

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number
WO 2005/004283 A1

(51) International Patent Classification⁷: **H01Q 9/42**,
21/24, 5/00

(21) International Application Number:
PCT/US2004/011179

(22) International Filing Date: 13 April 2004 (13.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/417,748 17 April 2003 (17.04.2003) US

(71) Applicant (for all designated States except US): **THE MITRE CORPORATION** [US/US]; 7515 Colshire Drive, McLean, VA 22102-7508 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **RAO, B., Rama** [US/US]; 60 Allen Street, Lexington, MA 02421-7138 (US). **SMOLINSKI, Michael** [US/US]; 51 Pratt Avenue,

Apt.9, Lowell, MA 01851 (US). **QUACH, C.** [US/US]; 158 Pine Hill Road, Nashua, NH 03063 (US). **ROSARIO, Eddie, N.** [US/US]; 111 Lawrence Street, Methuen, MA 01844 (US).

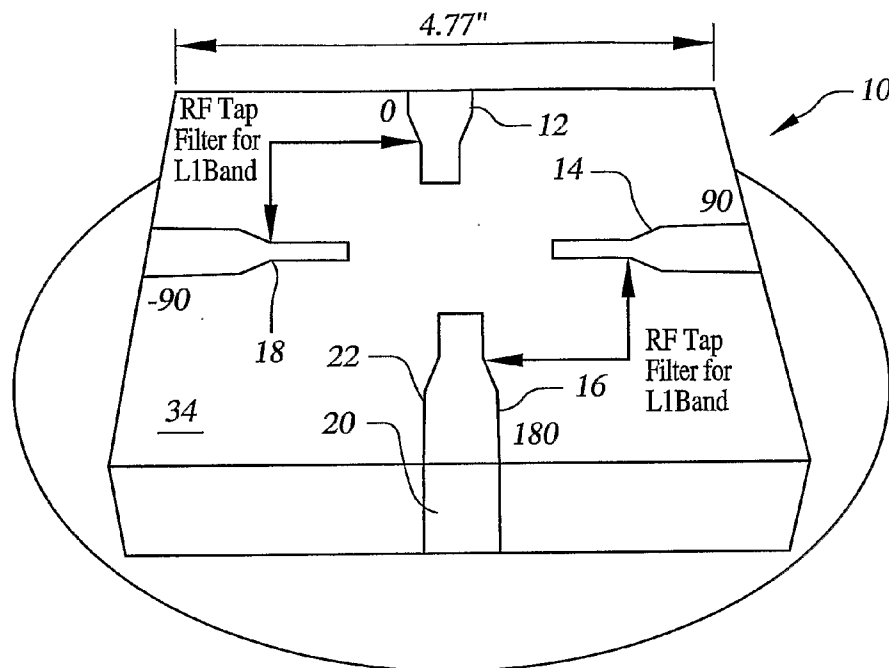
(74) Agent: **PASTERNAK, Sam**; Choate, Hall & Stewart, Exchange Place, 53 State Street, Boston, MA 02109 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,

[Continued on next page]

(54) Title: TRIPLE BAND GPS TRAP-LOADED INVERTED L ANTENNA ARRAY



(57) Abstract: The antenna includes four elements excited with equal amplitudes but with a relative phase difference of 0°, -90°, -180°, and -270°. Each element includes a vertical and horizontal portion. An RF trap filter is located within the horizontal portion so that the antenna provides good gain coverage at all three frequency bands of a modernized global positioning system.

WO 2005/004283 A1



GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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.

Published:

— *with international search report*