



US 20230232528A1

(19) **United States**(12) **Patent Application Publication****Wu et al.**(10) **Pub. No.: US 2023/0232528 A1**(43) **Pub. Date:****Jul. 20, 2023**

(54) **POWER AMPLIFIER MODULES AND SYSTEMS CONTAINING ELECTROMAGNETIC BANDGAP ISOLATION ARRAYS**

(71) Applicant: **NXP USA, Inc.**, Austin, TX (US)

(72) Inventors: **Yu-Ting David Wu**, Schaumburg, IL (US); **Pascal Peyrot**, Frouzins (FR); **Xavier Hue**, Frouzins (FR)

(21) Appl. No.: **18/156,972**(22) Filed: **Jan. 19, 2023**(30) **Foreign Application Priority Data**

Jan. 19, 2022 (EP) ..... 22305054.3

**Publication Classification**(51) **Int. Cl.****H05K 1/02** (2006.01)**H03F 3/195** (2006.01)**H03F 3/213** (2006.01)**H01L 23/66** (2006.01)(52) **U.S. Cl.**

CPC ..... **H05K 1/0236** (2013.01); **H03F 3/195** (2013.01); **H03F 3/213** (2013.01); **H01L 23/66** (2013.01); **H05K 1/0209** (2013.01); **H05K 1/0206** (2013.01); **H01L 2223/6655** (2013.01); **H01L 2223/6611** (2013.01); **H01L 2223/6622** (2013.01); **H01L 2223/6672** (2013.01); **H03F 1/0288** (2013.01)

(57)

**ABSTRACT**

Power amplifier systems including power amplifier modules (PAMs) and electromagnetic bandgap (EBG) isolation structures are disclosed. In embodiments, the power amplifier system includes a printed circuit board (PCB) and a PAM mounted to the PCB in an inverted orientation. The PCB has a PCB frontside on which a PAM mount region is provided, and radio frequency (RF) input and output bondpads. The PAM includes a topside input/output interface having RF input and output terminals electrically coupled to the RF input and output pads, respectively. The power amplifier system further includes a first EBG isolation structure containing a first grounded EBG cell array, at least a portion of which is located within or beneath the PAM mount region.

