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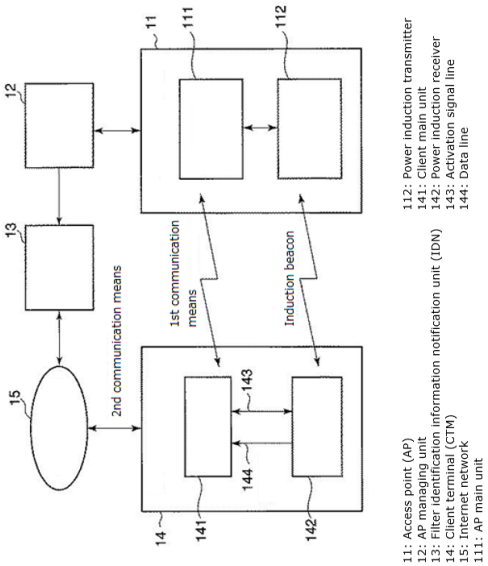
(54) [Title of the Invention] Wireless Communication System

(57) [Abstract]
[Problem] To reduce the power consumed by mobile devices used to detect access points.
[Solution] An electrical power induction transmitter 112 is provided at an access point 11, and an electrical power induction receiver 142 is provided at a client terminal 14. The electrical power induction transmitter supplies power to the electrical power induction receiver and transmits an induction beacon to notify the receiver of transmitter identification information. The electrical power induction receiver is activated upon receiving the induction beacon and compares the transmitter identification information in the induction beacon with pre-set filtering identification information. When there is an identification information match, the electrical power induction receiver activates the client main unit 141 and performs data communication between the client main unit and the AP main unit.
[Selected Drawing] FIG. 1



[Claims]

[Claim 1]

A wireless communication system comprising an access point and a terminal equipped with a wireless communication unit that communicates wirelessly with the access point, the wireless communication system characterized in that the access point is provided with an electrical power induction transmitter that transmits transmitter identification information associated with the access point using a power supply signal that provides power to a terminal in a non-contact manner,

and the terminal is equipped with an electrical power induction receiver that activates upon receiving the power supply signal, compares the transmitter identification information in the power supply signals with pre-set filtering identification information, and activates the wireless communication unit when the information matches.

[Claim 2]

The wireless communication system according to claim 1, further comprising a management unit that stores predetermined information related to the access point, and a filtering identification information notification unit that selectively extracts information related to the terminal from the predetermined information recorded in the management unit and generates filtering identification information.

[Claim 3]

The wireless communication system according to claim 2, wherein the terminal is equipped with another communication unit distinct from the wireless communication unit for acquiring AP identification information from the identification information notification unit.

[Claim 4]

A wireless communication system including an access point and a client terminal, wherein the access point is equipped with an AP-side data communication unit for performing wireless data communication with the client terminal, and an electrical power induction transmitter that supplies power to the client terminal in a non-contact manner and transmits a beacon to send unique transmitter identification information assigned to the access point, and

the client terminal is equipped with a client-side data communication unit for performing wireless data communication with the access point, and an electrical power induction receiver that is activated upon receiving the beacon, compares the transmitter identification information with pre-set filtering identification information, and activates the client-side data communication unit to enable communication with the AP-side data communication unit when the information matches.

[Claim 5]

The wireless communication system according to claim 4, wherein the transmitter identification information is represented by a filtering code with a plurality of fields, and each field is compared with the filtering identification information.

[Claim 6]

The wireless communication system according to claim 4, further comprising an access point management unit connected to the access point that collects and stores the transmitter identification signals and unique identifier assigned to the access point.

[Claim 7]

The wireless communication system according to claim 6, wherein the access point management unit classifies the collected information, generates the filtering identification information, and notifies the client terminal.

[Claim 8]

The wireless communication system according to claim 4, wherein the transmitter identification information includes a field for indicating the service provider company and a field for indicating the type of service provided by the service provider company.

[Claim 9]

The wireless communication system according to claim 4, wherein the transmitter identification information includes a field representing information related to a communication channel to be established with the access point and/or the group ID of the access point.

[Claim 10]

The wireless communication system according to claim 4, wherein the wireless communication system is configured to enable data communication only with access points providing a specific service when a group ID is set for access points according to the services they provide and a field is provided that represents the group ID in the transmitter identification information.

[Claim 11]

The wireless communication system according to claim 4, wherein the wireless communication system is configured to enable data communication only with access points associated with a specific service provider company when a group ID is set for access points based on the service provider company associated with the access points, and a field is provided that represents the group ID in the transmitter identification information.

