates further options of adapting the privacy level

that may be alternatively and/or additionally available in an apparatus 300 for providing metering information.

5 The apparatus 300 may be positioned and installed in such a way, that the user may see the apparatus or at least an power consumption counter/display of or connected to the apparatus, despite the fact, that the apparatus itself may be due safety and/or security reasons locked from the user. The visibility of the apparatus enables a control of the privacy level via
10 infrared based communication. For this purpose the apparatus 300 may comprise an infrared input unit 322, which is adapted to communicate with a infrared based remote control unit 320 the user has access to. For adapting the privacy level the user may initiate via the remote control unit 320 an infrared
15 input 321, which will be detected by the infrared input unit 322 and provided via a communication relationship 323 to an adapting means 306 of the apparatus 300.

If infrared based communication with the apparatus 300 may
20 not be possible, the control of the privacy level may still be possible via a radio frequency input 331 to the apparatus, e.g. a 433 MHz signal, which may enable such communication as long as the apparatus is in the same house or in the near of the user's apartment. For this purpose the apparatus 300 may
25 comprise an radio frequency input unit 332, which is adapted to communicate with a radio frequency based remote control unit 330 the user has access to. For adapting the privacy level the user may initiate via the remote control unit 330 the radio frequency input 331, which will be detected by the
30 radio frequency input unit 332 and provided via a communication relationship 333 to the adapting means 306 of the apparatus 300.

The user may as well have the possibility of initiating a
35 privacy level message 324, which may be provided to the apparatus 324 via a communication network 303. Such message may be provided by a direct communication of the user's PC or telephone with the apparatus 300. As well such privacy level

message may be relayed via a server of the user's public utility company or may be generated by a user portal functionality provided by the user's public utility company.

5 In form of the privacy level message 324 the user may as well communicate the privacy level to the apparatus 300. The privacy level message may be received by a network interface unit 304 of the apparatus 300, which may forward the privacy level message or its essential parts to the adapting means
10 306 via a communication relationship 325.

Responsive to receiving a privacy level update via one of the communication relationships 323, 333, or 325, the adapting means 306 forwards an accordingly detected adapted privacy
15 level to a determining means 307, which is adapted to re-determine the privacy profile on base of the service profile and the adapted privacy level 311.

Fig.4 presents a simplified block diagram of an embodiment
20 for illustration of an information flow assigned to different possibilities of providing a privacy level information and/or indication. A determining means 407 of an apparatus 400 for providing metering information may be aware of the current privacy level, the user has requested by one of the
25 aforementioned possibilities of adaptation of the privacy level.

For optical indication of the current privacy level, the apparatus may comprise a optical display 431, to which the
30 determining means 407 provides the current privacy level via a communication relationship 432 for the purpose of supporting a visible indication of the current privacy level.

As well the apparatus 400 may comprise an infrared sender
35 434, which may receive from the determining means 407 via a communication relationship 433 information on the current privacy level for providing an infrared signal 435 to an

infrared receiver 436 of the user, thus providing the current privacy level to the user's infrared receiver 436.

As well the apparatus 400 may comprise a radio frequency
5 sender 444, which may receive from the determining means 407
via a communication relationship 443 information on the
current privacy level for providing a radio frequency signal
445 to a radio frequency receiver 446 of the user, thus
providing the current privacy level to the user's radio
10 frequency receiver 446.

Alternatively or in addition the apparatus 400 may comprise
an interface unit 405 to a communication network 403, which
may receive from the determining means 407 via a
15 communication relationship 412 information on the current
privacy level for providing a message 430 indicating the
current privacy level to the communication network 403, thus
enabling a providing the current privacy level to a device
connected to the network 403, the user has access to. Such
20 device may preferably be the user's PC or smart phone.

Fig.5 presents a simplified block diagram of an embodiment
for illustration of an information flow assigned to receiving
a request to provide a metering information. An apparatus 500
25 may comprise a receiving means 551 for receiving a request
550 from a communication network 503 to provide metering
information 502 over the communication network 503.

The receiving means 551 may forward the request 550 via a
30 communication relationship 552 to a determining means 507.
Responsive to receiving information on the request via the
communication relationship 552, the determining means 507 may
request a capturing means 508 for capturing of the metering
information in accordance to a privacy profile available to
35 the determining means 507. Responsive to the request of the
determining means 507, the metering related information 513,
e.g. comprising consumption and/or production relevant data,
in particular counters representing energy, gas and/or water

throughput, may be received by the capturing means 508 and may be forwarded via a communication relationship 514 to the determining means 507, from where it is forwarded via a communication relationship 512 to a providing means 505 for providing over the communication network 503 the metering information 502 in accordance to the privacy profile.

Fig. 6 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to receiving and filtering of external metering information 623, 624, 625 and providing the filtered external metering information 602.

An apparatus 600 may be communicatively coupled with a first metering equipment 633, e.g., a water consumption metering module, with a second metering equipment 634, e.g., a gas consumption metering module, and/or with a third metering equipment 635, e.g., a electricity consumption metering module. These metering equipments may not have a direct interface to a communication network 603 for providing their metering information over the communication network 603. They also may not have the logic to support the privacy and/or confidentiality of their metering information requested by a user. The communicative coupling of the metering equipments 633, 634, 635, and said apparatus 600 may in particular be established via LAN and/or WLAN techniques, available, e.g., typically in a home network of the user's household.

For the purpose of providing the metering information provided by these metering equipments 633, 634, 635 the apparatus 600 comprises an interface unit 644 for receiving the external metering information 623 of the metering equipment 633, for receiving the external metering information 624 of the metering equipment 634, and/or for receiving the external metering information 625 of the metering equipment 635. The interface unit 644 may forward the received metering information 623, 624, and/or 625 via a communication relationship 614 to a determining means 607 of the apparatus 600. The determining means 607 may process

and/or forward via a communication relationship 612 the metering information received via the communication relationship 614 in accordance to a privacy profile determined on the basis of a service profile and a detected
5 privacy level, the user has requested. A providing means 605 may provide over the communication network 603 the metering information received via the communication relationship 612 in accordance to the determined privacy profile.

10 **Fig.7** presents a simplified block diagram of an embodiment for illustration of an information flow assigned to providing the metering information to two destinations over a communication network 703.

15 An apparatus 700 for providing metering information may comprise capturing means 708 for receiving metering related raw information 713, e.g., information comprising a read-out electrical power, gas, and/or water consumption, which may be provided via a communication relationship 714 to a
20 determining means 707, which has available a privacy profile determined according to a privacy level requested by a user of the apparatus 700 and according to a service profile provided, e.g., by the user's public utility company.

25 The determining means 707 may forward the metering information received from the communication relationship 714 via a communication relationship 712 in accordance to the privacy profile determined on the basis of the service profile and the privacy level, the user has requested. A
30 providing means 705 after appropriate processing may provide over the communication network 703 and in accordance to the determined privacy profile the processed metering information as a first message 702 to a first network destination and as a second message 760 to a second network destination. The
35 processed metering information may be included in both said messages as being received via the communication relationship 712.

Alternatively a distribution to a second and further network addresses may be realized by providing the said metering information 702 by the providing means 705 to a network address, that is configured to act as a multicast and/or
5 broadcast supporting network address.

Fig.8 presents a simplified block diagram of an embodiment for illustration of an information flow assigned to an metering equipment 800.

10

Following internal or external modules of the metering equipment 800, e.g. a smart metering module, may be present:

- Water meter module
- Gas meter module
- 15 - Electricity meter module

The modules may comprise sensor elements to transduce the water flow rate, gas volume or electrical usage into measureable values. Fig.8 presents the case of an internal electricity meter module, comprising sensors 872, 873 and
20 isolation 874. E.g., the voltage sensor 872 and the current sensor 873 may be connected to a three phase electrical supply 890 of a user's household.

