26/02/03
10030087 37

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
7 March 2002 (07.03.2002)

PCT

(10) International Publication Number
WO 02/19671 A1

(51) International Patent Classification[7]: H04M 1/00, H04B 1/08, 1/034, 1/38, 7/00, H01Q 1/24, 1/48

(21) International Application Number: PCT/IL01/00767

(22) International Filing Date: 16 August 2001 (16.08.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/228,123 28 August 2000 (28.08.2000) US

(71) Applicant *(for all designated States except US)*: **IN4TEL LTD.** [IL/IL]; P.O. Box 12882, 60 Medinat Hayehudim Street, 46 733 Herzlia Pituah (IL).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MAOZ, Joseph** [IL/IL]; 23 Emek Bracha Street, 67 456 Tel Aviv (IL). **KADICHEVITZ, Michael** [IL/IL]; 9 Klonimus Street, 62 644 Tel Aviv (IL).

(74) Agent: **G. E. EHRLICH (1995) LTD.**; Bezalel Street 28, 52521 Ramat Gan (IL).

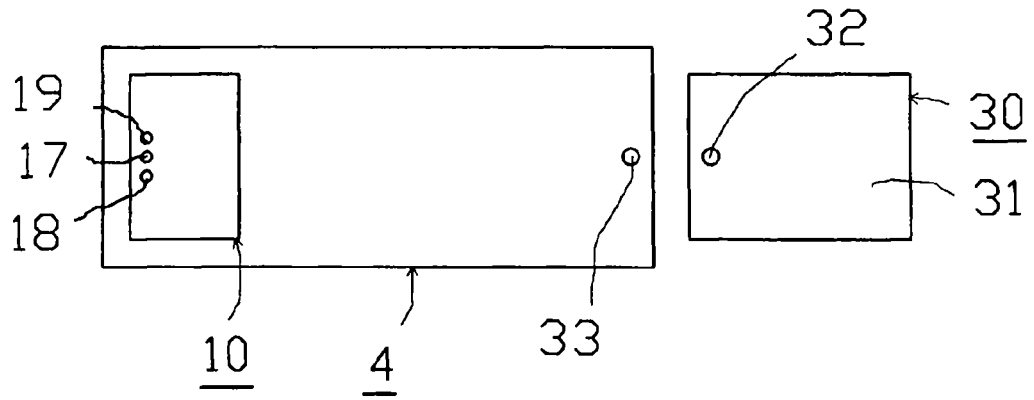
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: APPARATUS AND METHOD FOR ENHANCING LOW-FREQUENCY OPERATION OF MOBILE COMMUNICATION ANTENNAS



(57) Abstract: The operation of a mobile communication apparatus is enhanced particularly in the lower frequency portion of its bandwidth by connecting an electrically-conductive reflector to the electrically-conductive ground of the printed wired board (PWB) containing the communication circuitry such that the reflector effectively enlarges the ground of the PWB to load the antenna in the lower portion of its radio frequency band. The reflector may include stub reflectors integrally formed on the PWB, or connected thereto, preferably at the end of the PWB opposite to that connected to the antenna. The antenna may be an internal antenna or an external antenna.

WO 02/19671 A1

162162

ACTION