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Remote control system and remote control program

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ABSTRACT

A remote control system includes a portable terminal, a server that acquires position information of the portable terminal, and a control target apparatus controlled from the server. The server stores a remote control execution area that centers on a base (a user's home) where the control target apparatus is set and a remote control execution check area that centers on a position different from the base (the user's home) and does not overlap the remote control execution area. When the portable terminal exits the remote control execution check area, the server transmits a control execution check message for the control target apparatus to the portable terminal. When the portable terminal enters the remote control execution area, the server controls the control target apparatus according to presence or absence of a response to the control execution check message and content of the response.

Australian Patents Act 1990 – Regulation 3.2

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ORIGINAL COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title

Remote control system and remote control program

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a remote control system and a remote control program.

2. Description of the Related Art

Home electric appliances have been commercialized that are capable of grasping, through position information services provided using GPSs, present positions of portable terminals (cellular phones, smart phones, and tablet terminals) and causing the portable terminals to start or stop operations of the home electric appliances from the outside of homes according to the grasped present positions.

For example, Japanese Patent Application Laid-Open No. 2005-175776 discloses a remote control system that automatically enables control of information apparatuses such as home information appliances when fixed conditions registered in advance are satisfied even if a user does not actively perform operation, or prevents the user from forgetting the operation and enables the control of the information apparatuses by notifying the user of various statuses of the home information appliances.

However, with the remote control system, although it

is possible to cause control target apparatuses to operate according to the transition of the position of the user and the approach of the user, the user cannot perform a setting change. Therefore, the remote control system can perform only the operations set in advance.

It would therefore be advantageous to provide a remote control system capable of at least partially solving the problems in the conventional technology, for example while preventing a user from forgetting to perform the setting of the remote control system, causing control target apparatuses to perform appropriate operations even when the user does not perform setting of the remote control system.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, a remote control system including: a portable terminal; a server that acquires position information of the portable terminal; and a control target apparatus controlled from the server. The server stores a remote control execution boundary where the control of the control target apparatus is started and a remote control execution check boundary present in a position farther from a base where the control target apparatus is set than the remote control execution

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boundary, when the portable terminal crosses the remote control execution check boundary while approaching the base, the server transmits a control execution check message for the control target apparatus to the portable terminal, and when the portable terminal crosses the remote control execution boundary while approaching the base, the server controls the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

According to another aspect of the present invention, a remote control system including: a portable terminal; a server that acquires position information of the portable terminal; and a control target apparatus controlled from the server. The server stores a remote control execution area that centers on a base where the control target apparatus is set and a remote control execution check area that centers on a position different from the base and does not overlap the remote control execution area, when the portable terminal exits the remote control execution check area, the server transmits a control execution check message for the control target apparatus to the portable terminal, and when the portable terminal enters the remote control execution area, the server controls the control target apparatus according to presence or absence of a response to the control execution check message and the

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content of the response.

According to still another aspect of the present invention, a remote control system including: a portable terminal; a server that acquires position information of the portable terminal; and a control target apparatus controlled from the server. The server stores a remote control execution area that centers on a base where the control target apparatus is set and a remote control execution check area that centers on a position different from the base and does not overlap the remote control execution area, when the portable terminal exits the remote control execution check area, the server transmits a control execution check message for the control target apparatus to another portable terminal, and when the portable terminal, which exits the remote control execution check area, enters the remote control execution area, the server controls the control target apparatus according to presence or absence of a response to the control execution check message from the another portable terminal and the content of the response.

According to still another aspect of the present invention, a remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute: a step of transmitting, when

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the portable terminal crosses a remote control execution check boundary while approaching a base, a control execution check message for the control target apparatus to the portable terminal; and a step of controlling, when the portable terminal crosses, while approaching the base, a remote control execution boundary where the control of the control target apparatus is started, the remote control execution boundary being present in a position closer to a base where the control target apparatus is set than the remote control execution check boundary, the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

According to still another aspect of the present invention, a remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute: a step of transmitting, when the portable terminal exits a remote control execution check area, a control execution check message for the control target apparatus to the portable terminal; and a step of controlling, when the portable terminal enters a remote control execution area that centers on a base where the control target apparatus is set and does not overlap the remote control execution check area, the control target

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apparatus according to presence or absence of a response to the control execution check message and the content of the response.

According to still another aspect of the present invention, a remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute: a step of transmitting, when the portable terminal exits a remote control execution check area that centers on a base where the control target apparatus is set, a control execution check message for the control target apparatus to another portable terminal; and a step of controlling, when the portable terminal, which exits the remote control execution check area, enters a remote control execution area that centers on a base where the control target apparatus is set and does not overlap the remote control execution check area, the control target apparatus according to presence or absence of a response to the control execution check message from the another portable terminal and content of the response.

The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the

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accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram of the configuration of a remote control system according to a first embodiment;

Fig. 2 is a schematic diagram for explaining operations performed after a remote control execution check area and a remote control execution area are set in the remote control system according to the first embodiment;

Figs. 3(A) to 3(C) are diagrams illustrating a remote control setting screen registered in the remote control system according to the first embodiment;

Fig. 4 is a flowchart for explaining the order of operations of the remote control system according to the first embodiment;

Fig. 5 is a schematic diagram for explaining operations performed after remote control execution check areas and remote control execution areas are set in a remote control system according to a third embodiment;

Figs. 6(A) to 6(C) are diagrams illustrating a remote control setting screen registered in the remote control system according to the third embodiment; and

Fig. 7 is a flowchart for explaining the order of operations of the remote control system according to the third embodiment.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the present invention are explained in detail below with reference to the drawings. Note that the present invention is not limited by the embodiments.

