Claims

1. A system for controlling and managing medical supplies stored inside a medical refrigerator or freezer, comprising:

a reader;

at least two antennas situated in different locations at a exterior of the medical refrigerator or freezer;

tags attached on the medical supplies respectively, wherein the medical supplies are stored inside a storage space in the medical refrigerator or freezer, each of the tags stores an identification code of the corresponding medical supply;

a processing unit connected to the reader, wherein the processing unit receives the identification code of the medical supply read from the reader through the antennas and determines a specific location of the medical supplies in the storage space according to a situated location of the antennas and scope of beam coverage of the antennas.

2. The system of claim 1, wherein an interior of the tag is situated with a temperature sensor; and

the processing unit receives the temperature detected by the temperature sensor read from the reader through the antennas, and determines whether a frozen environmental temperature of the medical refrigerator or freezer has exceeded a pre-set temperature scope according to the temperature as detected, and sends out warning signals when the frozen environmental temperature has exceeded the pre-set temperature scope.

3. The system of claim 2, wherein the warning signals comprise mobile phone warning signals, internet warning signals, sound or text messages.

4. The system of claim 1, wherein the tag stores a remaining amount of the corresponding medical supply; and

the processing unit receives the remaining amount of the medical supply read from the reader through the antennas, and determines whether the medical supply has been fully utilized according to the remaining amount of the medical supply as received so as to perform a cost control.

5. The system of claim 1, wherein the tag stores a expiration date of the medical supply; and

the processing unit receives the expiration date of the medical supply read by the reader through the antennas, and determines whether the expiration date has arrived

~~according to the expiration date as received, and display warning signals on the~~ expiration date.

6. The system of claim 1, wherein the processing unit records cut-off time of electricity inside the medical refrigerator or freezer, and sends out a notice on the temperature as collected during an electricity cut-off period and electricity revival time when the electricity revives.
7. The system of claim 6, wherein the notice is sent out through a sound, a voice message, a short message or wired/wireless internet access.
8. The system of claim 1, wherein the medical supplies comprise medications, reagents, or vaccines.
9. The system of claim 1, wherein the processing unit is a remote computer.
10. The system of claim 1, wherein the medical refrigerator or freezer is compartmentalized into several layers.
11. The system of claim 1, wherein an exterior of each layer of the medical refrigerator or freezer is situated with any numbers of 4-9 antennas.
12. The system of claim 10 further comprising a RF multi-plexer, one end of the RF multi-plexer connects to the reader, while the other end according to an assigned task selects and connects to the corresponding antennas situated at the medical refrigerator or freezer.
13. A method for controlling and managing medical supplies stored inside medical refrigerator or freezer using the system of claim 1, comprising the steps of:

S22. scanning the tag on the medical supplies stored in the medical refrigerator or freezer through at least two antennas, sending the identification code to the processing unit; and

S23. receiving the identification code of the medical supply read from the reader through the antennas and determining the specific location of the medical supplies in the storage space according to the situated location of the antennas and the scope of beam coverage of the antennas by the processing unit.
14. The method of claim 13, wherein step S22 further comprising:

sending the read temperature detected by the temperature sensor to the processing unit; and

step S23 further comprising:

receiving the temperature as detected by the temperature sensor read by the reader ~~through the antennas; determining whether the frozen environmental temperature has~~

~~exceeded the pre-set temperature scope according to the temperature as detected; and~~

sending out warning signals when the temperature scope has exceeded the pre-set limit by the processing unit.

15. The method of claim 14, wherein the warning signals comprise mobile phone warning signals, internet warning signals, sound or text messages.

16. The method of claim 13, wherein step S22 further comprising:

sending the read remaining amount of the corresponding medical supply to the processing unit; and

step S23 further comprising:

receiving the remaining amount of the medical supply read from the reader through the antennas and determining whether the medical supplies are fully utilized according to the remaining amount of medical supply as received so as to perform a cost control by the processing unit.

17. The method of claim 13, wherein step S22 further comprising:

sending the expiration date of the corresponding medical supply to the processing computer; and

step S23 further comprising:

receiving the remaining amount of the medical supply read by the reader through the antennas; determining whether the expiration date has arrived according to the expiration date as received; and displaying warning signals on the expiration date by the processing unit.

18. The method of claim 13 further comprising:

recording the cut-off time of the electricity inside the medical refrigerator or freezer; and sending out the notice on the temperature as collected during the electricity cut-off period and the electricity revival time when the electricity revives by the processing unit.

19. The method of claim 13, wherein the notice is sent out through a sound, a voice ~~message, a short message or wired/wireless internet access.~~

The invention claimed is:

1. A system for controlling and managing medical supplies stored inside a medical refrigerator or freezer, the medical refrigerator or freezer comprising:
a storage space compartmentalized into a plurality of areas, the system comprising:
a reader;
at least two antennas situated on an exterior side wall and an exterior rear wall of each of the areas of the storage space of the medical refrigerator or freezer respectively;
tags attached on the medical supplies respectively, wherein each of the medical supplies is stored inside each of the areas of the storage space in the medical refrigerator or freezer respectively, each of the tags stores an identification code of the corresponding medical supply;
a processing unit connected to the reader, wherein the processing unit receives the identification code of the medical supply read from the reader through the antennas and determines a specific location of each of the medical supplies in the areas of the storage space according to a situated location of the antennas and scope of beam coverage of the antennas.

