SUMMARY

[0005] In accordance with the present disclosure, there is provided a receiving system comprising:

a controller configured to selectively activate one or more of a plurality of paths between an input of the receiving system and an output of the receiving system;

a plurality of amplifiers, each one of the plurality of amplifiers disposed along a corresponding one of the plurality of paths and configured to amplify a signal received at the amplifier; and

a plurality of phase-shift components, each one of the plurality of phase-shift components disposed along a corresponding one of the plurality of paths and configured to phase-shift a signal passing through the phase-shift component.

[0005A] In accordance with the present disclosure, there is also provided a radio-frequency (RF) module comprising:

a packaging substrate configured to receive a plurality of components; and

a receiving system implemented on the packaging substrate, the receiving system including a controller configured to selectively activate one or more of a plurality of paths between an input of the receiving system and an output of the receiving system, a plurality of amplifiers, each one of the plurality of amplifiers disposed along a corresponding one of the plurality of paths and configured to amplify a signal received at the amplifier, and a plurality of phase-shift components, each one of the plurality of phase-shift components disposed along a corresponding one of the plurality of paths and configured to phase-shift a signal passing through the phase-shift component.

[0005B] In accordance with the present disclosure, there is further provided a wireless device comprising:

a first antenna configured to receive a first radio-frequency (RF) signal;

a first front-end module (FEM) in communication with the first antenna, the first FEM including a packaging substrate configured to

receive a plurality of components, the first FEM further including a receiving system implemented on the packaging substrate, the receiving system including a controller configured to selectively activate one or more of a plurality of paths between an input of the receiving system and an output of the receiving system, a plurality of amplifiers, each one of the plurality of amplifiers disposed along a corresponding one of the plurality of paths and configured to amplify a signal received at the amplifier, and a plurality of phase-shift components, each one of the plurality of phase-shift components disposed along a corresponding one of the plurality of paths and configured to phase-shift a signal passing through the phase-shift component; and

a transceiver configured to receive a processed version of the first RF signal from the output via a transmission line and generate data bits based on the processed version of the first RF signal.

[0005C] In some implementations, the present disclosure relates to a receiving system including a controller configured to selectively activate one or more of a plurality of paths between an input of the receiving system and an output of the receiving system. The receiving system further includes a plurality of amplifiers. Each one of the plurality of amplifiers is disposed along a corresponding one of the plurality of paths and is configured to amplify a signal received at the amplifier. The receiving system further includes a plurality of impedance matching components. Each one of the plurality of impedance matching components is disposed along a corresponding one of the plurality of paths and is configured to reduce at least one of an out-of-band noise figure or an out-of-band gain of the one of the plurality of paths.

[0006] In some embodiments, a first impedance matching component of the plurality of impedance matching components disposed along a first path of the plurality of paths corresponding to a first frequency band can be configured to reduce at least one of an out-of-band noise figure or an out-of-band gain for a second frequency band corresponding to a second path of the plurality of paths.

[0007] In some embodiments, a second impedance matching component of the plurality of impedance matching components disposed along the second path can be configured to reduce at least one of an out-of-band noise

figure or an out-of-band gain for the first frequency band. In some embodiments, the first impedance matching component can be further configured to reduce at least one of an out-of-band noise figure or an out-of-band gain for a third frequency band corresponding to a third path of the plurality of paths.

[0008] In some embodiments, the first impedance matching component can be further configured to reduce at least one of an in-band noise figure or increase an in-band gain for the first frequency band. In some embodiments, the first impedance matching component can be configured to reduce an in-band metric of the in-band noise figure minus the in-band gain to within a threshold amount of an in-band metric minimum. In some embodiments, the first impedance matching component can be configured to reduce an out-of-band metric of the out-of-band noise figure plus the out-of-band gain to an in-band-constrained out-of-band minimum.