First Embodiment

Fig. 1 is a diagram of the configuration of a remote control system according to a first embodiment. The remote control system shown in Fig. 1 includes a portable terminal 10, a satellite 11, which is a global positioning system (GPS) satellite that grasps the position of the portable terminal 10, a server 12 functioning as a remote control server, a home electric appliance 13, a personal computer 14, a base station 15 that performs radio communication with the portable terminal 10, and a router 16 connected to the home electric appliance 13. The server 12, the personal computer 14, the base station 15, and the router 16 are connected to a network 20. As the home electric appliance 13, a refrigerator 13a and an air conditioner 13b are illustrated. However, the home electric appliance 13 is not limited to these appliances.

The portable terminal 10 carried by a user acquires present location information of the portable terminal 10 from the GPS satellite 11 and transmits the present location information to the server 12 via the network 20.

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The personal computer 14 is just an example of a terminal used when the user performs registration of control contents (for example, at home), and is not limited to a specific apparatus. Further, the personal computer 14 does not have to be always connected to the network 20 and only has to be connected to the network 20 according to necessity. As the network 20, the Internet can be raised as an example.

In the remote control system according to this embodiment, a remote control execution check area and a remote control execution area are set. Fig. 2 is a schematic diagram for explaining operations performed after a remote control execution check area 31 and a remote control execution area 30 are set in the remote control system according to this embodiment. In Fig. 2, as an example, the remote control execution area 30 is set around a user's home 40 in which the home electric appliance 13 is set and the remote control execution check area 31 is set around a company 41. The user sets the remote control execution check area 31 and the remote control execution area 30 in advance using the portable terminal 10 or the personal computer 14 in Fig. 1 connected to the network 20.

Figs. 3(A) and 3(B) are diagrams illustrating a remote control setting screen registered in the remote control system according to this embodiment. Area setting and

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operation setting are shown on the remote control setting screen shown in Figs. 3(A) to 3(C). As shown in Figs. 3(A) and 3B, the area setting screen includes the remote control execution area (Fig. 3(A)) and the remote control execution check area (Fig. 3(B)). As shown in Fig. 3(C), on the operation setting screen, operations performed by control target apparatuses when the user goes out, when the user comes home, and when there is no response to a check message are shown.

For example, an air conditioner in a living room is turned off when the user goes out, turned on at set temperature of 25°C if the room temperature is equal to or higher than 28°C when the user comes home, and turned off when there is no response to the check message. For example, a refrigerator operates in a power saving mode when the user goes out, operates in a normal operation mode when the user comes home, and operates in the power saving mode when there is no response to the check message. For example, a light in the living room is turned off when the user goes out, turned on when the user comes home, and turned off when there is no response to the check message.

Fig. 4 is a flowchart for explaining the order of operations of the remote control system according to this embodiment. The user registers the portable terminal 10 in

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the server 12 in advance. The user installs application software of the remote control system in the portable terminal 10. The user registers area setting (the remote control execution area 30 and the remote control execution check area 31) and operation setting during remote control using the portable terminal 10 or the personal computer 14 installed with the application software. As the operation setting during the remote control, not only ON/OFF of a power supply of a control target apparatus but also detailed setting can be performed. For example, if the control target apparatus is an air conditioner, the remote control system sets the air conditioner to be turned on only when the room temperature is equal to or higher than a predetermined temperature.

When the portable terminal 10 enters the remote control execution area 30, the remote control system does not always perform an operation for turning on the control target apparatus. As shown in Fig. 3(C), if the control target apparatus is a refrigerator, the remote control system performs switching of an operation mode when the portable terminal 10 enters the remote control execution area 30. Or, for example, if the control target apparatus is an automatic cleaner that automatically operates during the user's absence from home, the remote control system may be set to turn off the control target apparatus when the

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portable terminal 10 enters the remote control execution area 30.

Further, not only the position of the portable terminal 10 but also time can be used. For example, the remote control system may be set to execute the remote control after 5 o'clock in the evening or may be set to enable the remote control only between 10 o'clock in the morning and 5 o'clock in the evening.

After being set as explained above, when the portable terminal 10 exits the remote control execution range 30, the remote control system starts processing (step S11). When the processing is started, first, the server 12 issues a command to the home electric appliance 13 via the network 20 and the router 16, whereby remote control of an operation at the time of going out set in advance is executed (step S12). For example, the server 12 turns off the home electric appliance 13 or switches an operation mode of the home electric appliance 13. Thereafter, when the portable terminal 10 enters the remote control execution check area 31 (for example, where a company is present) and thereafter exits the remote control execution check area 31 (for example, leaves the company), the server 12 transmits, to the portable terminal 10, a check message for checking whether the remote control is to be executed (step S13).

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Regarding the check message, it may be the one that an application displays on a top screen of the portable terminal 10 or the one that is transmitted using an electronic mail. The check message is not limited to a specific form. The check message includes content for at least causing the user to select "whether the remote control is executed" and checking "whether operation setting is changed". When the operation setting is changed, the server 12 causes the user to input content to be changed. Operations to be performed after the server 12 transmits the check message to the portable terminal 10 are determined according to presence or absence of a response to the check message and content of the response.