[Claim 12]

The wireless communication system according to claim 4, wherein negotiation is performed to initiate communication with an AP-side data communication unit via the communication channel indicated in communication channel information when the client-side data communication unit is activated, by including the communication channel information in the transmitter identification information.

[Claim 13]

The wireless communication system according to claim 4, wherein the wireless communication system is configured such that the client-side data communication unit powers off or transitions to power-saving mode when communication becomes impossible after communication has been initiated between the client-side data communication unit and the AP-side data communication unit.

[Claim 14]

The wireless communication system according to claim 4, wherein the wireless communication system is configured such that the client-side data communication unit is kept in an operational state until a predetermined time has elapsed when communication becomes impossible after communication has been initiated between the client-side data communication unit and the AP-side data communication unit, and the client-side data communication unit powers off or transitions to power-saving mode when the predetermined time has elapsed without communication being initiated again.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a short-to-medium range wireless communication system using wireless LAN, Bluetooth, or UWB, and more specifically to saving power in such a wireless communication system.

[0002]

[Prior Art]

Wireless communication systems have been proposed that utilize short-to-medium range wireless communication technologies such as wireless LAN, Bluetooth, or UWB to provide information to mobile terminals (client terminals) entering a predetermined area. In such wireless communication systems, for example, information about the area surrounding a train station can be provided to the mobile terminals of users using the station by installing access points covering a predetermined area within the station. Mobile terminals include devices such as mobile phones equipped with short-to-medium range wireless communication units.

[0003]

In order to establish a wireless link between a mobile terminal and an access point in such a wireless communication system, the mobile terminal must either perform a scan or respond to a scan from the access point. Therefore, power must be supplied to the wireless communication unit. However, since the power source for the mobile terminal is a battery, the continuous supply of power is undesirable. Therefore, wireless communication systems periodically (intermittently) supply power to wireless units and continuously supply power when radio signals from the access point are received (see, for example, Patent Document 1).

[0004]

[Patent Document 1]

JP 2001-298780 A

[0005]

[Problem to Be Solved by the Invention]

In conventional wireless communication systems, power is supplied intermittently to wireless units to reduce battery consumption by mobile terminals. However, under normal conditions, the time a mobile terminal spends outside the coverage area of an access point is significantly longer than the time it spends within that area. Thus, conventional wireless communication systems waste a significant amount of power in mobile terminals, resulting in short battery life.

[0006]

Here, supplying power to a mobile terminal from an external source would reduce battery consumption. However, in order to supply the power required by the wireless unit in a mobile terminal in a non-contact manner, the mobile terminal must be brought close to the power supply source, which is impractical.

[0007]

Therefore, it is an object of the present invention to provide a wireless communication system that can reduce power consumption when a mobile terminal is not communicating data with an access point, thereby extending battery life.

[0008]

It is another object of the present invention to provide a wireless communication system that performs data communication only with predetermined access points and does not perform data communication with any other access points.

[0009]

[Means for Solving the Problem]

The present invention provides a wireless communication system comprising an access point and a terminal equipped with a wireless communication unit that communicates wirelessly with the access point, the wireless communication system characterized in that the access point is provided with an electrical power induction transmitter that transmits transmitter identification information associated with the access point using a power supply signal that provides power to a terminal in a non-contact manner, and the terminal is equipped with an electrical power induction receiver that activates upon receiving the power supply signal, compares the transmitter identification information in the power supply signals with pre-set filtering identification information, and activates the wireless communication unit when the information matches.

[0010]

The present invention also provides a wireless communication system including an access point and a client terminal, wherein the access point is equipped with an AP-side data communication unit for performing wireless data communication with the client terminal, and an electrical power induction transmitter that supplies power to the client terminal in a non-contact manner and transmits a beacon to send unique transmitter identification information assigned to the access point, and the client terminal is equipped with a client-side data communication unit for performing wireless data communication with the access point, and an electrical power induction receiver that is activated upon receiving the

beacon, compares the transmitter identification information with pre-set filtering identification information, and activates the client-side data communication unit to enable communication with the AP-side data communication unit when the information matches.

[0011]

[Embodiment of the Invention]

A detailed description of an embodiment of the present invention will now be provided with reference to the drawings.

