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(19) **United States**(12) **Patent Application Publication**
HUANG et al.(10) **Pub. No.: US 2023/0231594 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **ULTRA COMPACT AND WIDE BAND
FOLDED MARCHAND BALUN FOR
MILLIMETER-WAVE AND BEYOND
WIRELESS COMMUNICATION**(52) **U.S. Cl.**
CPC *H04B 1/40* (2013.01); *H01P 5/10* (2013.01)(71) Applicant: **SWIFTLINK TECHNOLOGIES
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NALLANDHIGAL**, Richmond (CA)(21) Appl. No.: **17/578,824**(22) Filed: **Jan. 19, 2022****Publication Classification**(51) **Int. Cl.**
H04B 1/40 (2006.01)
H01P 5/10 (2006.01)(57) **ABSTRACT**

A folded Marchand Balun includes a first, a second, a third port, and a first transmission line being folded into a first and second intermediate transmission lines, the first intermediate transmission line disposed on a first signal plane and electrically connected through metal vias to the second intermediate transmission line disposed on a second signal plane. The first transmission line has one end as the first port and an opposite end as an open circuit. The Balun includes a second transmission line disposed on the first signal plane and is adjacent to the first intermediate transmission line. The second transmission line has one end as the second port and an opposite end grounded. The Balun includes a third transmission line disposed on the second signal plane and adjacent to the second intermediate transmission line. The third transmission line has one end as the third port and an opposite end grounded.

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