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Claims page

Patent Document Number: **2245251**

(54) English Title: **ANTENNA FOR ELECTRIC METER AND METHOD OF MANUFACTURE THEREOF**

(54) French Title: **ANTENNE POUR COMPTEUR ELECTRIQUE ET METHODE DE FABRICATION DE CELLE-CI**

Claims:

Note: Claims are shown in the official language in which they were submitted.

Claims:

1. An antenna for use with an electric meter chassis having a dielectric housing protruding therefrom, said antenna allowing electric meter circuitry within said chassis to communicate wirelessly through said dielectric housing, comprising:
antenna elements, located within said dielectric housing and adapted to transmit and receive electromagnetic radiation; and
a balance circuit, coupled to said antenna elements to cause said antenna elements to act as said antenna and coupable to an unbalanced output port of a wireless communication circuit, that balances an impedance of said unbalanced output port thereby to balance said antenna.

2. The antenna as recited in Claim 1 wherein said antenna elements generally conform to a portion of an internal surface of said dielectric housing.

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3. The antenna as recited in Claim 1 wherein said chassis

comprises electric meter circuitry located in a circuit board rack within said dielectric housing, said antenna elements located between circuit boards in said circuit board rack.

4. The antenna as recited in Claim 1 wherein said chassis comprises:
electric meter circuitry located in said dielectric housing; and
an electromagnetic shield located about at least a portion of said electric meter circuitry.

5. The antenna as recited in Claim 1 wherein said antenna elements are arcuate and have a flattened lateral cross section.

6. The antenna as recited in Claim 1 wherein said balance circuit is embodied on a circuit board having mounts located thereon and mechanically supports said antenna elements, said mounts allowing said antenna to be reoriented with respect to said dielectric housing.

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7. The antenna as recited in Claim 1 wherein said antenna elements are first and second conductors of a dipole and said balance circuit balances an impedance of said dipole.

8. The antenna as recited in Claim 1 wherein said chassis comprises a wireless communication circuit having a carrier frequency of between 700 and 950 megahertz.

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9. A method of manufacturing an antenna for use with an electric meter chassis having a dielectric housing protruding therefrom, said antenna allowing electric meter circuitry within said chassis to communicate wirelessly through said dielectric housing, comprising the steps of:
locating antenna elements within said dielectric housing, said antenna elements adapted to transmit and receive electromagnetic radiation; and
coupling a balance circuit to said antenna elements to cause said antenna elements to act as said antenna, said balance circuit couplable to an unbalanced output port of a wireless communication circuit to balance an impedance of said unbalanced output port and thereby balance said antenna.

10. The method as recited in Claim 9 further comprising the step of causing said antenna elements generally to conform to a portion of an internal surface of said dielectric housing.

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11. The method as recited in Claim 9 further comprising the step of placing electric meter circuitry in a circuit board rack within said dielectric housing, said antenna elements located between circuit boards in said circuit board rack.

12. The method as recited in Claim 9 further comprising the steps of:
placing electric meter circuitry in said dielectric housing; and
placing an electromagnetic shield about at least a portion of said electric meter circuitry.

13. The method as recited in Claim 9 further comprising the step of forming said antenna elements into metal arcs having a flattened lateral cross section.

14. The method as recited in Claim 9 further comprising the step of forming said balance circuit on a circuit board having mounts located thereon, said circuit board mechanically supporting said antenna elements, said mounts allowing said antenna to be reoriented with respect to said dielectric housing.

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15. The method as recited in Claim 9 wherein said antenna elements are first and second conductors of a dipole and said balance circuit balances an impedance of said dipole.

16. The method as recited in Claim 9 further comprising the step of generating a carrier frequency of between 700 and 950 megahertz in a wireless communication circuit.

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17. An electric meter, comprising:
an electric meter chassis having a dielectric housing protruding therefrom;
electric meter circuitry;
a wireless communication circuit coupled to said electric meter circuitry; and
an antenna for allowing said electric meter circuitry to communicate wirelessly through said dielectric housing, including:
antenna elements, located proximate said electric meter circuitry, adapted to transmit and receive electromagnetic radiation, and
a balance circuit, coupled to said antenna elements to cause said antenna elements to act as said antenna and to an unbalanced output port of said wireless communication circuit, that balances an impedance of said unbalanced output port thereby to balance said antenna.

18. The meter as recited in Claim 17 wherein said antenna elements generally conform to an inner cylindrical surface of said

dielectric housing.

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19. The meter as recited in Claim 17 further comprising an electromagnetic shield located about at least a portion of said electric meter circuitry.

20. The meter as recited in Claim 17 wherein said antenna elements are arcuate and have a flattened lateral cross section.

21. The meter as recited in Claim 17 wherein said balance circuit is embodied on a circuit board having mounts located thereon and mechanically supports said antenna elements, said mounts allowing said antenna to be reoriented with respect to said dielectric housing.

22. The meter as recited in Claim 17 wherein said antenna elements are first and second conductors of a dipole, said balance circuit balancing an impedance of said dipole.

23. The meter as recited in Claim 17 wherein said wireless communication circuit has a carrier frequency of between 700 and 950 megahertz.

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24. The meter as recited in Claim 17 wherein said wireless communication circuit communicates meter billing information.

25. The meter as recited in Claim 17 wherein said wireless communication circuit communicates information selected from the group consisting of:
energy usage,
power demand, and
power factor.

26. The meter as recited in Claim 17 wherein said wireless communication circuit communicates information selected from the group consisting of:
time of use, and~~
interval recordings of energy usage.

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27. The meter as recited in Claim 17 wherein said wireless communication circuit communicates information selected from the group consisting of:
power quality information,
power outage information,
site analysis information, and
diagnostic information.
28. The meter as recited in Claim 17 wherein said chassis comprises a capacitively backed up power supply that powers said

electric meter circuitry and said wireless communication circuit, thereby allowing said wireless communication circuit to communicate power outage information during a loss of power.

29. The meter as recited in Claim 17 wherein said balance circuit is a microstrip.

30. The meter as recited in Claim 17 wherein said chassis comprises a flex strip connector that couples said wireless communication circuit to said electric meter circuitry.