[0012]

FIG. 1 shows the configuration of the wireless communication system in one embodiment of the present invention. This wireless communication system includes at least one access point (AP) 11 connected to a network (for example, a LAN), at least one AP managing unit 12 that manages information related to the access point 11, a filtering identification information notification unit (IDN) 13 connected to the AP managing unit 12, and at least one client terminal 14 that communicates with an electronic information device (for example, a server) connected to the network via the access points 11.

[0013]

An access point 11 is typically installed for each service provider. Therefore, if three service providers exist, at least one access point is provided for each company, totaling at least three access points.

[0014]

Each access point 11 has an AP main unit (AP-side data communication unit) 111 as a first communication means for wireless communication (data communication) with client terminals 14. The AP main unit 111 functions as a bridge or router between the wireless LAN, etc., formed between the client terminal 14 and the access point 11, and the network to which the access point 11 is connected. Also, each access point 11 has an electrical power induction transmitter 112 that continuously or intermittently (periodically) generates an induction beacon (power supply signal) to supply power in a non-contact manner via electromagnetic induction to client terminals 14 located within communication range via the first communication means, and to notify these terminals of transmitter identification information.

[0015]

The transmitter identification information broadcast by the electrical power induction transmitter 112 of each access point 11 includes a plurality of fields. For example, as shown in FIG. 2, the transmitter identification information includes a company code 201 indicating the service provider company that provides services such as information to client terminals 14 using the access point 11, a service code 202 indicating the type of service that can be provided via the access point 11, and a unique code 203 specific to the electrical power induction transmitter 112. These codes are collectively referred to as the filter code. The unique code 203 can also be used to identify individual access points 11. The field configuration for this transmitter identification information is commonly used when using internet services.

[0016]

Any service can be provided by an access point 11. For example, if service provider C1 is able to provide services S1 and S2, it can be configured to provide both services S1 and S2 at one access point 11 and only service S1 at another access point 11. In this case, the transmitter identification information broadcast from these two access points will be the information shown in FIG. 3 (a) and FIG. 3 (b), respectively. By configuring the services provided by each access point 11 in this manner, services can be selectively provided based on the location of the access point 11 and the required bandwidth. This avoids the need to equip each access point 11 with more capacity than necessary, thereby keeping down costs.

[0017]

Additionally, when service provider C2 is able to provide services S1, S2, and S3, the system can be configured so that service S1 and S3 are provided by one access point 11, while only service S2 is provided by another access point 11. In this case, the transmitter identification information reported from these two access points will be the information shown in FIG. 3 (c) and FIG. 3 (d), respectively. Thus, by assigning different services to each access point 11, services requiring a fixed bandwidth, such as VoIP, which necessitates a certain quality of service (QoS), and services using a best-effort approach can be provided via different access points 11.

[0018]

The transmitter identification information may also include a group ID, such as a communication channel code or ESSID (expanded service set identification), as shown in FIG. 4 (a) and FIG. 4 (b). It may also include both or even configuration information related to other access points. Embedding a code indicating a communication channel (and bandwidth) in the transmitter identification information reduces the negotiation operations required when a client terminal 14 establishes data communication with the access point, thereby reducing power consumption. Incorporating ESSID into transmitter identification information also enables automatic execution of the ESSID configuration that would otherwise require user input. By assigning a group ID to each service or to each service provider, data communication only with access points 11 providing specific services or only with a specific service provider becomes possible using group IDs.

[0019]

The transmitter identification information may also include fields for embedding information other than the information mentioned above. For example, a start code for detecting the start of a beacon or a CRC code for detecting bit errors in the beacon data may be included.

[0020]

While the order (arrangement) of each field in the transmitter identification information is arbitrary, the fields should be assigned so that the code used for filtering arrives first if each code arrives in a time-series manner.

[0021]

As in the case of access points 11, an AP managing unit 12 is installed for each service provider. Each access point 11 is connected to an AP managing unit 12 for each service provider. In other words, at least one access point 11 is connected to at least one AP managing unit 12. The AP managing unit 12 and the access point 11 may be connected via a dedicated line or via the network.

[0022]

Each AP managing unit 12 associates, stores, and manages information such as the unique identifier (for example, the MAC address) assigned to an associated access point 11, the ESSID assigned to the group to which the access point 11 belongs, and the unique identification information specific to the electrical power induction transmitter 112 at the access point 11.

[0023]

The AP managing unit 12 is equipped with a function to search registered information and extract only information matching specified conditions. For example, the unit can extract the unique identification information specific to the electrical power induction transmitter 112 at an access point 11 assigned a specific ESSID from among all of the access points 11 the unit is managing, or extract information indicating the type of service provided by the access point 11. The AP managing unit 12 also extracts information matching requested conditions in response to a request from the filtering identification information notification unit 13 and notifies the filtering identification information notification unit 13 of this information.

