CLAIMS

What is claimed is:

1. An antenna structure for a radio frequency identification (RFID) reader, the antenna structure comprising:

a substrate; and

an antenna disposed on the substrate, the antenna comprising:

a peripheral frame portion;

a first strip section disposed at a first side of the peripheral frame portion; and

a second strip section disposed at a second side of the peripheral frame portion,

wherein the first strip section and the second strip section each comprises a plurality of spaced-apart strip portions extending from a first part of the peripheral frame portion to a second part of the peripheral frame portion, and

wherein at least one of the spaced-apart strip portions in the first strip section has a width which is different from a width of another spaced-apart strip portion in the first strip section, and/or at least one of the spaced-apart strip portions in the second strip section has a width which is different from a width of another spaced-apart strip portion in the second strip section.

2. The antenna structure according to claim 1, wherein the first part is a lower part of the peripheral frame portion and the second part is an upper part of the peripheral frame portion.

3. The antenna structure according to claim 1 or 2, wherein the first side is opposite to the second side, and the first strip section disposed at the first side and the second strip section disposed at the second side define an opening therebetween in the antenna.

4. The antenna structure according to any one of claims 1 to 3, wherein the spaced-apart strip portions in the first strip section and/or the second strip section are substantially parallel to each other.

5. The antenna structure according to any one of claims 1 to 4, wherein the first strip section and the second strip section are substantially symmetrical with respect to a central axis of the antenna passing through the first and second parts of the peripheral frame portion.

6. The antenna structure according to any one of claims 1 to 4, wherein the first strip section and the second strip section are asymmetrical with respect to a central axis of the antenna passing through the first and second parts of the peripheral frame portion.

7. The antenna structure according to any one of claims 1 to 4, wherein each adjacent pair of the spaced-apart strip portions in the first strip section is spaced apart by a first distance and each adjacent pair of the spaced-apart strip portions in the second strip section is spaced apart by a second distance, and wherein the first distance and the second distance are substantially the same.

8. The antenna structure according to any one of claims 1 to 4, wherein each adjacent pair of the spaced-apart strip portions in the first strip section is spaced apart by a first distance and each adjacent pair of the spaced-apart strip portions in the second strip section is spaced apart by a second distance, and wherein the first distance and the second distance are different.

9. The antenna structure according to any one of claims 1 to 4, wherein at least one of the adjacent pairs of the spaced-apart strip portions in the first strip section is spaced apart by a distance which is different from that of another adjacent pair of the space-apart strip portions in the first strip section, and/or

at least one of the adjacent pairs of the spaced-apart strip portions in the second strip section is spaced apart by a distance which is different from that of another adjacent pair of the space-apart strip portions in the second strip section.

10. The antenna structure according to any one of claims 1 to 4, wherein widths of the spaced-apart strip portions in the first strip section and/or widths of the spaced-apart strip portions in the second strip section are substantially the same.

11. The antenna structure according to any one of claims 1 to 10, wherein the peripheral frame portion forms a closed shape.

12. The antenna structure according to any one of claims 1 to 10, wherein the peripheral frame portion forms a shape selected from the group consisting of circle, oval, and polygon.

13. The antenna structure according to any one of claims 1 to 12, wherein the peripheral frame portion and the plurality of spaced-apart strip portions in the first strip section and the second strip section are made of conductive metallic strips and/or conductive wires.

14. The antenna structure according to any one of claims 1 to 13, further comprising another antenna disposed on the substrate, said antenna and said another antenna being disposed on opposite sides of the substrate, said another antenna comprising:

a peripheral frame portion;

a first strip section disposed at a first side of the peripheral frame portion; and

a second strip section disposed at a second side of the peripheral frame portion,

wherein the first strip section and the second strip section each comprises a plurality of spaced-apart strip portions extending from a first part of the peripheral frame portion to a second part of the peripheral frame portion,

wherein said antenna and said another antenna are electrically coupled to each other.

15. A method of manufacturing an antenna structure for a radio frequency identification (RFID) reader, the method comprising:

providing a substrate;

forming an antenna on the substrate, the antenna comprising:

a peripheral frame portion;

a first strip section disposed at a first side of the peripheral frame portion; and

a second strip section disposed at a second side of the peripheral frame portion,

wherein the first strip section and the second strip section each comprises a plurality of spaced-apart strip portions extending from a first part of the peripheral frame portion to a second part of the peripheral frame portion, and

wherein at least one of the spaced-apart strip portions in the first strip section has a width which is different from a width of another spaced-apart strip portion in the first strip section, and/or at least one of the spaced-apart strip portions in the second strip section has a width which is different from a width of another spaced-apart strip portion in the second strip section.

16. The method of claim 15, wherein the peripheral frame portion and the plurality of spaced-apart strip portions in the first strip section and the second strip section are made of conductive metallic strips and/or conductive wires.

17. A radio frequency identification (RFID) reader system, comprising an antenna structure according to any one of claims 1 to 14 configured to communicate with an RFID tag through an inductive coupling.

18. The RFID reader system according to claim 17, further comprising:

an RFID reader comprising a radio frequency source for generating a radio frequency signal, wherein the radio frequency signal is coupled to the antenna structure, and the antenna structure is configured to generate a magnetic field based on the radio frequency signal for communicating with the RFID tag, and

an impedance matching circuit coupled to the antenna structure for enhancing impedance matching between the antenna structure and the RFID reader.

19. A radio frequency identification (RFID) system comprising:

an RFID reader system according to claim 17 or 18, and

an RFID tag having stored therein information associated with an article,

wherein the RFID reader system is configured to communicate with the RFID tag through an inductive coupling to obtain the information associated with the article.