Claims

1. A portable communication device comprising:

a printed circuit board;

one antenna disposed on the printed circuit board;

a first feeding unit connected to a first part of the one antenna;

a second feeding unit connected to a second part of the one antenna that is different from the first part of the one antenna but is physically part of the same one antenna;

a first communication circuit comprising a first transmission circuit and a first reception circuit;

a second communication circuit comprising a second transmission circuit and a second reception circuit;

a first switch circuit configured to connect the first feeding unit with one of the first transmission circuit or the first reception circuit;

a second switch circuit configured to connect the second feeding unit with one of the second transmission circuit or the second reception circuit;

a processor; and

a memory operatively connected to the processor,

wherein the memory is configured to store instructions that, when executed, cause the processor to:

perform a first operation by:

controlling the first switch circuit to connect the first transmission circuit with the first feeding unit to transmit a first signal via the first part of the one antenna, and

while transmitting the first signal, controlling the second switch circuit to connect the second transmission circuit with the second feeding unit to transmit a second signal via the second part of the one antenna, and

perform a second operation by:

controlling the first switch circuit to connect the first transmission circuit with the first feeding unit to transmit a third signal via the first part of the one antenna, and

while transmitting the third signal, controlling the second switch circuit to connect the second reception circuit with the second feeding unit to receive

a signal, corresponding to the third signal being transmitted via the first part of the one antenna, via the second part of the one antenna.

2. The portable communication device of claim 1,

wherein the printed circuit board comprises a first surface and a second surface facing opposite to the first surface,

wherein the one antenna is disposed on the first surface, and

wherein the first communication circuit and the second communication circuit are disposed on the second surface.

3. The portable communication device of claim 1, further comprising:

another printed circuit board,

wherein the processor is disposed on the other printed circuit board.

4. The portable communication device of claim 20, wherein the instructions, when executed, further cause the processor to perform calibration related to the signal path based on the determined state.

5. The portable communication device of claim 20, wherein the instructions, when executed, further cause the processor to determine the state, when at least a part of the received signal is attenuated by a designated degree or more in comparison to the transmitted third signal.

6. The portable communication device of claim 20, wherein the instructions, when executed, further cause the processor to determine the state based on at least one of a magnitude difference, phase difference, or frequency difference between the transmitted third signal and the received signal.

7. The portable communication device of claim 1, wherein the first switch circuit comprises:

a first wiring configured to connect the first feeding unit and the first transmission circuit;

a second wiring configured to connect the first feeding unit and the first reception circuit;

a first switch configured to electrically connect or disconnect a ground and a point on the first wiring having a length of λ/4 from the first feeding unit; and

a second switch configured to electrically connect or disconnect a ground and a point on the second wiring having a length of λ/4 from the first feeding unit.

8. The portable communication device of claim 7, wherein the instructions, when executed, further cause the processor to:

electrically disconnect the first wiring and the ground via the first switch, and

electrically connect the second wiring with the ground via the second switch, so as to transfer the transmitted first or third signals to the first feeding unit from the first transmission circuit.

9. The portable communication device of claim 1, wherein the second switch circuit comprises:

a third wiring configured to connect the second feeding unit and the second transmission circuit;

a fourth wiring configured to connect the second feeding unit and the second reception circuit;

a third switch configured to electrically connect or disconnect a ground and a point on the third wiring having a length of λ/4 from the second feeding unit; and

a fourth switch configured to electrically connect or disconnect a ground and a point on the fourth wiring having a length of λ/4 from the second feeding unit.

10. The portable communication device of claim 9, wherein the instructions, when executed, further cause the processor to:

electrically connect the third wiring and the ground via the third switch, and

electrically disconnect the fourth wiring and the ground via the fourth switch, so as to transfer the received signal to the second reception circuit from the second feeding unit.

11. The portable communication device of claim 1,

wherein the first communication circuit is configured to support a horizontal polarization component of a signal transmitted or received via the one antenna, and

wherein the second communication circuit is configured to support a vertical polarization component of a signal transmitted or received via the one antenna.

12. The portable communication device of claim 1, wherein the instructions, when executed, further cause the processor to transmit a radio frequency (RF) signal of a frequency band designated to be used for fifth generation (5G) network communication to the one antenna, via the first transmission circuit.