The water meter and gas meter modules may comprise computing
25 means, i. e., at least a microcontroller with plurality of input and/or output ports configured to control and transceive information to/from a flowmeter, i.e. an instrument used to measure linear, nonlinear, mass or volumetric flow of a liquid or gas. Thus a microcontroller
30 may interface to the water or gas flow meter, which may be or represent special metering devices.

For example an ultrasonic transducer assembly may be configured to determine the flow rate present in a water
35 pipe. This may be determined from the difference due to the Doppler effect between the transmitting transducer and receiving transducer attached to the water pipe, the velocity measurement is then converted into the measurement of water

volume. Based on the diameter of the pipe and distance between the transducers, and speed of sound in water. The water flow meter output may comprise a digital pulse (either galvanic or optical output) corresponding to a predetermined
5 unit (liter/min) or specific volume of water. This may be interfaced to the metering equipment 800, e.g. a smart meter, via galvanic, optical or radio means. Typically the water flow meter output may be determined by the manufacturer, some water flow meters may also offer additional features such as
10 leakage detection. For diagnostic purposes the interface from the water flow meter to the smart meter may comprise a digital bus such as a third generation SCADA. Measurement values may be current flow rate in liters/min for a metric water meter or gas volume in cubic meters (or feet).

15 The electricity meter module may comprise computing means, in particular a microcontroller, i.e., a processor with internal memory, memory management, and application specific interfaces such as serial communications, radio, logic input
20 and/or output port, etc., configured, e.g., to determine the consumption of electrical power used in kilowatt hours. The consumption is calculated by integrating the voltage and current transducer measurements over time. (RMS load $P = V * A$) Measurement values may comprise a consumed value, e.g., as
25 kW/hour.

The smart module 800 may further comprise an embedded microcontroller 807 for determining a privacy profile and providing metering data according to the determined privacy
30 profile. The microcontroller 807 may contain program memory, data memory and non-volatile memory, timers and/or real time clock used during the execution of a control program. The microcontroller 807 may have access to analog or digital input and/or output ports 806. The analog or digital input
35 and/or output ports 806 may be connected via the isolation unit 874 with the sensors 872 and/or 873. The module 800 may detect changes on a local control and configuration interface 870 via a communication relationship 814 and changes at the

analog or digital input ports 806 via a communication relationship 811 to provide output to a local display 871 via a communication relationship 813 and/or to transmit via a communication relationship 812 the result of measurements as
5 determined by the microcontroller 807 to a network interface unit 804 connected to a communication network 803.

Metering information related measurement data may be collected using application specific transducers at the analog or digital input ports 806.

10 Metering information in accordance to the privacy profile of the user may be provided to the network interface unit 804 for transmission to a MASTER device, e.g. a server or server farm of the user's utility company in an M2M core network via a message 805 over the communication network 803. As well the
15 smart module 800 may periodically send metering information according to the privacy profile selected by the user via the network interface unit 804, e.g. due to a configuration via the local control and configuration means 871.

Provision of the metering information may be responsive to a
20 request 801 received in a receiving interface unit 802 connected to the communication network 803, wherein the receiving interface unit 802 may forward the request 801 via an communication relationship 810 to the microcontroller 807. The interface unit 802 and/or the interface unit 804 may
25 provide power management functionality, comprise Ethernet communications means, provide SCADA functionality, and/or comprise radio interface means. Instead of SCADA also zigbee, bluetooth or wifi may be used in further embodiments of the invention.

30 **Fig.9** presents a simplified block diagram of an embodiment for illustration of an metering equipment 900 with external modules 983, 984, 985, remote privacy control 946, and remote web browser access;

35 The metering equipment 900, e.g., a smart meter device, may include a front control panel 960, display 961 and keyboard 962 together with interface modules that may be either local

to the device or remotely located. The smart meter 900 may determine based on the external modules present a volume and/or a amount of energy consumed and/or produced.

The smart meter 900 either on request or after a
5 predetermined period may communicate metering information to an ETSI M2M compliant core apparatus, which may be connected via a M2M core network 902.

If the metering information is determined by the user to be of a "private" nature the user may override the smart meters
10 ability to communicate such metering information.

The user may select a privacy mode by operating a switch local to (on) the smart meter, or in the case of a centralized meter infrastructure via the remote control device 946 local to the user. Such changes may be transmitted
15 using, e.g., wifi, zigbee or galvanic connections to the smart meter. The smart meter may indicate the state of the privacy via, e.g., the local display 961 or one located remotely. In the case of remote control the smart meter may transceive related control messages via a network interface module 970
20 to a local radio / optical network 903.

In addition to the above, web based control via a computer 999 having a Web browser and being connected to the internet 908 is a further embodiment where the computer may access the smart meter 900 via a Machine to Machine gateway node 909.
25 The latter establishes connection between the M2M core network 902, the local radio/ optical network 903, and the internet 908.

The smart meter 900 may communicate via the local radio, in particular including, e.g., a 3G interface. In the latter
30 case a smart card 987 may be required. This smart card may also contain provisioning information from the operator, e.g. the user's public utility company. To indicate the state of the privacy, if a control message cannot be delivered via the local radio /optical network 903, or internet means, privacy
35 may be linked to a set of operating device profiles. Information elements present in the device may be signaled according to a version of ETSI M2M TS 102690.

The smart meter 900 may be connected to the external module 983, which, e.g., may be a water module, to the external module 984, which, e.g., may be a gas module, and/or to the external module 985, which, e.g., may be a electricity
5 module. For connecting to the external modules the smart meter 900 comprises a module interface unit 934, which is communicatively coupled to a determining means 907, which may be processor based. The determining means is communicatively coupled to the front control panel 960, a privacy interface
10 940, and/or a provisioning interface unit 936 for connecting to the smart card 987. The privacy interface 940 is communicatively coupled to the network interface module 970 and to the privacy subsystem 910. The latter comprises a privacy switch 920 for input of a privacy level selected by a
15 user, a privacy indicator unit 931 for indicating the selected privacy level locally and/or to remote equipment and for control of dependent remote metering equipment, that uses the smart meter 900 to provide its metering related data under control and support of the smart meter 900. For that
20 purpose the privacy indicator unit 931 is communicatively coupled to a control unit 945 for remote equipment. The control unit 945 for remote equipment is communicatively coupled to such remote equipment via a remote privacy interface unit 944. Such remote equipment may be pure privacy
25 indicator equipment as remote displays or further smart meters.

Associated with an information element may be an access rights element.

During a determination and information providing phase, if
30 the smart meter 900 determines that one of the information elements has been over-ridden by the user's privacy profile, the element may not be signaled/communicated to the M2M core.

Application of the privacy profile may be determined based on
35 the fact that information elements, the smart meter SHALL NOT transmit, are not provided. Alternative elements, e.g. dummy values, may be provided or otherwise may indicate that a privacy profile based feature is enabled.

Communication according to ETSI TC M2M definition is transport agnostic. In order to fulfill a privacy or confidentiality restriction, it must cope with any protocol. Thus for a given protocol containing a specific information element, the privacy profile SHALL refer to this element, if the user wishes to restrict its transmission with respect to this element.

The information element MAY also be tokenized or obfuscated so its meaning may not be obvious, e.g., 0x3418 may correspond to the information element that carries the "building number" as indicated in the following example:

During the construction of a message body containing a number of information elements the smart meter may determine, that the privacy control is enabled, and will accordingly for instance not populate the message body with the name, identification or building number as indicated.

If privacy enabled, elements="name, id, building number" may be disallowed. If privacy is disabled, all elements may be allowed.

Advantageously this gives the end user the control over the dissemination of any collected metering information by adding a "privacy switch" local or remote to the, e.g., electrical meter to restrict the flow of information, thus putting control back in the hands of the end user. In summary the user may request to not to monitor his meter beyond the information really need, e.g., for determination of a power consumption.