First, the server 12 determines presence or absence of a response to the check message when the portable terminal 10 enters the remote control execution area 30 (step S14). As a result of the determination, if the response to the check message is absent (No at step S14), when the portable terminal 10 enters the remote control execution area 30 (step S17d), the server 12 performs an operation at the time of no response to the check message (see Fig. 3(C)) (step S18d). As a result of the determination, if the response to the check message is present (Yes at step S14), the processing shifts to step S15 and the server 12 performs the next determination.

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The server 12 determines content of the response to "whether the remote control is to be executed" in the check message (step S15). As a result of the determination, if the remote control is not executed (No at step S15), even if the portable terminal 10 enters the remote control execution area 30 (step S17c), the server 12 does not execute the remote control (step S18c). As a result of the determination, if the remote control is executed (Yes at step S15), the processing shifts to step S16 and the next determination is performed.

Subsequently, the server 12 determines content of a response to "whether operation setting is changed" in the check message (step S16). As a result of the determination, if the operation setting is not changed (No at step S16), when the portable terminal 10 enters the remote control execution area 30 (step S17a), the server 12 executes the remote control according to the operation setting registered in advance or initial setting (step S18a). As a result of the determination, if the operation setting is changed (Yes at step S16), when the portable terminal 10 enters the remote control execution area 30 (step S17b), the server 12 executes the remote control according to the operation setting after the change (step S18b).

After steps S18a to S18d, the processing ends (step S19). In this way, it is possible to cause the remote

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control system in this embodiment to operate. By remotely controlling the control target apparatus with the remote control system, it is possible to improve convenience for the user, prevent the user from forgetting to turn off the control target apparatus, and reduce power consumption.

Note that, in the above explanation, the four operation patterns are explained as the operations of the remote control system. However, even if the remote control is being executed to cause the control target apparatus to operate, if a communication between the portable terminal 10 and the server 12 is possible, the operation setting can be changed by application software or the like of the portable terminal 10.

The remote control system in this embodiment can be set to execute the remote control when the portable terminal 10 simply exits the remote control execution area 30 and enters the remote control execution area 30 again without entering the remote control execution check area 31. In this case, because there is no response to the check message, when the portable terminal 10 enters the remote control execution area 30, the remote control system performs a set operation. The set operation can be the operation at the time of no response to the check message at step S18d or can be an operation set in advance different from the operation at the time of no response to

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the check message.

Note that, in this embodiment, the remote control execution area and the remote control execution check area are set and the remote control system is caused to operate with the entrance into and exit from the areas as triggers. However, the present invention is not limited to this. An edge of the remote control execution area can be set as a remote control execution boundary and an edge of the remote control execution check area can be set as a remote control execution check boundary. That is, the present invention can also include a remote control system including a portable terminal, a server that acquires position information of the portable terminal, and a control target apparatus controlled from the server. The server stores a remote control execution boundary where the control of the control target apparatus is started and a remote control execution check boundary present in a position farther from a base where the control target apparatus is set than the remote control execution boundary. When the portable terminal crosses the remote control execution check boundary while approaching the base, the server transmits a control execution check message for the control target apparatus to the portable terminal. When the portable terminal crosses the remote control execution boundary while approaching the base, the server controls the control

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target apparatus according to presence or absence of a response to the control execution check message and content of the response.

Second Embodiment

A remote control system according to a second embodiment of the present invention is explained. In the remote control system, even if the portable terminal 10 repeats entrance into and exit from the remote control execution area 30, the operation of a control target apparatus is not unnecessarily switched by remote control. In the remote control system in this embodiment, a predetermined time from the entrance of the portable terminal 10 into the remote control execution area 30 and a predetermined time from the exit from the remote control execution area 30 of the portable terminal 10 are set as "area entrance and exit non-detection time". The operation of the control target apparatus is not switched by the remote control until this time elapses.

In general, a largest electric current flows when a power supply is turned on and off in the home electric appliance 13, which is the control target apparatus. Therefore, power consumption increases when the power supply is frequently turned on and off in the home electric appliance 13. For example, some air conditioner does not start for several minutes if operation is once stopped. If

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the power supply is frequently turned on and off, the operation of the home electric appliance 13 cannot be performed. In this way, if the operation is frequently switched by the remote control, the power consumption of the home electric appliance 13 increases or the home electric appliance 13 cannot be started.

A user only has to set the "area entrance and exit non-detection time" by adding an item to a remote control setting screen using the portable terminal 10 or the personal computer 14 installed with application software or the like. The user repeats entrance into and exit from the remote control execution area 30, for example, when the user notices something left behind after once exiting the remote control execution area 30 and returns to the user's home.

As explained above, the "area entrance and exit non-detection time" is provided by not switching the operation of the control target apparatus until the predetermined time elapses after the user once enters and exits the remote control execution area 30. Consequently, it is made possible to prevent the power supply of the control target apparatus from being frequently repeatedly turned on and off, suppress an increase in power consumption, and prevent the control target apparatus from not starting to operate. It is also made possible to suppress occurrence of a

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failure of the control target apparatus caused by the power supply of the control target apparatus being frequently repeatedly turned on and off.

Note that, in the remote control execution check area 31, even if the "area entrance and exit non-detection time" is not set, the number of transmission of a check message only has to be set to one.

