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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0393650 A1**  
(43) **Pub. Date: Dec. 8, 2022**(54) **WIDEBAND MULTI GAIN LNA  
ARCHITECTURE**2200/387 (2013.01); H03F 2200/294  
(2013.01); H04B 1/40 (2013.01)(71) Applicant: **pSemi Corporation**, San Diego, CA  
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**Jubaid Qayyum**, San Diego, CA (US)(21) Appl. No.: **17/337,227**(22) Filed: **Jun. 2, 2021****Publication Classification**(51) **Int. Cl.**  
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(2013.01); **H03F 2200/451** (2013.01); **H03F**(57) **ABSTRACT**

Circuits and methods for a multi-gain mode amplifier, particularly an LNA, that achieves wideband output impedance matching and high gain while maintaining low power and a low NF in a highest gain mode, and which can switch to one or more lower gain modes that achieve higher linearity with lower power. In a highest gain mode, an inductor is selectively inserted between the amplified-signal terminal of an amplification core and an output LC output matching network. The inductor, when inserted, provides wideband output impedance matching, functioning as a series peaking inductor; accordingly, the inserted inductor delays current flow to the output capacitor and lowers the rise time of signal changes across the output capacitor. In addition, higher gain can be achieved compared to a conventional LC output impedance matching topology due to a higher impedance at the amplified-signal terminal of the amplification core.

