

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
28 September 2023 (28.09.2023)



(10) International Publication Number
WO 2023/183891 A2

(51) International Patent Classification:
G01S 15/32 (2006.01) *H04B 1/713* (2011.01)

LU, LV, MC, ME, 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).

(21) International Application Number:
PCT/US2023/064885

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

(22) International Filing Date:
23 March 2023 (23.03.2023)

Published:

— without international search report and to be republished
upon receipt of that report (Rule 48.2(g))

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/322,987 23 March 2022 (23.03.2022) US

(71) Applicant: **IOTA BIOSCIENCES, INC.** [US/US]; 1020
Atlantic Avenue, Suite 100, Alameda, California 94501
(US).

(72) Inventors: **GOWDA, Suraj**; c/o Iota Biosciences, Inc.,
1020 Atlantic Avenue, Suite 100, Alameda, California
94501 (US). **KRANICH, Emma**; c/o Iota Biosciences,
Inc., 1020 Atlantic Avenue, Suite 100, Alameda, California
94501 (US). **YOU, Albert**; c/o Iota Biosciences, Inc., 1020
Atlantic Avenue, Suite 100, Alameda, California 94501
(US).

(74) Agent: **WEINER, Ethan M.** et al.; Morrison & Foerster
LLP, 755 Page Mill Road, Palo Alto, California 94304-1018
(US).

(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, CV, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG,
KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY,
MA, MD, MG, MK, MN, MU, 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, CV,
GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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,

(54) Title: FREQUENCY MODULATED COMMUNICATION

(57) Abstract: Methods and systems for low-power communication using ultrasonic waves are described herein. The methods may include receiving, at one or more ultrasonic transducers of an implantable device, ultrasonic waves transmitted by an interrogator; and emitting, from the one or more ultrasonic transducers of the implantable device, ultrasonic backscatter comprising encoded data, wherein the data is encoded into the ultrasonic backscatter by modulating a frequency of the ultrasonic backscatter. The device may include an ultrasonic transducer configured to receive ultrasonic waves and emit ultrasonic backscatter; a switch configured to modulate a frequency of the emitted ultrasonic backscatter, and a circuit configured to operate the switch to encode data, in the emitted ultrasonic backscatter based on the frequency.



WO 2023/183891 A2