What is claimed is:

1. A communication apparatus, comprising:

a phase adjustment circuit, configured to adjust phases of electromagnetic signals;

a charging circuit, configured to convert the electromagnetic signals into electrical energy;

a switching circuit that enables switching between the charging circuit and the phase adjustment circuit; and

antennas, configured to receive the electromagnetic signals;

wherein the antennas are connected to the phase adjustment circuit, and the electromagnetic signals are transmitted to the phase adjustment circuit through the antennas; and

the antennas are connected to the charging circuit, and the electromagnetic signals are transmitted to the charging circuit through the antennas.

2. The apparatus of claim 1, wherein

the charging circuit and the phase adjustment circuit share at least a portion of electronic components.

3. The apparatus of claim 1 or 2, further comprising:

a battery module configured to store the electrical energy.

4. The apparatus of claim 1 or 2, wherein

the antennas comprise energy antennas and information antennas;

the energy antennas are configured to receive electromagnetic signals, and the electromagnetic signals received by the energy antennas are converted into the electrical energy; and

the information antennas are configured to receive electromagnetic signals, and communication information is obtained by processing the electromagnetic signals received by the information antennas.

5. The apparatus of claim 1, wherein

the antennas comprise information antennas;

the information antennas comprise energy antennas, wherein at least a portion of the information antennas are switchable into the energy antennas; and

the energy antennas are configured to receive electromagnetic signals.

6. The apparatus of claim 1, wherein

the antennas comprise energy antennas;

the energy antennas comprise information antennas, wherein at least a portion of the energy antennas are switchable to the information antennas; and

the information antennas are configured to receive electromagnetic signals.

7. The apparatus of claim 5 or 6, wherein

the apparatus further comprises a signal processing unit;

the signal processing unit is configured to process the electromagnetic signals to obtain information carried by the electromagnetic signals; and

the electromagnetic signals received by the information antennas are processed by the signal processing unit to obtain the information carried by the electromagnetic signals.

8. The apparatus of claim 1 or 2, wherein

the communication apparatus has a first operation mode, a second operation mode, and a third operation mode;

in the first operation mode, the electromagnetic signals are processed to obtain information carried by the electromagnetic signals;

in the second operation mode, the electromagnetic signals are converted into the electrical energy; and

in the third operation mode, the electromagnetic signals are processed to obtain information carried by the electromagnetic signals, and converted into the electrical energy.

9. The apparatus of claim 5 or 6, wherein

the communication apparatus is configured to receive the electromagnetic signals through the energy antennas; and

the electromagnetic signals are converted into the electrical energy by an energy charging circuit.

10. The apparatus of claim 5 or 6, wherein

the communication apparatus is configured to receive the electromagnetic signals through the information antennas; and

the electromagnetic signals are adjusted in phase by the phase adjustment circuit.

11. The apparatus of claim 1 or 2, wherein

the antennas are further configured for at least one of:

reflecting the electromagnetic signals; or

passing through the electromagnetic signals; and

the reflecting or passing through the electromagnetic signals comprises at least one of:

adjusting phases of the received electromagnetic signals via the phase adjustment circuit and reflecting the electromagnetic signals;

adjusting phases of the received electromagnetic signals via the phase adjustment circuit and passing through the electromagnetic signals; or

adjusting phases of the received electromagnetic signals via the phase adjustment circuit and both reflecting and passing through the electromagnetic signals.

12. The apparatus of claim 1 or 2, wherein

the antennas are further configured to emit electromagnetic signals; and

the electromagnetic signals are emitted by: adjusting phases of the received electromagnetic signals via the phase adjustment circuit and radiating the adjusted electromagnetic signals outward from the antennas.

13. The apparatus of claim 4, wherein

the antennas are configured to receive electromagnetic signals of a first frequency band and a second frequency band;

the electromagnetic signals of the first frequency band are received through the information antennas and are used for wireless communication; and

the electromagnetic signals of the second frequency band are received through the energy antennas and are used for wireless charging.

14. The apparatus of claim 1 or 2, wherein

the communication apparatus is configured to perform at least one of:

receiving the electromagnetic signals during a first time period, the electromagnetic signal being used for wireless communication; or

receiving the electromagnetic signals during a second time period, the electromagnetic signal being used for wireless charging.

15. A communication apparatus, comprising: an antenna module, a signal processing module, an energy receiving module, and a switching circuit, wherein:

the antenna module comprises an antenna management unit and an antenna array;

the antenna array is configured to receive electromagnetic signals;

the antenna management unit is configured to control operation modes of the antenna array and manage allocation of antenna array resources;

the signal processing module comprises a phase adjustment unit and a signal processing unit;

the phase adjustment unit comprises a phase adjustment circuit configured to adjust phases of the electromagnetic signals;

the signal processing unit is configured to process the electromagnetic signals to obtain information carried by the electromagnetic signals;

the energy receiving module comprises an energy conversion unit and an energy management unit;

the energy conversion unit comprises an energy charging circuit configured to convert the electromagnetic signals into electrical energy;

the energy management unit is configured to collect or manage the electrical energy; and

the switching circuit enables switching between the energy charging circuit and the phase adjustment circuit.

16. The communication apparatus of claim 15, wherein:

the charging circuit and the phase adjustment circuit share at least a portion of electronic components and circuitry.

17. The communication apparatus of claim 15, wherein:

the antenna array comprises information antennas and energy antennas;

the energy antennas are configured to receive electromagnetic signals; and

the information antennas are configured to receive electromagnetic information.

18. The communication apparatus of claim 15, wherein:

the energy management unit further comprises a battery configured to store the electrical energy.

19. A communication device, comprising the communication apparatus of any one of claims 1 to 15.