Claims

1. A portable communication device comprising:

an antenna;

a communication chip including a linear regulator and an amplifier disposed therein, and the amplifier operatively connected with the linear regulator and with the antenna; and

a switching regulator disposed outside the communication chip and operatively connected with the linear regulator,

wherein the linear regulator is configured to output a voltage corresponding to an envelope of an input radio-frequency (RF) signal with the switching regulator, and

wherein the amplifier is configured to amplify the input RF signal.

2. The portable communication device of claim 1, wherein the communication chip includes another amplifier configured to amplify another input RF signal received via the antenna.

3. The portable communication device of claim 2, wherein the amplifier is a power amplifier, and the other amplifier is a low-noise amplifier.

4. The portable communication device of claim 1, wherein the switching regulator and the communication chip are arranged such that a first electric path between the switching regulator and the linear regulator is longer than a second electric path between the linear regulator and the amplifier.

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

an envelope tracking digital-to-analog converter (ET DAC) configured to control the linear regulator to provide the amplifier with the voltage,

wherein the ET DAC is disposed in the communication chip.

6. The portable communication device of claim 5, wherein the switching regulator and the communication chip are arranged such that a first electric path between the switching regulator and the linear regulator is longer than a second electric path between the ET DAC

and the linear regulator.

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

another communication chip including another linear regulator operatively connected with the switching regulator.

8. The portable communication device of claim 7, wherein the switching regulator is arranged such that a first electric path between the switching regulator and the other communication chip is longer than a second electric path between the switching regulator and the communication chip.

9. The portable communication device of claim 7, wherein the communication chip is arranged closer to a lower end of the portable communication device than to an upper end of the portable communication device, and the other communication chip is arranged closer to the upper end of the portable communication device than to the lower end of the portable communication device.

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

a first envelope tracking (ET) modulator including the switching regulator and no linear regulator disposed therein;

a second ET modulator including another switching regulator and another linear regulator disposed therein; and

another communication chip operatively connected with the second ET modulator.

11. The portable communication device of claim 1, wherein the input RF signal has a first frequency and the envelope has a second frequency equal to or lower than the first frequency.

12. A communication chip for mounting on a circuit board of an electronic device to amplify an input signal corresponding to a radio-frequency signal to be transmitted through an antenna of the electronic device or to amplify a radio-frequency signal received through the antenna, the communication chip comprising:

an amplifier configured to receive an input signal, wherein a radio-frequency signal to

be transmitted through the antenna corresponds to the input signal of the amplifier; and

a linear regulator configured to provide the amplifier with a voltage corresponding to an envelope of the input signal,

wherein the linear regulator and the amplifier are disposed inside the communication chip, and a switching regulator is not disposed inside the communication chip, and

wherein the amplifier is configured to amplify the input signal.

13. The communication chip of claim 12, further comprising:

an ET DAC configured to control the linear regulator to provide the amplifier with the voltage.

14. The communication chip of claim 13, wherein each of a first electric path between the linear regulator and the amplifier and a second electric path between the linear regulator and the ET DAC is shorter than a third electric path between the linear regulator and the switching regulator.

15. The communication chip of claim 12, further comprising:

a low-noise amplifier configured to amplify another input RF signal received through an antenna external to the communication chip.

16. A portable communication device comprising:

an antenna;

a switching regulator;

an amplifier operably connected to the switching regulator and configured to amplify an input RF signal;

a linear regulator operably connected to the switching regulator and the amplifier; and

an ET DAC configured to control the linear regulator to provide the amplifier with a voltage corresponding to an envelope of the input RF signal,

wherein a first electric path between the linear regulator and the switching regulator is longer than a second electric path between the linear regulator and the amplifier.

17. The portable communication device of claim 16, wherein the first electric path is

longer than a third electric path between the linear regulator and the ET DAC.

18. The portable communication device of claim 16, wherein the amplifier, the linear regulator, and the ET DAC are disposed in a same communication chip, and wherein the switching regulator is disposed outside the same communication chip.

19. The portable communication device of claim 16, wherein the switching regulator is disposed in an ET modulator.