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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2023/0231524 A1**  
(43) **Pub. Date:** **Jul. 20, 2023**(54) **SYSTEM, METHOD, AND OUTPHASING  
POWER AMPLIFIER HAVING VECTOR  
GENERATOR AND IQ MODULATORS**(52) **U.S. Cl.**  
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(2013.01); **H03F 2200/336** (2013.01)(71) Applicant: **Rockwell Collins, Inc.**, Cedar Rapids,  
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**H03F 3/24** (2006.01)(57) **ABSTRACT**

A system may include a first IQ modulator configured to: based on an I and a Q, produce a zero to ninety degree variable phase shifted output signal that changes relative to an input envelope of an RF drive waveform of the RF drive. The system may include a first amplifier path configured to: output a first phase modulated signal. The system may include a second IQ modulator configured to: based on the I and the  $-Q$ , produce a zero to negative ninety degree variable phase shifted output signal that changes relative to the input envelope. The system may include a second amplifier path configured to: output a second phase modulated signal, wherein the second phase modulated signal is complementary to the first phase modulated signal. The system may include a vector generator configured to: generate the Q and the  $-Q$  for the first and second IQ modulators, respectively.

