

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
22 April 2021 (22.04.2021)



(10) International Publication Number
WO 2021/076459 A1

(51) International Patent Classification:

H01Q 1/22 (2006.01) H01Q 21/06 (2006.01)
H01Q 3/26 (2006.01)

(21) International Application Number:

PCT/US2020/055294

(22) International Filing Date:

12 October 2020 (12.10.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/655,523 17 October 2019 (17.10.2019) US

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(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

(54) Title: ANTENNA APPARATUS WITH INTEGRATED ANTENNA ARRAY AND LOW LOSS MULTI-LAYER INTER-
POSER

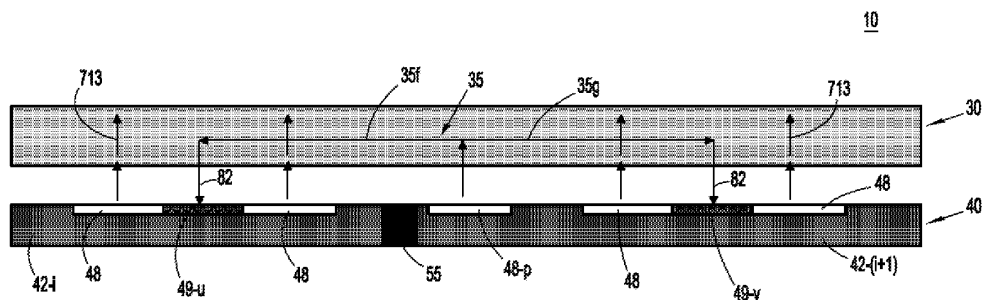


FIG. 8

(57) Abstract: Disclosed is an antenna apparatus including a radiating layer with a plurality of antenna elements forming an antenna array; a semiconductor wafer including multiple tiles each having beamforming circuits; and a multi-layer interposer. The multi-layer interposer may include: a lower dielectric layer adjacent to the substrate; an upper dielectric layer adjacent to the radiating layer; a metal layer between the lower and upper layers and including a plurality of conductive traces; a plurality of first vias extending through both the upper and lower layers and electrically coupling the beamforming circuits to the plurality of antenna elements; and a plurality of second vias extending between the beamforming circuits and the conductive traces to interconnect the tiles.

[Continued on next page]

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*