



(51) International Patent Classification:

H04B 7/02 (2018.01) H01Q 3/26 (2006.01)

(21) International Application Number:

PCT/SG2022/050170

(22) International Filing Date:

28 March 2022 (28.03.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202103162Q 26 March 2021 (26.03.2021) SG

(71) Applicant: **AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH** [SG/SG]; 1 Fusionopolis Way, #20-10 Connexis North Tower, Singapore 138632 (SG).

(72) Inventors: **ZHOU, Yijun**; c/o PKM, Institute for Infocomm Research, 1 Fusionopolis Way, #21-01 Connexis (South Tower), Singapore 138632 (SG). **CHIA, Yan Wah Michael**; c/o PKM, Institute for Infocomm Research, 1 Fusionopolis Way, #21-01 Connexis (South Tower), Singapore 138632 (SG). **QING, Xianming**; c/o PKM, Institute for Infocomm Research, 1 Fusionopolis Way, #21-01 Connexis (South Tower), Singapore 138632 (SG).

(74) Agent: **VIERING, JENTSCHURA & PARTNER LLP**; P.O. Box 1088, Rochor Post Office, Rochor Road, Singapore 911833 (SG).

(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, JM, JO, JP, KE, KG, KH,

(54) Title: SPATIAL MODULATION SYSTEM AND METHOD THEREOF

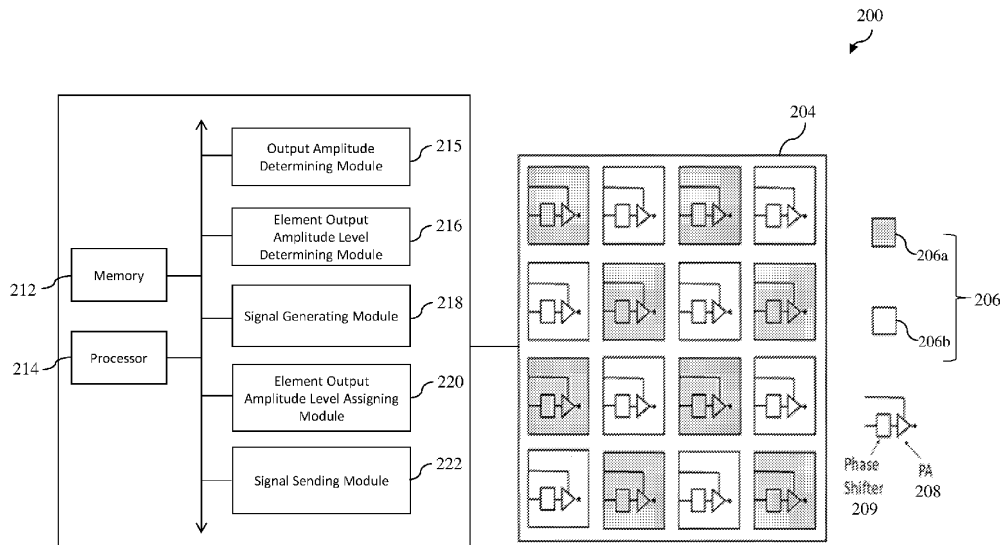


FIG. 2

(57) Abstract: There is provided a method of spatial modulation using an antenna array including a plurality of radiating elements having a plurality of power amplifiers communicatively coupled thereto, respectively. The method includes: determining an amplitude of an output signal to be formed in space by the antenna array based on an input signal; determining a plurality of output amplitude levels for the plurality of radiating elements, respectively, based on the amplitude of the output signal and a current output amplitude level of the antenna array; generating one or more first signals for a first subarray of the antenna array and one or more second signals for a second subarray of the antenna array based on the input signal; assigning the plurality of output amplitude levels determined to the plurality of power amplifiers of the plurality of radiating elements, respectively; and sending the one or more first signals to radiating elements of the first subarray and sending the one or more second signals to radiating elements of the second subarray for transmission

[Continued on next page]

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).

Published:

- with international search report (*Art. 21(3)*)
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE

therefrom to form a combined signal in space as the output signal. In particular, the first subarray includes one or more first concentric radiating element pairs and the second subarray includes one or more second concentric radiating element pairs.