[0024]

The filtering identification information notification unit 13 is connected to all AP managing units 12 via a dedicated line or the network and is also connected to the internet 15.

[0025]

The filtering identification information notification unit 13 can collect and classify information stored in the AP managing units 12 and extract information matching any desired conditions. In other words, the filtering identification information notification unit 13 generates filtering identification information corresponding to instructions or to a client terminal 14 from the information managed by the AP managing unit 12, in response to instructions from an administrator or a request from a client terminal 14.

[0026]

The client terminal 14 includes a client main unit 141 equipped with first and second communication units. Here, the first communication unit (client-side data communication unit) serves as the first communication means for data communication with the AP main unit 111 at an access point 11, while the second communication unit serves as the second communication means for communicating with the filtering identification information notification unit 13 via the internet 15. A client terminal 14 is activated upon receiving a beacon from the electrical power induction transmitter 112 at an access point 11, and an electrical power induction receiver 142 that compares the identification information in a beacon with pre-set configuration information and activates the client main unit 141 when the comparison results match. The configuration information for the electrical power induction receiver 142 is filtering identification information generated by a filtering identification information notification unit 13 and is set by the client main unit 141.

[0027]

In the present embodiment, the first communication means for realizing wireless communication between an AP main unit 111 and a client main unit 141 is a short-to-medium range wireless communication device, such as a wireless LAN, a Bluetooth-based wireless communication device, or a communication device using UWB. The second communication means in the client terminal 14 used to access the internet 15 can be, for example, a mobile phone, a landline telephone, or a wired LAN.

[0028]

The operation of the wireless communication system shown in FIG. 1 will now be described in detail with reference to FIG. 5 through FIG. 8.

[0029]

FIG. 5 is a diagram showing the operation sequence performed by each unit when automatically updating filtering identification information at a client terminal 14 receiving a service.

[0030]

First, when an access point 11 is newly installed or changes occur to the services provided via the access point, the AP main unit 111 at the access point 11 retrieves the transmitter identification information from the electrical power induction transmitter 112 (S301). The AP main unit 111 then notifies the AP managing unit 12 of the retrieved transmitter identification information along with the AP identifier assigned to the access point 11 as the AP identification method (S302).

[0031]

Upon receiving notification of AP identification information from the access point 11, the AP managing unit 12 associates and stores the transmitter identification information and AP identifier (S303).

[0032]

The filtering identification information notification unit 13 retrieves transmitter identification information and AP identifiers from all AP managing units 12 in response to an instruction from an administrator (S304, S305).

[0033]

The filtering identification information notification unit 13 also classifies the information collected from all AP managing units 12 into each field of the filtering identification information (see FIG. 2) (S306) and generates filtering identification information corresponding to the target client terminals 14 (S307). Then, the filtering identification information notification unit 13 transmits the generated filtering identification information to the target client terminals via the internet 15 (S308).

[0034]

A client terminal 14 writes the filtering identification information received from the filtering identification information notification unit 13 to its electrical power induction receiver 142 (S309).

[0035]

As described above, when an access point 11 is added or a provided service is changed, the filtering information identification information is automatically updated for client terminals 14 receiving the service.

[0036]

Next, the operations performed when a client terminal 14 newly receives a service will be described.

[0037]

First, the user of the client terminal 14 enters into a contract with a service provider that offers a service, such as providing information, using access points 11. The user then accesses the filtering identification information notification unit 13 to learn the method for acquiring the filtering identification information necessary to receive the contracted service.

[0038]

When the user operates the client terminal 14, the client main unit 141 is activated and accesses the filtering identification information notification unit 13 via the internet 15 from the second communication unit.

[0039]

In response to the request from the client terminal 14, the filtering identification information notification unit 13 generates and provides filtering identification information corresponding to the client terminal 14, in the same manner employed when updating filtering identification information.

[0040]

Here, the filtering identification information notification unit 13 is connected to three AP managing units 11-1, 11-2, and 11-3, as shown in FIG. 6. AP managing units 11-1, 11-2, and 11-3 are operated by service providers C1, C2, and C3, respectively. AP managing unit 11-1 manages services S1, S2, and S3, AP managing unit 11-2 manages services S2 and S3, and AP managing unit 11-3 manages service S3.