According to ETSI TC M2M standard a resource tree may be used to describe the properties of the device, the resources may have additional access rights associated with the parameters / values. A physical galvanic or optical switch or a key set by remote administration via, e.g., a web interface, where an element in the resource tree or element local to the smart meter is permanently marked as "not readable" according to the application of a profile mask for the specific device. Different levels of control maybe possible using templates,

restricting the amount of information the smart meter 900 discloses based on a selected privacy profile. Examples are: "All metering information restricted" (no access to a certain element), "access restricted to energy provider or an identified resource" and "unrestricted".

The privacy profiles may be active dependent on, e.g., a physical location of a slider 920 present at the front of the smart meter 900. In the case that physical access to the smart meter 900 is not possible the smart meter 900 includes radio technology to both indicate the status of the privacy (on/off or the specific profile applied) and to allow control via, e.g., infrared, galvanic switch or slider, or via a control signal from a home automation system. According to a further embodiments administration of the privacy profiles and/or selection of a privacy level via a remotely located indicator panel with control means (one or more), a web interface, if the smart meter supports remote administration, or a web interface to the utility companies' smart meter management system may be available.

According to a further embodiment at least two profile templates that are used to change the access right values applicable to privacy may be present. (Privacy Enabled or Public/Disable). The associated values used in an access right element present in the table below depend on an actual implementation, or specifically an element they are protecting. The template matches elements related to access rights in any service control logic. Access rights may be part of the service capability layer structure SCL according to the following example, which may be dependent on an implementation:-

<sclBase1>

n - "attribute"

1 - scls

--- applications

1 - container

1 - groups

1 - accessrights
1 - subscriptions
...

5 This structure may be represented differently in a given device. XML or similar language may be needed for coding.

```
<manufacture><model>device id<parameter><value>  
<manufacture><model>device id<parameter><access rights>
```

10

When the device receives a request to transmit the value of a particular element in the structure, this may be represented as:

15 nsn/smv1/id1234/voltage/220V -

An associated access right may be present represented as:-
nsn/smv1/id1234/accessright/public

The enumeration of the access right given above may be
20 "public", "private", "internal" - given as possible examples only.

A device profile may be created that indicates the access rights that are applicable to privacy for a given device in a
25 given state.

Possible states may be "Privacy Enabled", "Privacy Disabled". Also further states may be allowed, e.g. "partial privacy".

30 A SET of access rights associated with device parameters maybe bundled to form a profile:-
profile name, privacy significance, [elements applicable]

An encoding may depend on an implementation.

A device profile

<devicelog>

<manufacture><model>device id<device

5 log><entry1><entry2><entry X>

<accessrights="public">

would allow the device log to be accessed.

A device profile

10 <devicelog>

<manufacture><model>device id<device

log><entry1><entry2><entry X>

<accessrights="private">

would not allow the device log to be accessed.

15

Thus a mechanical switch or slider representing two or more states (or positions) that correspond to profiles built in by the smart meter vendor may be linked. One possible implementation "restricted" and "unrestricted" or simply
20 "private" and "public" switch may be supported by and incorporated in the meter. This a software delineable state results with the state of the switch causing actions in software to either:-

1. allow the smart meter to discover and relay signature
25 information. (privacy profile = public)

or

2. disallow the smart meter from collecting information about any devices present on the electrical distribution circuit. (privacy profile = private)

30

The smart meter may also be a smart "plug" that is plugged into an electrical socket, followed by a device plugged into it.

The privacy restriction may apply to the whole meter or only one or more groups of its load circuits.

Thus a control means to restrict or allow access to
5 information contained in a smart meter based on preloaded or
remotely configured profiles. The profile describes the
information elements that fall under the restriction, if the
profile matches an information element during the
transmission of information, the information is dropped, or
10 an error condition is raised. Further the profile may enable
or disable certain data collection / logging abilities that
may be built into the smart meter.

Abbreviations:

	ATM	Asynchronous Transfer Mode
	CD	Compact Disk
5	DVD	Digital Versatile Disk
	BD	Blu-ray Disk
	DSL	Digital Subscriber Line
	HTTP	Hypertext Transfer Protocol
	IP	Internet Protocol
10	M2M	Machine to Machine
	RMS	Root Mean Square (square root of the arithmetic mean (average) of the squares of original values)
	SCADA	Supervisory Control and Data Acquisition
15	Wi-Fi	Trademark of Wi-Fi Alliance (Wi-Fi enabled device with access via wireless access network/hotspot)
	WLAN	Wireless Local Area Network

Claims:

1. A method for providing metering information comprising:

- 5 - Receiving a service profile (101);
- Detecting a privacy level (102);
- Determining a privacy profile on the basis of the service
 profile and the detected privacy level (103);
- 10 - Providing over a communication network (203) the metering
 information in accordance to the determined privacy
 profile (105).

2. The method according to claim 1,
wherein the determining (103) comprises:

- 15 - Selecting the privacy profile on the basis of the detected
 privacy level from a plurality of privacy profiles in the
 service profile.

3. The method according to claim 1,
20 wherein the determining (103) comprises:

- Generating in the privacy profile at least one access
 right state on the basis of at least one information
 element of the service profile and on the basis of the
 detected privacy level.

25

4. The method according to claim 3,
wherein a portion of the metering information is associated
to the at least one information element.

- 30 5. The method according to any of the preceding claims,
 wherein the service profile is associated with at least one
 device signature service.

6. The method according to any of the preceding claims,
further comprising:

- Capturing the metering information in accordance to the
privacy profile (104).

5

7. The method according to any of the preceding claims,
comprising:

- Adapting the privacy level responsive to at least one of
 - o a manual input (220) at a metering equipment (200);
 - 10 o an infrared input (321) to a metering equipment
(300);
 - o a radio frequency input (331) to a metering
equipment (300);
 - o a privacy level message (324) received by a
 - 15 metering equipment (300); and
- Re-determining the privacy profile on the basis of the
service profile and the adapted privacy level (311).

8. The method according to any of the preceding claims,
20 comprising:

- Providing the privacy level via at least one of
 - o a mechanical indication (220) at a metering
equipment (200);
 - o an optical display (431) at a metering equipment
 - 25 (400);
 - o an infrared signal (435) by a metering equipment
(400);
 - o a radio frequency signal (445) by a metering
equipment (400);
 - 30 o a message (430) provided by a metering equipment
(400);

9. The method according to any of the preceding claims,
comprising:

- Receiving a request (550) from the communication network (503) to provide the metering information (502),
- 5 - wherein the providing over the communication network (503) of the metering information is responsive to the request (550).

10. The method according to any of the preceding claims,
10 comprising:

- Receiving external metering information (623, 624, 625);
- Filtering the external metering information in accordance to the privacy profile,
- wherein the provided metering information (602) comprises
- 15 the filtered external metering information.

11. The method according to any of the preceding claims,
comprising:

- Providing the metering information (702, 760) to at least
- 20 two destinations via the communication network (703).

12. The method according to any of the preceding claims,
wherein the service profile, an element of the service
profile, an access right state attribute assigned to the
25 element, the privacy profile, and/or a request for providing
metering information are defined according to an ETSI M2M
standard, in particular according to a version of ETSI TS 102
690.

30 13. The method according to any of the preceding claims,
wherein the service profile is received from the
communication network (203).

14. An apparatus for providing metering information,
comprising:

- 5 - Receiving means (204) for receiving a service profile
 (201);
- Detecting means (206) for detecting a privacy level;
- Determining means (207) for determining a privacy profile
 on the basis of the service profile and the detected
 privacy level;
- 10 - Providing means (205) for providing over a communication
 network (203) the metering information (202) in accordance
 to the determined privacy profile.

15. The apparatus according to claim 14,
15 wherein the determining means (207) comprises:

- Selecting means for selecting the privacy profile on the
 basis of the detected privacy level from a plurality of
 privacy profiles in the service profile.

