

## (19) United States

# (12) Patent Application Publication (10) Pub. No.: US 2023/0232144 A1

Shringarpure et al.

Jul. 20, 2023 (43) **Pub. Date:** 

### (54) EXPOSED COPPER AREA FOR PORT ELECTROSTATIC DISCHARGE **PROTECTION**

(71) Applicant: Google LLC, Mountain View, CA (US)

(72) Inventors: Ketan Shringarpure, Santa Clara, CA (US); Warwick Ka Kui Wong, Palo Alto, CA (US); Chi Kin Benjamin Leung, Sunnyvale, CA (US); Yao Ding, San Jose, CA (US); Jingyu Huang, Santa Clara, CA (US); Jae Lee, Palo Alto, CA (US)

(21) Appl. No.: 17/685,924

(22) Filed: Mar. 3, 2022

#### Related U.S. Application Data

(60) Provisional application No. 63/300,466, filed on Jan. 18, 2022.

#### **Publication Classification**

(51) Int. Cl. H04R 1/08 (2006.01)H04R 1/04 (2006.01)H02H 9/04 (2006.01)

(52)U.S. Cl. ...... H04R 1/083 (2013.01); H04R 1/04 CPC ..... (2013.01); H02H 9/046 (2013.01); H04R 2499/11 (2013.01)

#### (57)ABSTRACT

The disclosure generally relates to a conductive layer having one or more protrusions configured to attract an electrostatic discharge ("ESD") arc. The device may be any device, such as a smartphone, tablet, earbuds, etc. The device may include a microphone and, therefore, may include a microphone opening. The conductive layer may include a conductive opening axially aligned with the microphone opening and one or more protrusions extending radially inwards towards the center of the conductive opening.

