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(54) **ACTIVE DUPLEXER**

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(57) **ABSTRACT**

A front-end module of a wireless device can replace a passive duplexer with an active duplexer that uses metamaterial matching circuits. The active duplexer can be formed from a power amplifier circuit and a low noise amplifier circuit that each include a metamaterial matching circuit. The combination of a power amplifier circuit and a low noise amplifier circuit that each utilize metamaterials to form the associated matching circuit can provide the functionality of a duplexer without including the additional circuitry of a stand-alone or passive duplexer. Thus, in certain cases, the front-end module can provide duplexer functionality without including a separate duplexer. Advantageously, in certain cases, the size of the front-end module can be reduced by eliminating the passive duplexer. Further, the loss introduced into the signal path by the passive duplexer is eliminated improving the performance of the communication system that includes the active duplexer.