Third Embodiment

A remote control system according to a third embodiment of the present invention is explained. The remote control system is used by portable terminals of a plurality of users. Fig. 5 is a schematic diagram for explaining operations performed after remote control execution check areas and remote control execution areas are set in the remote control system according to this embodiment. In an example shown Fig. 5, a first remote control execution area 30a is set around the user's home 40 where the home electric appliance 13 is set. A second remote control execution area 30b is set around a station 42. A first remote control execution check area 31a is set around the company 41, which is a place of work of a first user. A second remote control execution check area 31b is set around a school 43, which is a school to which a second user commutes. As shown in Fig. 5, the remote control execution area is not limited to the area around the user's

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home 40 and may be set around the station 42. When the remote control execution area is set around the station 42 in this way, for example, a user can turn on an air conditioner when the user arrives at a nearest station and can adjust the temperature and the like of a target area of the air conditioner in advance.

Figs. 6(A) to 6(C) are diagrams illustrating a remote control setting screen registered in the remote control system according to this embodiment. Figs. 6(A) to 6(C) are different from Figs. 3(A) to 3(C) in the first embodiment only in a remote control execution area and a remote control execution check area. Operation setting is the same.

Fig. 7 is a flowchart for explaining the order of operations of the remote control system according to this embodiment. The users register a portable terminal 10a of the first user and a portable terminal 10b of the second user in the server 12 in advance. The users install application software for remote control in the portable terminals 10a and 10b. The users register area setting (the first remote control execution area 30a, the second remote control execution area 30b, the first remote control execution check area 31a, and the second remote control execution check area 31b) and operation setting during remote control using the portable terminals 10a and 10b

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installed with the application software.

The operation setting during the remote control enables not only ON and OFF of a power supply of a control target apparatus but also detailed setting. For example, if the control target apparatus is an air conditioner, as in the first embodiment, the air conditioner can be set to be turned on only when a room temperature is equal to or higher than a predetermined temperature, an operation for turning on the control target apparatus is not always performed when the portable terminals 10a and 10b enter the remote control execution area 30, not only the positions of the portable terminals 10a and 10b but also time can also be used. Therefore, redundant explanation is omitted and the explanation of the first embodiment shall apply.

The portable terminals 10a and 10b can be registered in the server 12, the area setting and the operation setting for the portable terminal 10a can be performed by the portable terminal 10b, and the area setting and the operation setting for the portable terminal 10b can be performed by the portable terminal 10a. Alternatively, as in the first embodiment, the area setting and the operation setting for the portable terminals 10a and 10b can be performed from a terminal (a personal computer) other than the portable terminals 10a and 10b.

After the setting is performed in advance in this way,

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when the portable terminal 10a and the portable terminal 10b exit the remote control execution area 30, the remote control system starts processing (step S21). When the processing is started, first, the remote control system performs processing same as steps S12 to S18a, S18b, S18c, and S18d in Fig. 4 of the first embodiment (step S22). In this explanation, both of the portable terminals 10a and 10b exit the remote control execution area 30. However, remote control content can be set for each of the users when the users are going out. Thereafter, when the second user comes home earlier, remote control for the second user is executed when the portable terminal 10b enters the second remote control execution area 30b.

The server 12 determines, referring to the positions of the portable terminals 10a and 10b, whether there is any portable terminal that does not correspond to the executed remote control content (step S23) between those two portable terminals. As a result of the determination, if there is not any portable terminal that does not correspond to the executed remote control content (No at step S23), the server 12 does not transmit a message to the other of those two portable terminals or the like, and the processing ends (step S26). As a result of the determination, if there is a portable terminal that does not correspond to the executed remote control content (Yes

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at step S23), the server 12 determines whether transmission of a check message is necessary (step S24). As a result of the determination, if the transmission of the check message is unnecessary (No at step S24), the processing ends (step S26). As a result of the determination, if the transmission of the check message is necessary (Yes at step S24), for example, the server 12 transmits a message for informing that the remote control has been executed to the portable terminal that does not correspond to the executed remote control content and notifies to this effect (step S25). Thereafter, the processing ends (step S26).

With the remote control system in this embodiment, it is made possible to execute the remote control adapted to a life scene of each of the users. For example, each of the users can learn whether or not the other user has come home. The portable terminal registered in the server 12 is not limited to a high-performance portable terminal such as a smart phone or a tablet, but may be a GPS transmitter capable of communicating with the network 20. By adopting such a configuration, it is possible to manage a user who does not own a high-performance portable terminal such as a smart phone. For example, parents can give their child a GPS transmitter capable of communicating with the network 20 and manage the GPS transmitter.

Further, the operation setting for the control target

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apparatus can be different for each of the users. For example, rooms where an air conditioner is turned on can be set differently for each of the users who enters the control execution area.

In the first to third embodiments, the portable terminals 10, 10a, and 10b can be registered by the other terminals in advance rather than by the portable terminals 10, 10a, and 10b themselves. Therefore, the portable terminals 10, 10a, and 10b do not need to have a function for performing such setting registration. In the first to third embodiments, the other terminals can receive and respond to the control execution check message rather than the portable terminals 10, 10a, and 10b themselves that cross the boundary. Therefore, the portable terminals 10, 10a, and 10b do not need to be capable of receiving and responding to the control execution check message. The portable terminals 10, 10a, and 10b only have to have a configuration capable of transmitting position information to the server 12. That is, the portable terminal that crosses the remote control execution check boundary while approaching the base can operate as a cellular phone or a GPS transmitter including a GPS function, and the other portable terminals can receive the control execution check message.

The remote control system is explained in the first to

third embodiments. However, a remote control program that realizes the remote control system is also included in the present invention. The remote control program can be stored on the server side or can be stored on the portable terminal side.

According to the present invention, there is an effect that it is possible to, while preventing a user from forgetting to perform the setting of the remote control system, cause control target apparatuses to perform appropriate operations even when the user does not perform setting of the remote control system.

Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A remote control system comprising:

a portable terminal;

a server that acquires position information of the portable terminal; and

a control target apparatus controlled from the server, wherein

the server stores a remote control execution boundary where the control of the control target apparatus is started and a remote control execution check boundary present in a position farther from a base where the control target apparatus is set than the remote control execution boundary,

when the portable terminal crosses the remote control execution check boundary while approaching the base, the server transmits a control execution check message for the control target apparatus to the portable terminal, and

when the portable terminal crosses the remote control execution boundary while approaching the base, the server controls the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

2. A remote control system comprising:

a portable terminal;

a server that acquires position information of the portable terminal; and

a control target apparatus controlled from the server, wherein

the server stores a remote control execution area that centers on a base where the control target apparatus is set and a remote control execution check area that centers on a position different from the base and does not overlap the remote control execution area,

when the portable terminal exits the remote control execution check area, the server transmits a control execution check message for the control target apparatus to the portable terminal, and

when the portable terminal enters the remote control execution area, the server controls the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

3. A remote control system comprising:

a portable terminal;

a server that acquires position information of the portable terminal; and

a control target apparatus controlled from the server, wherein

the server stores a remote control execution area that centers on a base where the control target apparatus is set and a remote control execution check area that centers on a position different from the base and does not overlap the remote control execution area,

when the portable terminal exits the remote control execution check area, the server transmits a control execution check message for the control target apparatus to another portable terminal, and

when the portable terminal, which exits the remote control execution check area, enters the remote control execution area, the server controls the control target apparatus according to presence or absence of a response to the control execution check message from the another portable terminal and the content of the response.

4. The remote control system according to claim 3, wherein

the portable terminal that crosses the remote control execution check area while approaching the base includes a GPS function, and

the another portable terminal includes a configuration capable of receiving and responding to the control execution check message.

5. The remote control system according to any one of claims 2 to 4, wherein the remote control system does not detect entrance into and exit from the remote control execution area of the portable terminal until a set period elapses after the portable terminal enters the remote control execution area.

6. A remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute:

a step of transmitting, when the portable terminal crosses a remote control execution check boundary while approaching a base, a control execution check message for the control target apparatus to the portable terminal; and

a step of controlling, when the portable terminal crosses, while approaching the base, a remote control execution boundary where the control of the control target apparatus is started, the remote control execution boundary being present in a position closer to a base where the control target apparatus is set than the remote control execution check boundary, the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

7. A remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute:

a step of transmitting, when the portable terminal exits a remote control execution check area, a control execution check message for the control target apparatus to the portable terminal; and

a step of controlling, when the portable terminal enters a remote control execution area that centers on a base where the control target apparatus is set and does not overlap the remote control execution check area, the control target apparatus according to presence or absence of a response to the control execution check message and the content of the response.

8. A remote control program for acquiring position information of a portable terminal and controlling a control target apparatus, the remote control program causing a server to execute:

a step of transmitting, when the portable terminal exits a remote control execution check area that centers on a base where the control target apparatus is set, a control execution check message for the control target apparatus to

another portable terminal; and

a step of controlling, when the portable terminal, which exits the remote control execution check area, enters a remote control execution area that centers on a base where the control target apparatus is set and does not overlap the remote control execution check area, the control target apparatus according to presence or absence of a response to the control execution check message from the another portable terminal and content of the response.