[0041]

If the company codes representing each company are "C1," "C2," and "C3," and the service codes representing each service are "S1," "S2," and "S3," the filtering identification notification unit 13 can obtain information "C1:(S1·S2·S3), C2:(S2·S3), and C3:S3." The filtering identification information notification unit 13 selects and combines the proper codes to generate filtering identification information for the client terminal 14.

[0042]

For example, if the user has a contract to receive service S1 from service provider C1, the filtering identification information notification unit 13 provides the client terminal 14 with "C1:S1" as filtering identification information. If the user has contracts with service providers C1, C2, and C3 for all services, the filtering identification information notification unit 13 generates three filtering identification information items, namely, C1:(S1·S2·S3)," "C2:(S2·S3)," and "C3:S3," and notifies the client terminal 14. If the user has a contract with service providers C1, C2, and C3 to receive service S3, the filtering identification information notification unit 13 generates filtering identification information "C1·C2·C3):S3" and provides it to the client terminal 14.

[0043]
In this example, three bits are allocated for the company code, with the first bit designated as "C1," the second bit as "C2," and the third bit as "C3." Similarly, three bits are allocated for the service code, with the first bit designated as "S1," the second bit as "S2," and the third bit as "S3."

[0044]
When the client main unit 141 of the client terminal 14 receives the filtering identification information from the filtering identification information notification unit 13, it sets the filtering identification information in the electrical power induction receiver 142 via a data line 143. This enables the client terminal 14 to subsequently receive the contracted services via access points 11. At least the first wireless unit of the client main unit 141 is powered off or transitions to a power-saving mode after the filtering identification information has been set in the electrical power induction receiver 142.

[0045]
Next, the operations performed when the client terminal 14 receives services via access points 11 will be described.

[0046]
As shown in FIG. 7, the electrical power induction transmitter 112 at an access point 11 appends transmitter identification information to a beacon (S501) and continuously or periodically transmits the beacon (S502).

[0047]
When the electrical power induction receiver 142 in the client terminal 14 receives a beacon, it extracts the transmitter identification information in the beacon and compares this information with the pre-set filtering identification information (S503). If the comparison results match, the client main unit 141 is activated (S504).

[0048]
The operations performed by the client terminal 14 will not described in detail. In this example, there are three access points 11-1, 11-2, and 11-3 as shown in FIG. 8. Access points 11-1, 11-2, and 11-3 are provided by service providers C1, C2, and C3, respectively, and the client terminal 14 has a contract only with service provider C2.

[0049]
The electrical power induction transmitters 112-1, 112-2, and 112-3 at access points 11-1, 11-2, and 11-3 continuously or periodically transmit induction beacons 801, 802, and 803 to supply power to client terminals 14 within their range. As described above, each induction beacon contains a company code representing the service provider company that installed and manages the access point 11, service codes indicating the services provided by that access point 11, and a unique code specific to the electrical power induction transmitter 112 of that access point 11 (see FIG. 2). For example, the induction beacon transmitted from access point 11-1 contains the identification information "C1:S1:U1," the induction beacon from access point 11-2 contains "C2:S2:U2," and the induction beacon from access point 11-3 contains "C3:S3:U3."

[0050]
The client terminal 14 enters power-saving mode when no user operation is being performed, with both the client main unit and the electrical power induction receiver stopping. When the client terminal 14 enters an area covered by an access point 11, the electrical power induction receiver 142 receives an induction beacon transmitted from that access point 11 and is activated. In other words, the electrical power induction receiver 142 begins operating as soon as it receives power supplied by the induction beacon. The electrical power induction receiver 142 then extracts the identification information contained in the induction beacon and compares the information with pre-set filtering identification information.

[0051]

In this example, the client terminal 14 enters the area 811 covered by access point 11-1. The electrical power induction receiver 142 is activated as soon as it receives the induction beacon 801 and compares the transmitter identification information "C1:S1:U1" contained in the beacon with the pre-set filtering identification information (here, it is "C2:S2"). This comparison is performed on the company code and service code. In this case, company codes "C1" and "C2" do not match, so a mismatch is determined, and a service code comparison is not performed. Thus, when the transmitter identification information and the filtering identification information do not match, the electrical power induction receiver 142 stops operating. The suspension in operations continues until a predetermined amount of time has elapsed.