13. The portable communication device of claim 12, wherein the frequency band is 6 GHz or higher.

14. A portable communication device comprising:

a first printed circuit board;

a second printed circuit board;

an antenna array disposed on a first surface of the first printed circuit board, and comprising a plurality of antennas;

a first communication circuit disposed on a second surface of the first printed circuit board, and comprising a first transmission circuit and a first reception circuit;

a second communication circuit disposed on the second surface of the first printed circuit board, and comprising a second transmission circuit and a second reception circuit;

a first feeding unit connected to a first part of one antenna among the plurality of antennas;

a second feeding unit connected to a second part of the one antenna that is different from the first part of the one antenna but is physically part of the same one antenna;

a first switch circuit configured to selectively connect the first feeding unit with one of the first transmission circuit or the first reception circuit;

a second switch circuit configured to selectively connect the second feeding unit with one of the second transmission circuit or the second reception circuit;

a processor disposed on the second printed circuit board; and

a memory operatively connected to the processor,

wherein the memory is configured to store instructions that, when executed, cause the processor to:

perform a first operation by:

controlling the first switch circuit to connect the first transmission circuit with the first feeding unit to transmit a first signal via the first part of the one antenna, and

while transmitting the first signal, controlling the second switch circuit to connect the second transmission circuit with the second feeding unit to transmit a second signal via the second part of the one antenna, and

perform a second operation by:

controlling the first switch circuit to connect the first transmission circuit with the first feeding unit to transmit a third signal via the first part of the one antenna, and

while transmitting the third signal, controlling the second switch circuit to connect the second reception circuit with the second feeding unit to receive a signal, corresponding to the third signal being transmitted via the first part of the one antenna, via the second part of the one antenna.

15. The portable communication device of claim 14, wherein the first switch circuit comprises:

a first wiring configured to connect the first feeding unit and the first transmission circuit;

a second wiring configured to connect the first feeding unit and the first reception circuit;

a first switch configured to electrically connect or disconnect a ground and a point on the first wiring having a length of λ/4 from the first feeding unit; and

a second switch configured to electrically connect or disconnect a ground and a point on the second wiring having a length of λ/4 from the first feeding unit.

16. The portable communication device of claim 15, wherein the instructions, when executed, further cause the processor to:

electrically disconnect the first wiring and the ground via the first switch, and

electrically connect the second wiring with the ground via the second switch, so as to transfer the transmitted first or third signals to the first feeding unit from the first transmission circuit.

17. The portable communication device of claim 14, wherein the second switch circuit comprises:

a third wiring configured to connect the second feeding unit and the second transmission circuit;

a fourth wiring configured to connect the second feeding unit and the second reception circuit;

a third switch configured to electrically connect or disconnect a ground and a point on the third wiring having a length of λ/4 from the second feeding unit; and

a fourth switch configured to electrically connect or disconnect a ground and a point on the fourth wiring having a length of λ/4 from the second feeding unit.

18. The portable communication device of claim 17, wherein the instructions, when executed, further cause the processor to:

electrically connect the third wiring and the ground via the third switch, and

electrically disconnect the fourth wiring and the ground via the fourth switch, so as to transfer the received signal to the second reception circuit from the second feeding unit.

19. The portable communication device of claim 1, wherein the instructions, when executed, further cause the processor to, based on at least a part of the transmitted third signal, perform calibration related to a signal path comprising the processor, the first transmission circuit, the one antenna, and the second reception circuit.

20. The portable communication device of claim 1, wherein the instructions, when executed, further cause the processor to, based on the received signal, determine a state of at least a part of a signal path comprising the first transmission circuit, the one antenna, and the second reception circuit.

21. The portable communication device of claim 1,

wherein the first transmission circuit is configured to convert a baseband signal from the processor into a radio frequency band signal for the first switch circuit,

wherein the first reception circuit is configured to convert a radio frequency band signal from the first switch circuit into a baseband signal for the processor,

wherein the second transmission circuit is configured to convert a baseband signal from the processor into a radio frequency band signal for the second switch circuit, and

wherein the second reception circuit is configured to convert a radio frequency band signal from the second switch circuit into a baseband signal for the processor.

22. The portable communication device of claim 1, further comprising:

an intermediate frequency integrated circuit (IFIC) configured to:

convert a baseband signal from the processor into an intermediate frequency band signal for at least one of the first transmission circuit or the second transmission circuit, and

convert an intermediate frequency band signal from at least one of the first transmission circuit or the second transmission circuit into a baseband signal for the processor,

wherein the first transmission circuit is configured to convert the intermediate frequency band signal from the IFIC into a radio frequency band signal for the first switch circuit,

wherein the first reception circuit is configured to convert a radio frequency band signal from the first switch circuit into the intermediate frequency band signal for the IFIC,

wherein the second transmission circuit is configured to convert the intermediate frequency band signal from the IFIC into a radio frequency band signal for the second switch circuit, and

wherein the second reception circuit is configured to convert a radio frequency band signal from the second switch circuit into the intermediate frequency band signal for the IFIC.

23. The portable communication device of claim 1, wherein the one antenna is included in an antenna array comprising a plurality of antennas.