20 16. The apparatus according to claim 14,
 wherein the determining means (207) comprises:

- Generating means for generating in the privacy profile at
 least one access right state on the basis of at least one
 information element of the service profile and on the
25 basis of the detected privacy level.

17. The apparatus according to claim 16,
wherein a portion of the metering information is associated
to the at least one information element.

30

18. The apparatus according to any of claims 14 to 17,
wherein the service profile is associated with at least one
device signature service.

19. The apparatus according to any of claims 14 to 18,
further comprising:

- Capturing means (208) for capturing the metering
information in accordance to the privacy profile.

5

20. The apparatus according to any of claims 14 to 19,
comprising:

- Adapting means (206, 306) for adapting the privacy level
responsive to at least one of

- 10 o a manual input (220) at a metering equipment (200);
- o an infrared input (321) to a metering equipment
 (300);
- o a radio frequency input (331) to a metering
 equipment (300);
- 15 o a privacy level message (324) received by a
 metering equipment (300);

- wherein the determining means (307) is adapted to re-
determine the privacy profile on base of the service
profile and the adapted privacy level (211, 311).

20

21. The apparatus according to any of claims 14 to 20,
comprising:

- Providing means (407) for providing the privacy level via
at least one of

- 25 o a mechanical indication at a metering equipment;
- o an optical display (431) at a metering equipment
 (400);
- o an infrared signal (435) by a metering equipment
 (400);
- 30 o a radio frequency signal (445) by a metering
 equipment (400);
- o a message (430) provided by a metering equipment
 (400);

22. The apparatus according to any of claims 14 to 21,
comprising:

- Receiving means (551) for receiving a request (550) from
5 the communication network (503) to provide the metering
information;
- wherein the providing over the communication network (503)
of the metering information is responsive to the request
(550).

10

23. The apparatus according to any of claims 14 to 22,
comprising:

- Receiving means (644) for receiving external metering
