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(21) International Application Number: PCT/US98/05764 (22) International Filing Date: 16 April 1998 (16.04.98) (30) Priority Data: 08/842,412 23 April 1997 (23.04.97) US (71) Applicant: QUALCOMM INCORPORATED [US/US]; 6455 Lusk Boulevard, San Diego, CA 92121 (US). (72) Inventor: TRAN, Allen; 7529 Flower Meadow Drive, San Diego, CA 92126 (US). (74) Agents: MILLER, Russell, B. et al.; Qualcomm Incorporated, 6455 Lusk Boulevard, San Diego, CA 92121 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: A MULTI-FREQUENCY ANTENNA**(57) Abstract**

A multiple frequency antenna (112) and coupler (10) establish a low noise communication path from a multiple frequency wireless telephone (14) or multiple single frequency telephones, each operating at a different frequency, in a vehicle (16) to the exterior of the vehicle. The coupler (10) includes internal (32) and external elements (22) that are oriented face to face with each other, with a windshield (26) sandwiched between them. Each element (22, 32) is tapered, and the elements are juxtaposed with each other such that the wider end of one element is generally opposite the narrower end of the other. A multiple frequency radiator (112) is attached to the external element (22). The radiator includes plural radiating elements (114, 116) that are separated from each other and that are attached to a common base (118), with each radiating element being configured for radiating a respective frequency.