2. The system of claim 1, wherein an interior of the tag is situated with a temperature sensor; and the processing unit receives the temperature detected by the temperature sensor read from the reader through the antennas, and determines whether a frozen environmental temperature of the medical refrigerator or freezer has exceeded a pre-set temperature scope according to the temperature as detected, and sends out warning signals when the frozen environmental temperature has exceeded the pre-set temperature scope.

3. The system of claim 2, wherein the warning signals comprise mobile phone warning signals, internet warning signals, sound or text messages.

4. The system of claim 1, wherein the tag stores a remaining amount of the corresponding medical supply; and
the processing unit receives the remaining amount of the medical supply read from the reader through the antennas, and determines whether the medical supply has been fully utilized according to the remaining amount of the medical supply as received so as to perform a cost control.

5. The system of claim 1, wherein the tag stores an expiration date of the medical supply; and the processing unit receives the expiration date of the medical supply read by the reader through the antennas, and determines whether the expiration date has arrived according to the expiration date as received, and display warning signals on the expiration date.

6. The system of claim 1, wherein the processing unit records cut-off time of electricity inside the medical refrigerator or freezer, and sends out a notice on the temperature as collected

during an electricity cut-off period and electricity revival time when the electricity revives.

7. The system of claim 1, wherein the medical refrigerator or freezer is compartmentalized into Area 1 and Area 2 in one layer, a left exterior side wall of Area 1 is situated with antenna 1A, a right exterior side wall of Area 2 is situated with antenna 1D, a rear exterior wall of Area 1 is situated with antenna 1B, a rear exterior wall of Area 2 is situated with antenna 1C; the processing unit determines the specific location of each of the medical supplies according to following logic:

Antenna	Location of the medical supplies
1A	Area 1
1B	Area 1
1A ∩ 1B	Area 1
1C	Area 2
1D	Area 2
1C ∩ 1D	Area 2

wherein, "∩" indicates that the reader simultaneously reads through two antennas.

8. The system of claim 1, wherein the medical supplies comprise medications, reagents, or vaccines.

9. The system of claim 1, wherein the processing unit is a remote computer.

10. The system of claim 1, wherein the medical refrigerator or freezer is compartmentalized into a plurality of layers.

11. The system of claim 1, wherein an exterior of each layer of the medical refrigerator or freezer is situated with any numbers of 4-9 antennas.

12. The system of claim 10 further comprising a RF multi-plexer, one end of the RF multi-plexer connects to the reader, while the other end according to an assigned task selects and connects to the corresponding antennas situated at the medical refrigerator or freezer.

13. A method for controlling and managing medical supplies stored inside medical refrigerator or freezer using the system of claim 1, comprising the steps of:
S22. scanning the tag on the medical supplies stored in the medical refrigerator or freezer through at least two antennas, sending the identification code to the processing unit; and

S23. receiving the identification code of the medical supply read from the reader through the antennas and determining the specific location of the medical supplies in the storage space according to the situated location of the antennas and the scope of beam coverage of the antennas by the processing unit.

14. The method of claim 13, wherein step S22 further comprising:
sending the read temperature detected by the temperature sensor to the processing unit; and
step S23 further comprising:
receiving the temperature as detected by the temperature sensor read by the reader through the antennas; determining whether the frozen environmental temperature has exceeded the pre-set temperature scope according to the temperature as detected; and
sending out warning signals when the temperature scope has exceeded the pre-set limit by the processing unit.

15. The method of claim 14, wherein the warning signals comprise mobile phone warning signals, internet warning signals, sound or text messages.

16. The method of claim 13, wherein step S22 further comprising:
sending the read remaining amount of the corresponding medical supply to the processing unit; and
step S23 further comprising:
receiving the remaining amount of the medical supply read from the reader through the antennas and determining whether the medical supplies are fully utilized according to the remaining amount of medical supply as received so as to perform a cost control by the processing unit.

17. The method of claim 13, wherein step S22 further comprising:
sending the expiration date of the corresponding medical supply to the processing computer; and
step S23 further comprising:
receiving the remaining amount of the medical supply read by the reader through the antennas; determining whether the expiration date has arrived according to the expiration date as received; and displaying warning signals on the expiration date by the processing unit.

18. The method of claim 13 further comprising:
recording the cut-off time of the electricity inside the medical refrigerator or freezer;
and sending out the notice on the temperature as collected during the electricity cut-off period

and the electricity revival time when the electricity revives by the processing unit.

19. The method of claim 13, wherein the notice is sent out through a sound, a voice message, a short message or wired/wireless internet access.

20. The method of claim 13, wherein the medical refrigerator or freezer is compartmentalized into Area 1 and Area 2 in one layer, a left exterior side wall of Area 1 is situated with antenna 1A, a right exterior side wall of Area 2 is situated with antenna 1D, a rear exterior wall of Area 1 is situated with antenna 1B, a rear exterior wall of Area 2 is situated with antenna 1C; the method further comprises determining the specific location of each of the medical supplies according to following logic:

Antenna	Location of the medical supplies
1A	Area 1
1B	Area 1
1A ∩ 1B	Area 1
1C	Area 2
1D	Area 2
1C ∩ 1D	Area 2

wherein, "∩" indicates that the reader simultaneously reads through two antennas.