information (623, 624, 625);
- 15 - Filtering means (607) for filtering the external metering
information in accordance to the privacy profile;
- wherein the provided metering information (602) comprises
the filtered external metering information.

20

24. The apparatus according to any of claims 14 to 23,
wherein the providing means (705) are adapted to provide the
metering information (702, 760) to at least two destinations
via the communication network (703).

25

25. The apparatus according to any of claims 14 to 24,
wherein the service profile, an element of the service
profile, an access right state attribute assigned to the
element, a privacy profile, and/or a request for providing
metering information are defined according to an ETSI M2M
30 standard, in particular according to a version of ETSI TS 102
690.

26. The apparatus according to any of claims 14 to 25,

wherein the service profile is received from the communication network (203).

27. The apparatus according to any of claims 14 to 25,
5 wherein the apparatus is a or is part of a metering equipment.

28. A system for providing metering information comprising:

- the apparatus according to any of claims 14 to 27,

10 the system further comprising at least one of:

- a water metering module, in particular a warm and/or cold water metering module, communicatively coupled to the apparatus;

15 - a domestic wastewater metering module communicatively coupled to the apparatus;

- a rainwater and/or drinking water production metering module communicatively coupled to the apparatus;

- a gas consumption and/or production metering module communicatively coupled to the apparatus;

20 - an electricity consumption and/or production metering module communicatively coupled to the apparatus;

- a district heating metering module communicatively coupled to the apparatus;

25 - a smart card reader communicatively coupled to the apparatus;

- a central service control logic providing the service profile and/or receiving the metering information;

- a terminal connected to the communication network adapted to send a message to the apparatus and/or receive a

30 message provided by the apparatus.

Fig. 1

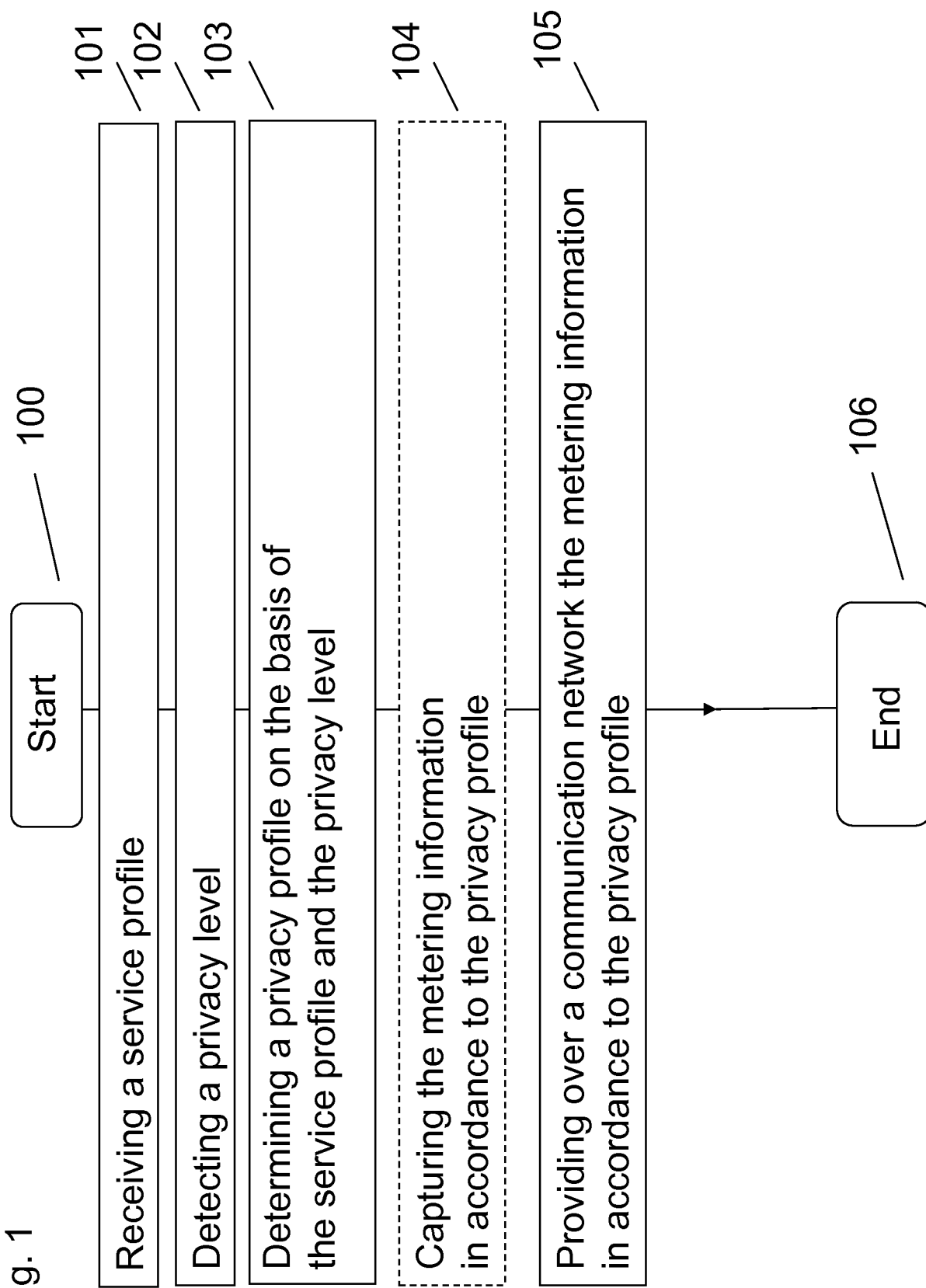
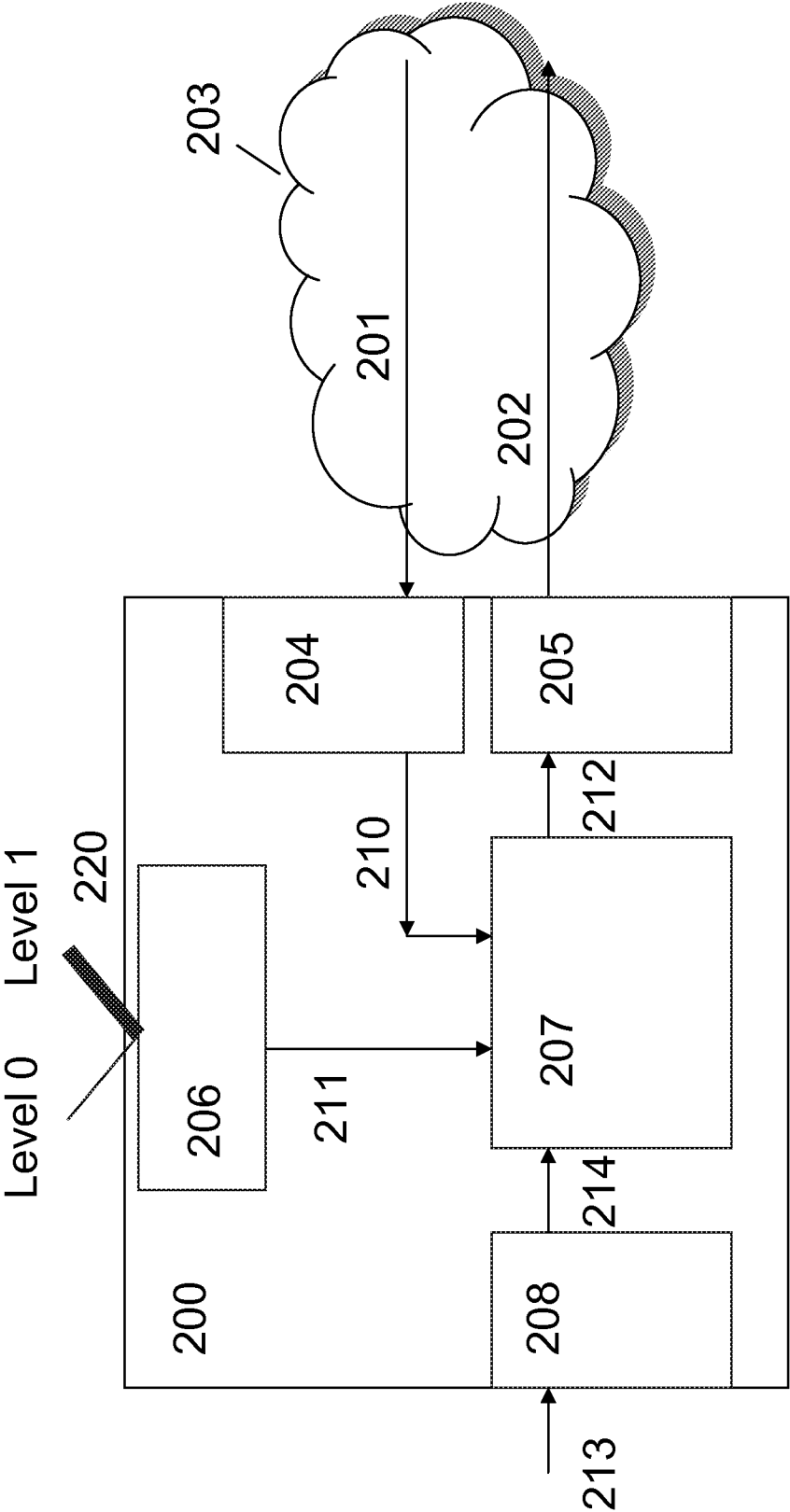