[0052]

If the client terminal 14 enters the area 812 covered by access point 11-2, the electrical power induction receiver 142 is activated as soon as it receives the induction beacon 802 and compares the transmitter identification information "C2:S2:U2" contained in the beacon with the filtering identification information "C2:S2." In this case, since the company code and service code match, the electrical power induction receiver 142 determines that the identification information matches. The electrical power induction receiver 142 transmits a start signal to the client main unit 141 via a start line 144, activating the client main unit 141.

[0053]

Once the client main unit 141 has been activated, the client main unit 141 establishes a communication channel with the AP main unit 111 using a known scanning method and begins data communication. For example, if the first communication means is a wireless LAN, it uses the ESSID to identify the communication partner and communicates with access point 11 whose group information matches the pre-set filtering identification information. Thus, the client terminal 14 can perform data communication with a server, etc. of the service provider via access point 11-2.

[0054]

Afterward, when the reception level for signals transmitted from the AP main unit 111 decreases, the client main unit 141 immediately, or after a predetermined period of time elapses, either cuts power to the first communication unit or transitions to power-saving mode. By keeping the client main unit 141 operational for a certain period of time after the reception level drops, communication can be resumed immediately upon improvement in radio signal reception after a temporary communication interruption caused by a drop in the reception signal level due to factors like fading noise.

[0055]

When the client terminal 14 moves and enters area 813 covered by access point 11-3, the power-induction receiver 142 operates in the same manner as when entering area 811. However, if the client terminal 14 enters area 813 while communication with access point 112-2 is disconnected due to a drop in reception level but the client main unit 141 is still in an operational state, the following operations are performed.

[0056]

Specifically, the client main unit 141 performs a scan in an attempt to resume communication but receives a response from the AP main unit 111-3 at access point 11-3. Since this response includes information such as the ESSID and WEP (Wired Equivalent Privacy), the client main unit 141 recognizes that its communication partner is not access point 11-2. Once the change in communication partner is recognized, the client main unit 141 immediately, or after a certain period of time has elapsed, disconnects power to the first communication unit or enters power-saving mode. Afterward, it performs normal operations upon receiving an induction beacon from access point 11-3.

[0057]

In this way, the client terminal 14 can use filtering identification information to filter between contracted access points and non-contracted access points, selectively communicating wirelessly only with contracted access points 11 to use contracted services.

[0058]

In the present embodiment, by allowing the electrical power induction receiver 142 to operate using power supplied from an access point 11 and determine whether to activate the first wireless unit, power consumption when the client terminal is not communicating with an access point can be reduced to nearly zero. This is possible because the power consumed by the electrical power induction receiver 142 is extremely low compared to when it scans for access points (that is, when it performs transmission operations).

[0059]

Also, in the present embodiment, since the first wireless unit in the client terminal 14 does not perform wireless communication with (uncontracted) access points 11 that are not authorized for wireless communication, unnecessary wireless traffic and power consumption can be reduced, thereby extending battery life.

[0060]

The present invention was described above with reference to one embodiment, but the invention is not limited to the embodiment described above.

[0061]

For example, in the description provided above, the filtering identification information notification unit 13 is accessed via the internet 15, but a wireless or wired LAN may also be used.

[0062]

Also, in the description provided above, the client terminal 14 had a contract with one service provider for one service. However, the client terminal may receive services from a plurality of service providers. In this case, the client terminal 14 has contracts with a plurality of service providers for different services, and the client terminal receives filtering identification information from a plurality of filtering identification information notification units 13 based on those contracts. Each time the client terminal 14 enters an area covered by an access point 11, it compares transmitter identification information with each of the filtering identification information items. If a contract has been entered into with a plurality of service providers for a common service, the client terminal 14 may receive a filtering identifier from one of the filter identification notification units 13 based on those contracts. Each time a client terminal 14 enters an area covered by access points 11, it compares transmitter identification information with the filtering identification information. At that time, if the company codes in the filtering identifiers indicate that the terminal has a contract with all of the service providers, the terminal can omit comparison of company codes and compare only service codes.

[0063]

[Effects of the Invention]

In the present invention, the wireless communication unit is configured to operate only when communication with an access point is permitted, after receiving power supply and transmitter identification information via a beacon transmitted from the access point, thereby reducing power consumption when not communicating with an access point. Additionally, the present invention prevents unnecessary communication with unauthorized access points, thereby further reducing power consumption.

[Brief Description of the Drawings]

[FIG. 1] FIG. 1 is a block diagram showing the configuration of the wireless communication system in an embodiment of the present invention.

[FIG. 2] FIG. 2 is a diagram showing the field configuration for transmitter identification information used in the wireless communication system of FIG. 1.