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FIG.1

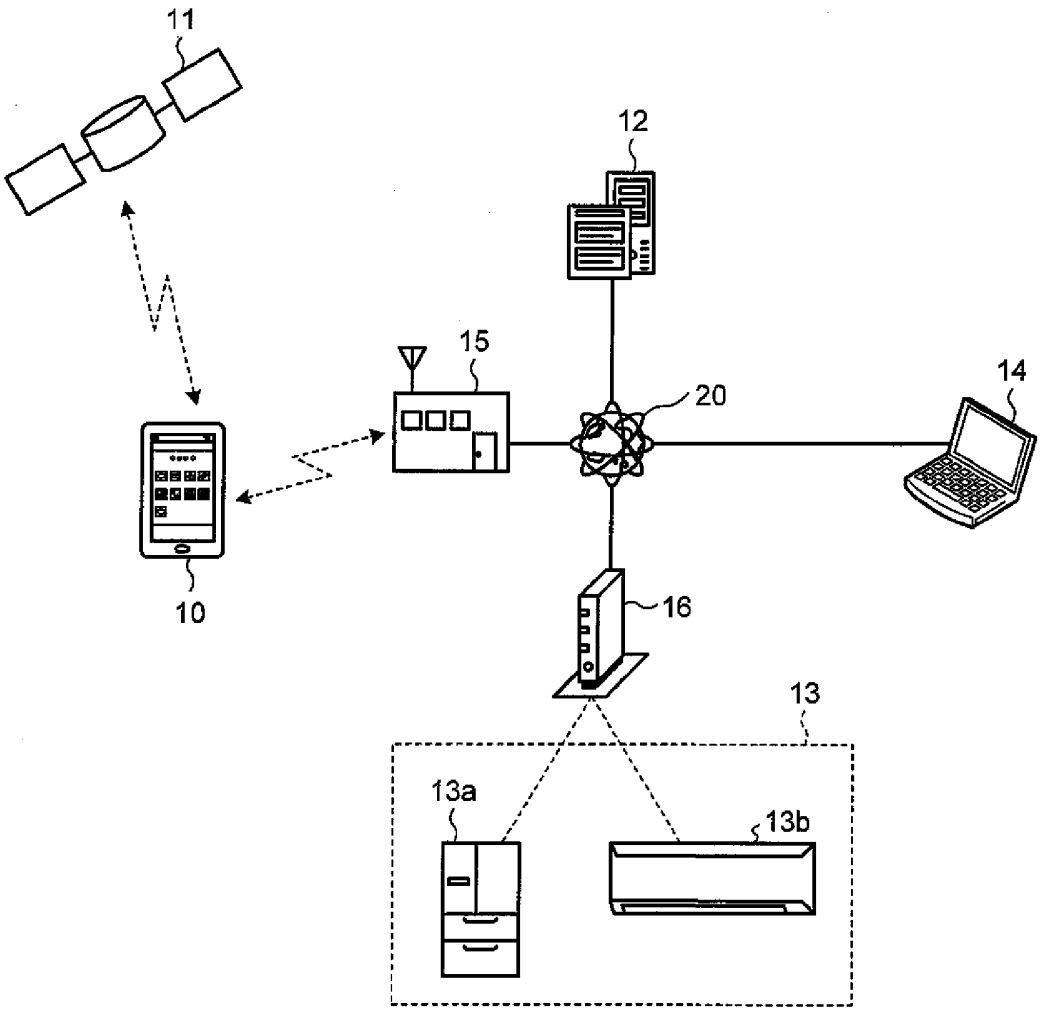

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FIG.2

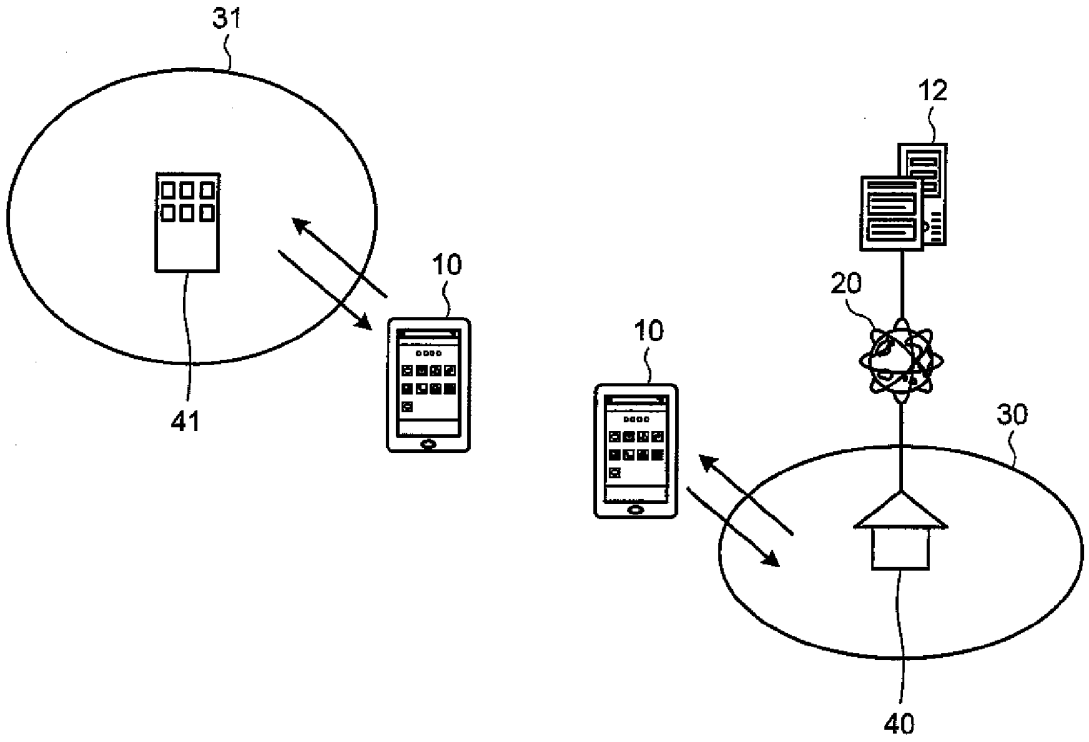
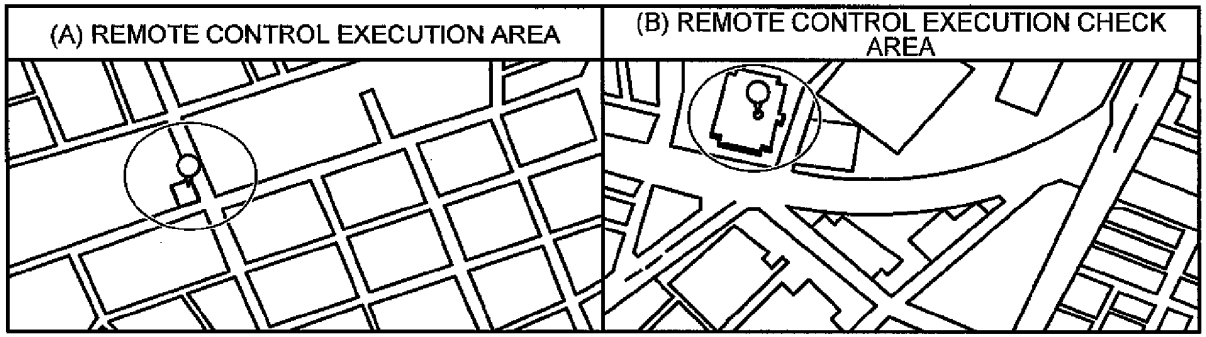