Fig. 2



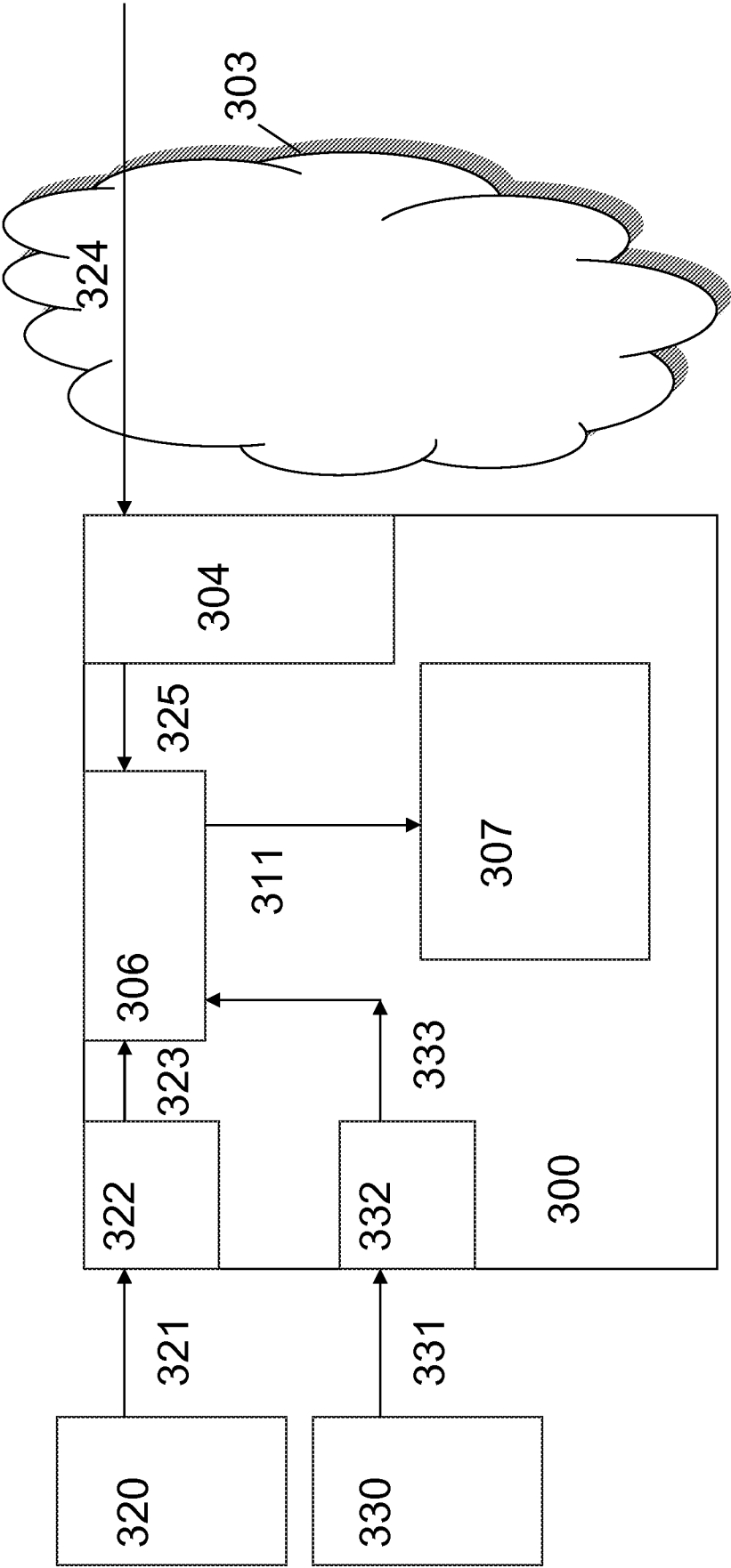


Fig. 3

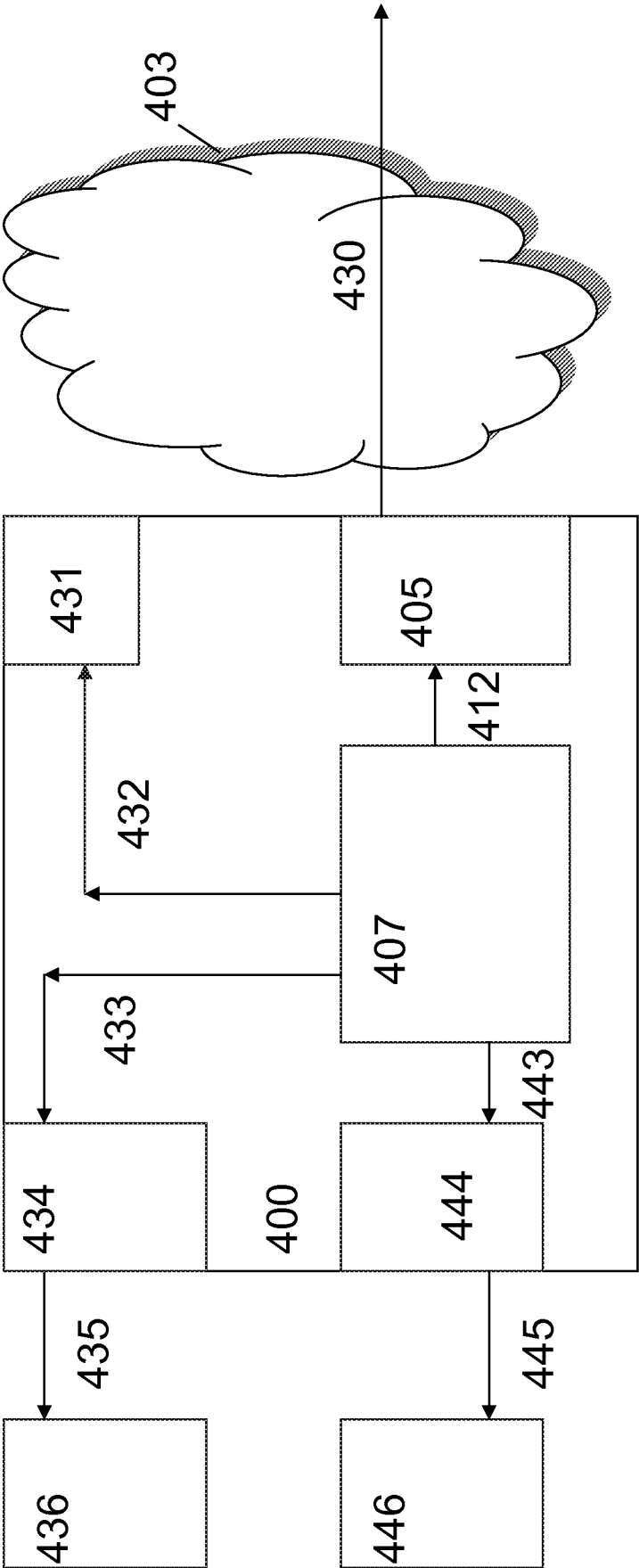
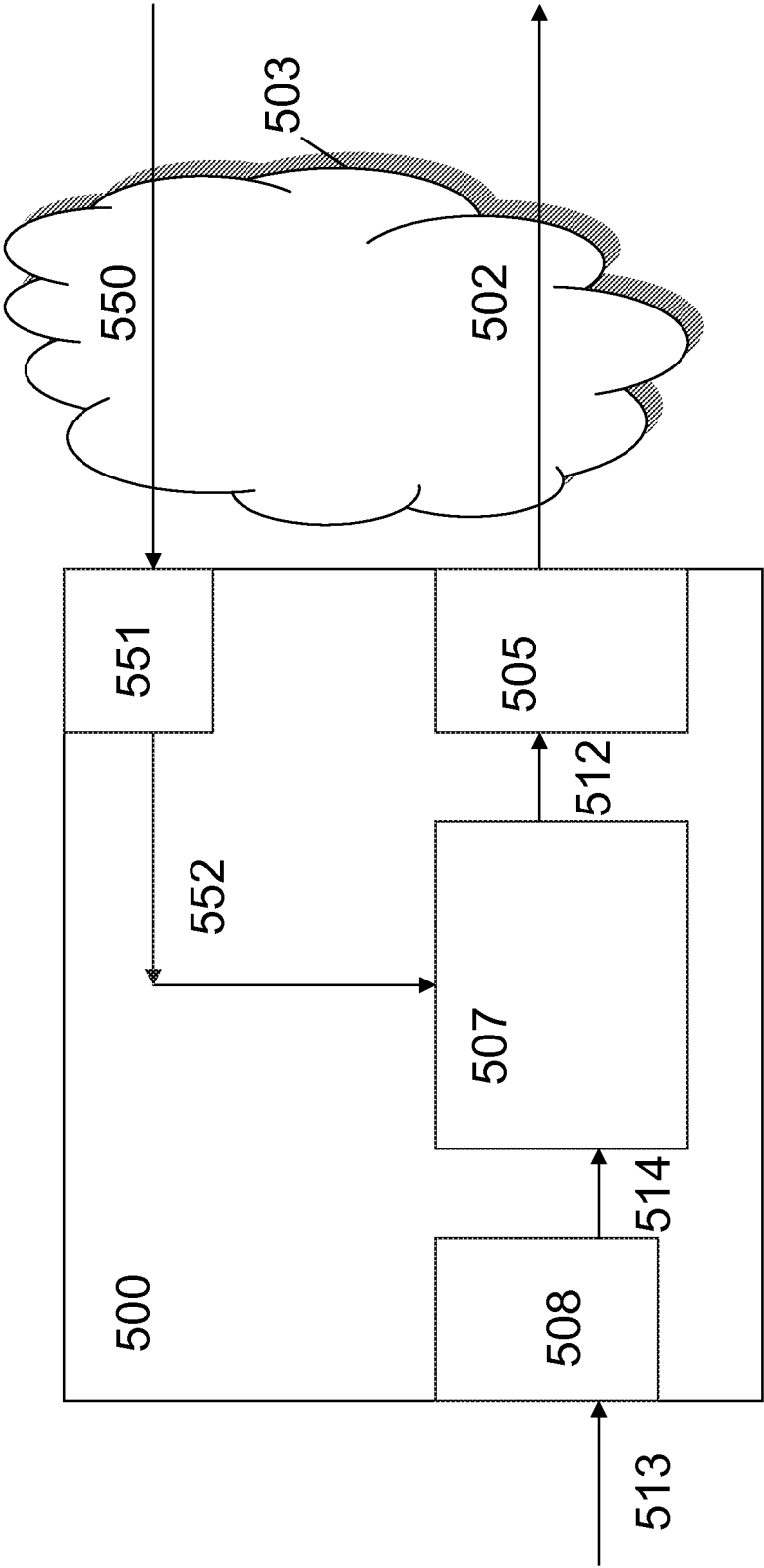


