POWER AMPLIFIER POWER MANAGEMENT IN USER EQUIPMENT

BACKGROUND

Field

[0001] Embodiments of the invention relate to electronic systems, and in particular, to radio frequency electronics.

Description of Related Technology

[0002] Radio frequency (RF) communication systems can be used for transmitting and/or receiving signals of a wide range of frequencies. For example, an RF communication system can be used to wirelessly communicate RF signals in a frequency range of about 30 kHz to 300 GHz, such as in the range of about 410 MHz to about 7.125 GHz for fifth generation (5G) communications using Frequency Range 1 (FR1) or in the range of about 24.25 GHz to 52.6 GHz for 5G communications using Frequency Range 2 (FR2).

[0003] Examples of RF communication systems include, but are not limited to, mobile phones, tablets, base stations, network access points, customer-premises equipment (CPE), laptops, and wearable electronics.

SUMMARY

[0004] In certain embodiments, the present disclosure relates to a mobile device. The mobile device includes a transceiver configured to generate a radio frequency signal, a front-end system including a first power amplifier module configured to amplify the radio frequency signal, and a power management system including an envelope tracking power management unit configured to provide an envelope tracking supply voltage to the first power amplifier module, and a first average power tracking power management unit configured to provide an average power tracking supply voltage to the first power amplifier module, the first power amplifier module configured to selectively switch between the envelope tracking supply voltage and the average power tracking supply voltage. In an aspect, there is provided a phone board assembly for a mobile phone, the phone board assembly comprising: a first power amplifier module configured to amplify a first radio frequency signal; a second power amplifier module configured to amplify a second radio frequency signal; and a first multi-mode power management unit configured to generate a first shared power amplifier supply voltage for the first power amplifier module and the second power amplifier module, the first multi-mode power management unit operable in a plurality of modes including an envelope tracking mode and an average power tracking mode. In an aspect, there is a provided a method of power

management in a mobile device, the method comprising: amplifying a first radio frequency signal using a first power amplifier module; amplifying a second radio frequency signal using a second power amplifier module; and generating a first shared power amplifier supply voltage for the first power amplifier module and the second power amplifier module using a first multi-mode power management unit that is operable in a plurality of modes including an envelope tracking mode and an average power tracking mode.

[0005] In some embodiments, the first power amplifier module is configured to provide amplification in a low band.