[FIG. 3] FIG. 3 (a), FIG. 3 (b), FIG. 3 (c), and FIG. 3 (d) are specific examples of transmitter identification information in FIG. 2.

[FIG. 4] FIG. 4 (a) and FIG. 4 (b) are diagrams showing alternative field configurations for the transmitter identification information used in the wireless communication system of FIG. 1.

[FIG. 5] FIG. 5 is a sequence diagram used to explain the notification operation for filtering identification information.

[FIG. 6] FIG. 6 is a block diagram showing the connection relationship between a plurality of AP managing units and the filtering identification information notification unit.

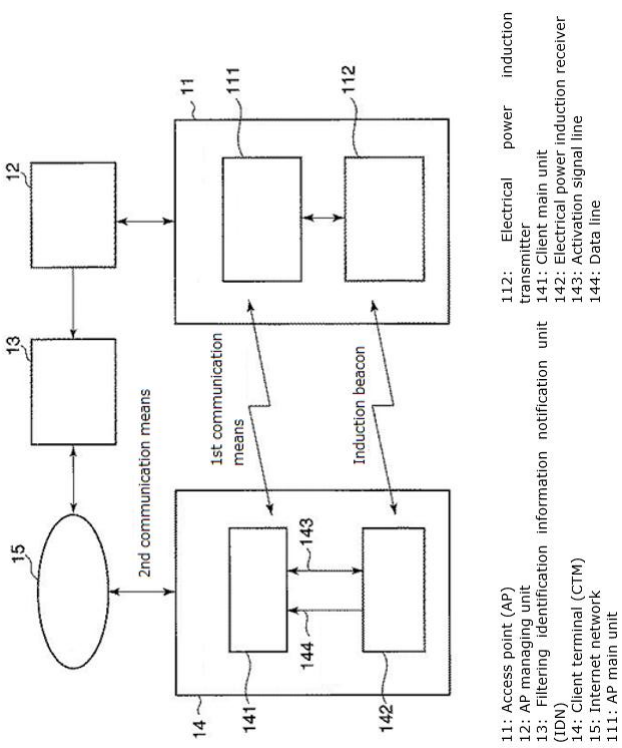
[FIG. 7] FIG. 7 is a sequence diagram used to explain the operation of the client terminal.

[FIG. 8] FIG. 8 is a diagram used to explain the operation of the client terminal.

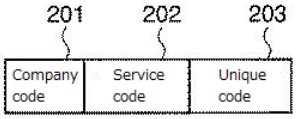
[Reference Numbers]

11: Access point
111: AP main unit
112: Electrical power induction transmitter
12: AP managing unit
13: Filtering identification information notification unit
14: Client terminal
141: Client main unit
142: Electrical power induction receiver
15: Internet

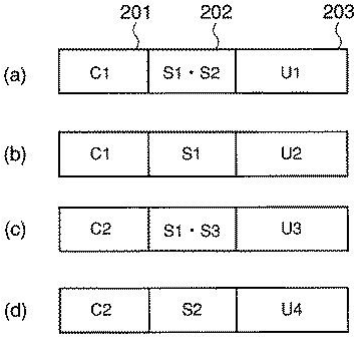
[FIG. 1]



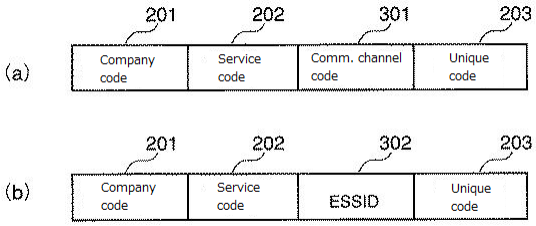
[FIG. 2]