FIG.3

AREA SETTING



OPERATION SETTING

(C)

CONTROL TARGET APPARATUS	SETTING PLACE	OPERATION AT TIME OF GOING OUT (WHEN PORTABLE TERMINAL EXITS REMOTE CONTROL EXECUTION AREA)	OPERATION AT TIME OF COMING HOME (WHEN PORTABLE TERMINAL ENTERS REMOTE CONTROL EXECUTION AREA)	OPERATION AT TIME OF NO RESPONSE TO CHECK MESSAGE
AIR CONDITIONER	LIVING ROOM	OFF	ON (SET TEMPERATURE OF 25℃, EXECUTE AT ROOM TEMPERATURE 28℃ OR HIGHER)	OFF
REFRIGERATOR		POWER SAVING MODE	NORMAL OPERATION MODE	POWER SAVING MODE
LIGHT	LIVING ROOM	OFF	ON	OFF
...	...	...	...	...

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FIG.4

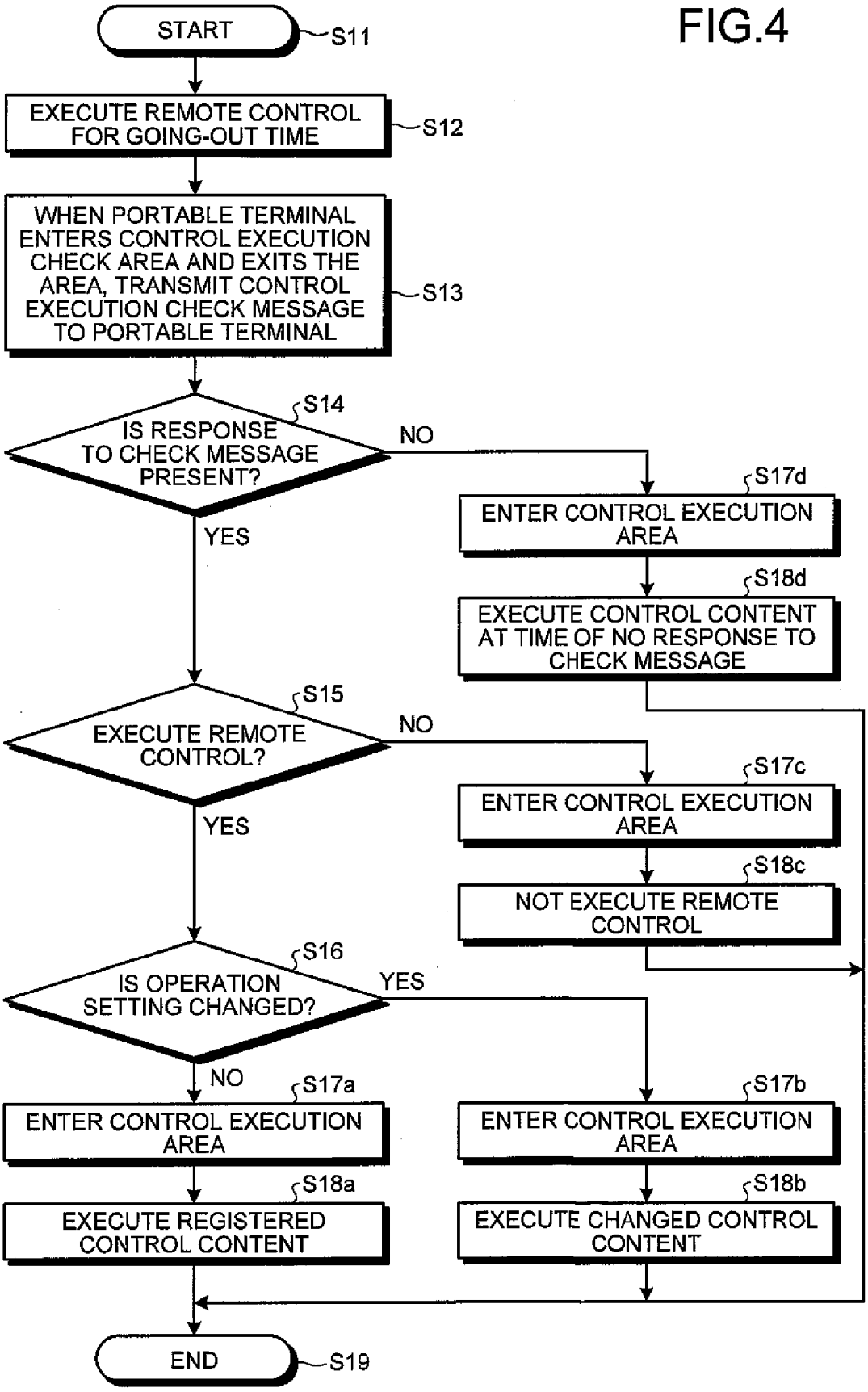

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FIG.5

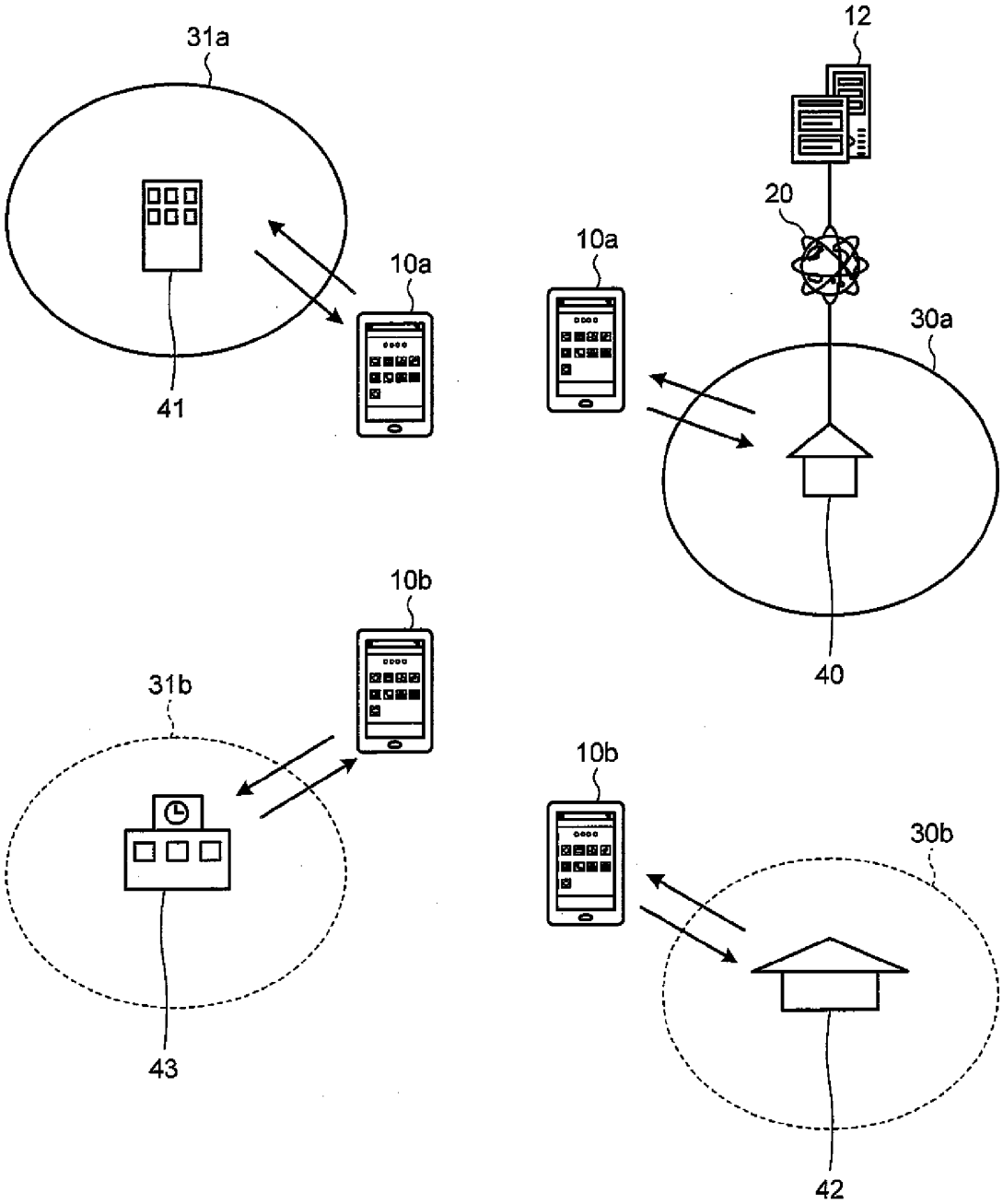