Fig. 4

Fig. 5



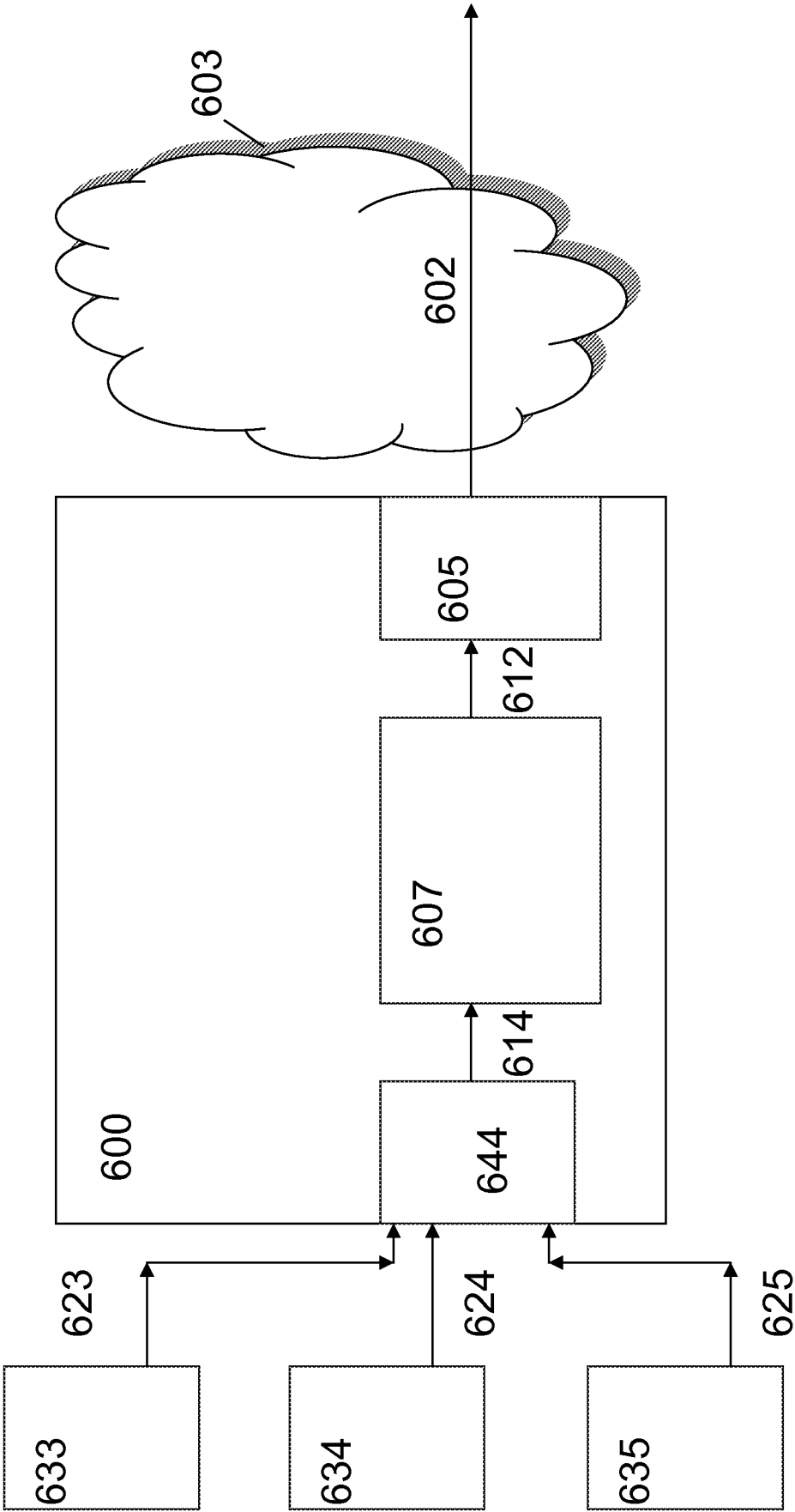


Fig. 6

Fig. 7

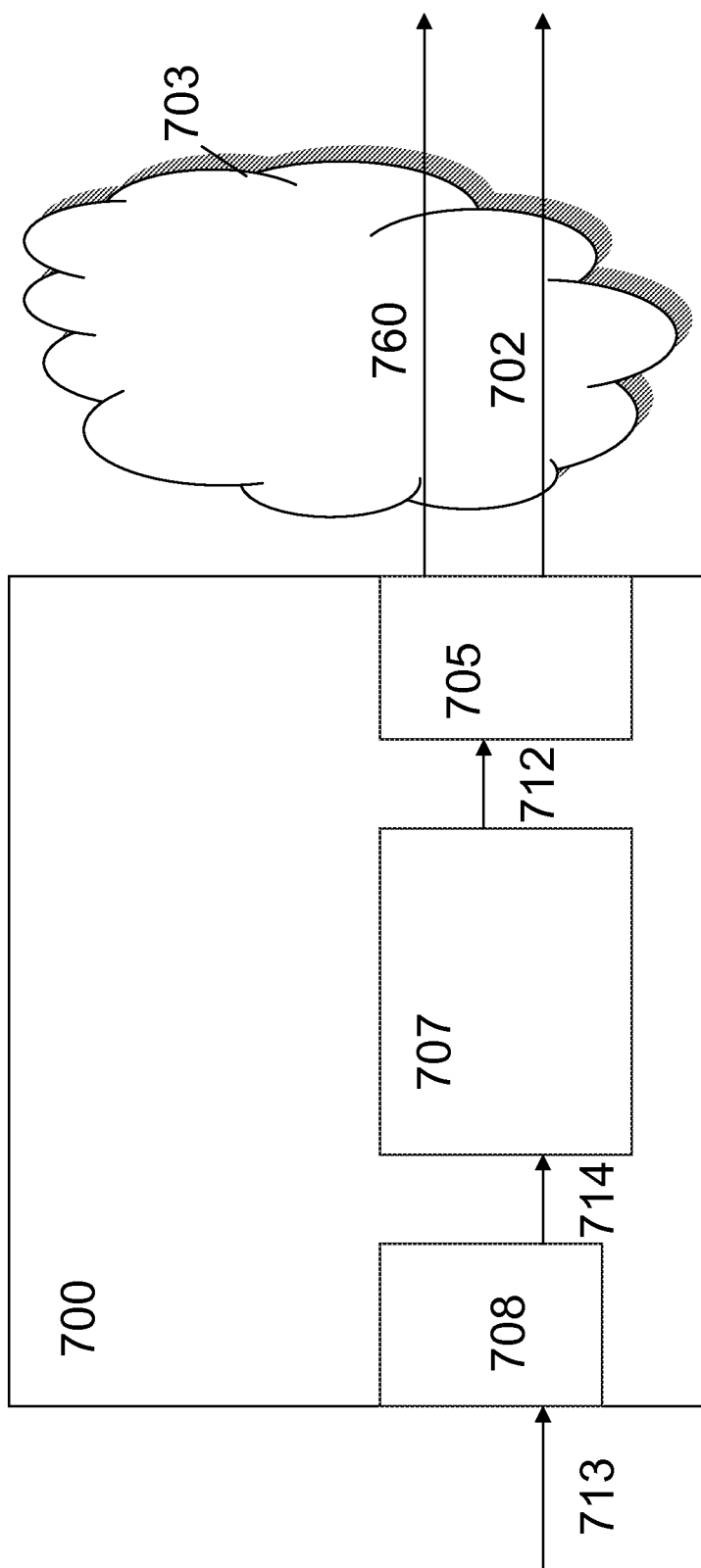


Fig. 8

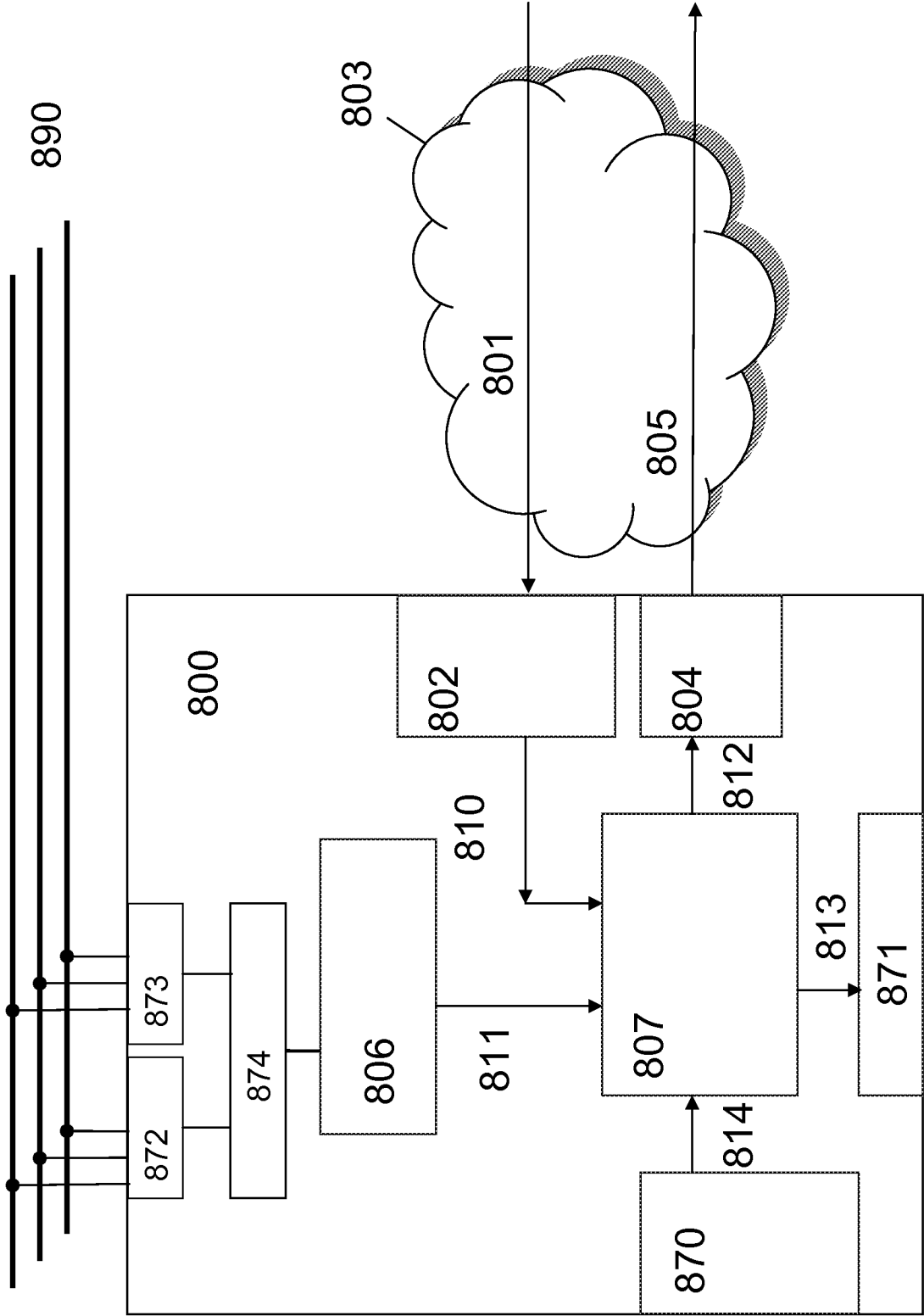
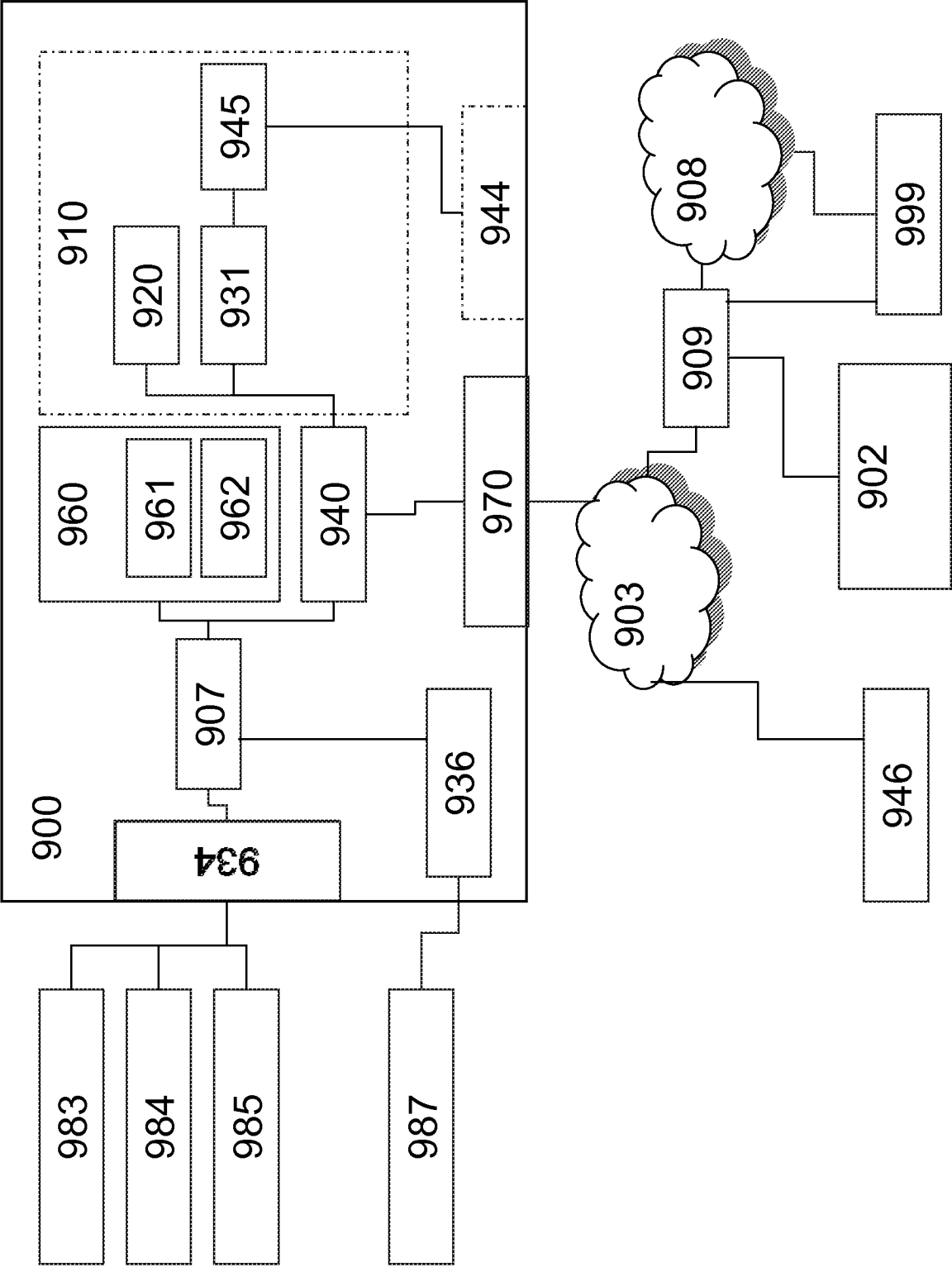


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/057232

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01D4/00 H04L29/06 H04W12/08 G06Q50/00
ADD.

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)
G01D H04L H04W G06Q

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	GB 2 473 083 A (TOSHIBA RES EUROP LTD [GB]) 2 March 2011 (2011-03-02)	1-28
Y	page 1 - page 10; figures 3-5 -----	1-28
X	"Smartprivacy for the smart grid", 20091101 1 November 2009 (2009-11-01), XP009156436, Retrieved from the Internet: URL: http://www.ipc.on.ca/images/resources/pbd-smartpriv-smartgrid.pdf [retrieved on 2012-02-07]	1-28
Y	page 8 - page 14 ----- -/-	1-28

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

☒ See patent family annex.

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Date of the actual completion of the international search

15 February 2012

Date of mailing of the international search report

24/02/2012

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/057232

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ARTICLE 29 DATA PROTECTION WORKING PARTY: "Opinion 12/2011 on smart metering", 4 April 2011 (2011-04-04), XP009156435, Retrieved from the Internet: URL:http://idpc.gov.mt/dbfile.aspx/WP_183. pdf [retrieved on 2012-02-07]	1-28
Y	page 11 - page 20 -----	1-28
X	US 2010/138348 A1 (MILLER MICHAELJON [US]) 3 June 2010 (2010-06-03)	1-28
Y	paragraph [0025] - paragraph [0042]; figure 1 -----	1-28

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/057232

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			JP 2011244441 A	01-12-2011
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			WO 2010144738 A2	16-12-2010