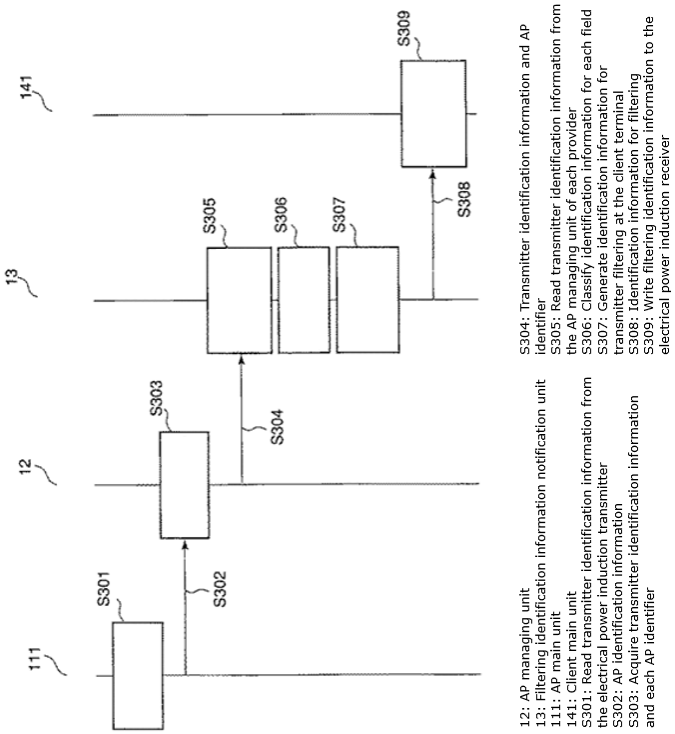
[FIG. 3]



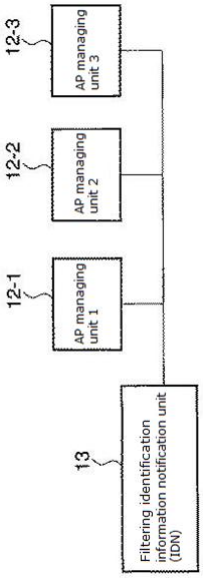
[FIG. 4]



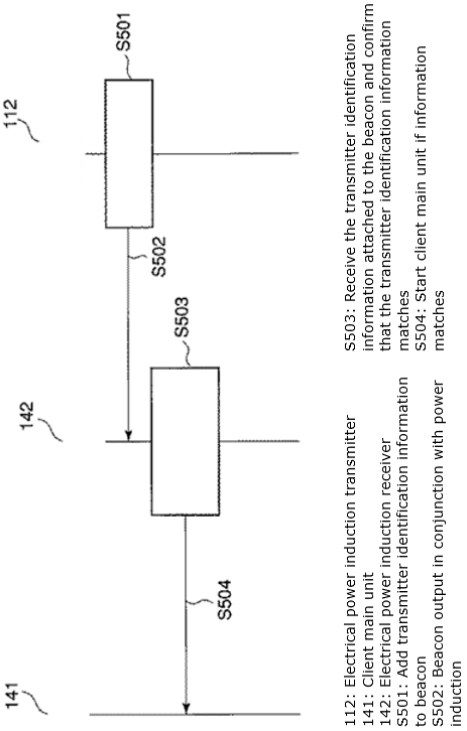
[FIG. 5]



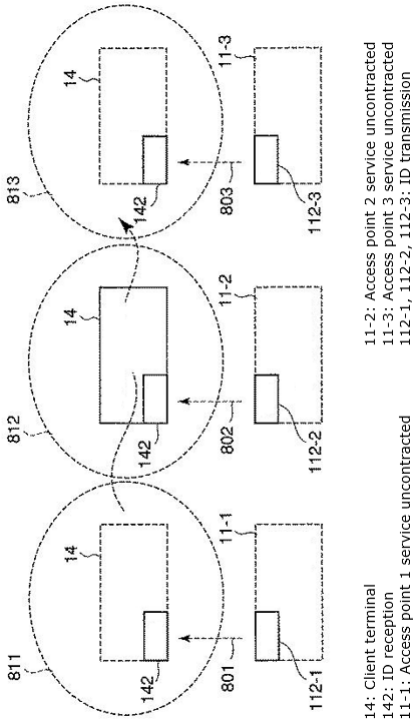
[FIG. 6]



[FIG. 7]



[FIG. 8]


811
812
813
14
142
801
802
803
11-1
11-2
11-3
112-1
112-2
112-3
14: Client terminal
142: ID reception
11-1: Access point 1 service uncontracted
11-2: Access point 2 service uncontracted
11-3: Access point 3 service uncontracted
112-1, 112-2, 112-3: ID transmission

10

TRANSLATION CERTIFICATION

Date: 2026/02/19

To whom it may concern:

This is to certify that the attached translation is an accurate representation of the documents received by this office. The translation was completed from:

- Japanese

To:

- English (USA)

The documents are designated as:

- EX1005 - Watanabe JP.pdf

Samuel Wu, Managing Director of this company, attests to the following:

"To the best of my knowledge, the aforementioned documents are a true, full and accurate translation of the specified documents."

Signature of Samuel Wu, Managing Director