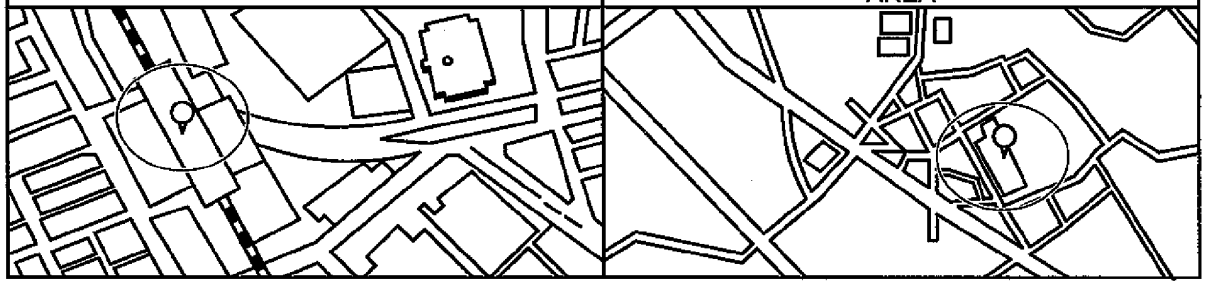


FIG.6

AREA SETTING

(A) REMOTE CONTROL EXECUTION AREA

(B) REMOTE CONTROL EXECUTION CHECK AREA



OPERATION SETTING

(C)

CONTROL TARGET APPARATUS	SETTING PLACE	OPERATION AT TIME OF GOING OUT (WHEN PORTABLE TERMINAL EXITS REMOTE CONTROL EXECUTION AREA)	OPERATION AT TIME OF COMING HOME (WHEN PORTABLE TERMINAL ENTERS REMOTE CONTROL EXECUTION AREA)	OPERATION AT TIME OF NO RESPONSE TO CHECK MESSAGE
AIR CONDITIONER	CHILD'S ROOM	OFF	ON (SET TEMPERATURE OF 28℃, EXECUTE AT ROOM TEMPERATURE 30℃ OR HIGHER)	OFF
REFRIGERATOR		POWER SAVING MODE	NORMAL OPERATION MODE	POWER SAVING MODE
LIGHT	LIVING ROOM	OFF	ON	OFF
...	...	...	...	...

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FIG.7

