

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 January 2004 (29.01.2004)

PCT

(10) International Publication Number
WO 2004/010729 A3

(51) International Patent Classification⁷: H04B 5/00

(21) International Application Number:
PCT/IB2003/002793

(22) International Filing Date: 14 July 2003 (14.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/199,453 19 July 2002 (19.07.2002) US

(71) Applicant (for all designated States except US): SONY ERICSSON MOBILE COMMUNICATIONS AB [SE/SE]; Nya Vattentornet, S-221 83 Lund (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): MOORE, Richard [US/US]; 2000 Ridge Road, Raleigh, NC 27607 (US).

(74) Agent: BENNETT, David; Coats & Bennett, P.L.L.C., Post Office Box 5, Raleigh, NC 27602 (US).

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

Declarations under Rule 4.17:

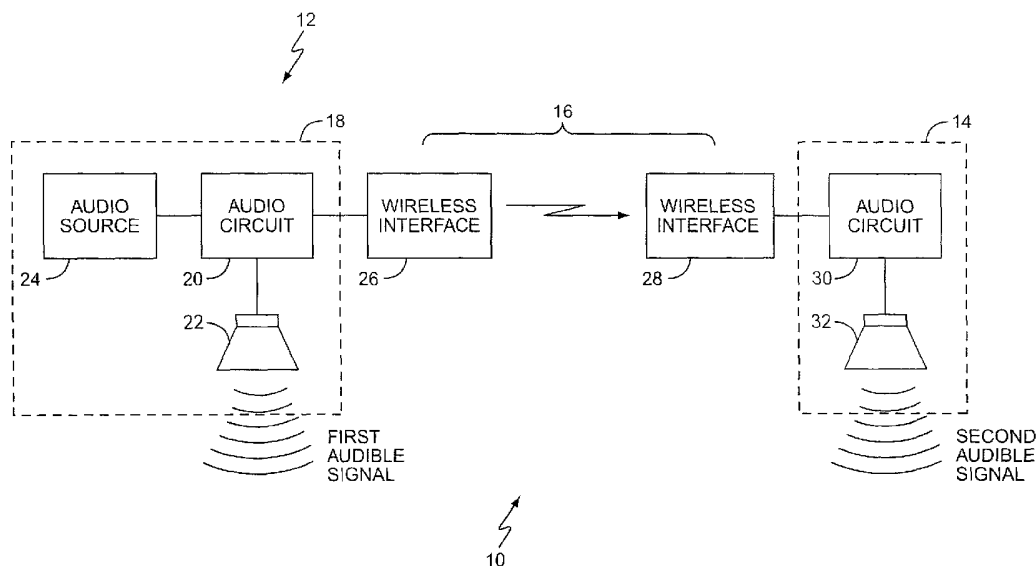
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

Published:

- with international search report

[Continued on next page]

(54) Title: PORTABLE AUDIO PLAYBACK DEVICE WITH BASS ENHANCEMENT



(57) Abstract: Wirelessly linking a portable audio device to an external audio system permits the external audio system to generate audible signals that enhance local playback of audio by the portable device. For example, the portable device wirelessly transmits lower frequency components of an audio signal to a subwoofer system for reproduction of bass frequencies extending below the playback capability of the portable device. In this manner, the external audio system provides bass enhancement for the portable audio device. Wireless transmissions between the portable audio device and the external audio system may be, but are not limited to, optical or radio frequency (RF) transmissions. Where RF signaling is used, the wireless link may be based on wireless network links, such as those supported by Bluetooth and 802.11b standards, or based on, for example, dedicated RF interfaces.

WO 2004/010729 A3



— *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.

(88) Date of publication of the international search report:

22 July 2004

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/02793

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H04B5/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 H04B H04R		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 907 122 A (HEWLETT PACKARD CO) 7 April 1999 (1999-04-07) abstract paragraph '0016! - paragraph '0025!; figures 1,9-11 ----- -/--	1,11,16, 27,36, 41,52, 62,66,67
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family	
Date of the actual completion of the international search <p style="text-align: center; font-size: 1.2em;">19 May 2004</p>	Date of mailing of the international search report <p style="text-align: center; font-size: 1.2em;">01/06/2004</p>	
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center; font-size: 1.2em;">Fuchs, P</p>	

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/02793

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 424 416 A (FUKUOKA NORIO) 3 January 1984 (1984-01-03) column 5, line 9 column 1, line 55 - column 2, line 2 column 2, line 33 - column 4, line 45; figures 2,3 -----	1,6,7, 11-13, 27,31, 32, 36-38, 52,57, 58,62,63
A	US 6 111 960 A (STRAETEMANS STEPHANUS P ET AL) 29 August 2000 (2000-08-29) column 3, line 26 - line 33 column 10, line 5 - line 30; figure 10 -----	1,27,52
A	US 5 668 884 A (BORTHWICK RONALD D ET AL) 16 September 1997 (1997-09-16) abstract; figures 1,2 -----	1-3, 27-29, 52,54,55

INTERNATIONAL SEARCH REPORT

 Int. Patent Application No
 PCT/IB 03/02793

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0907122	A	07-04-1999	US 6233343 B1	15-05-2001
			DE 69812825 D1	08-05-2003
			DE 69812825 T2	04-03-2004
			EP 0907122 A1	07-04-1999
			JP 11168790 A	22-06-1999
			US 2001046305 A1	29-11-2001

US 4424416	A	03-01-1984	JP 57041388 U	05-03-1982

US 6111960	A	29-08-2000	CN 1193450 A	16-09-1998
			DE 69716216 D1	14-11-2002
			DE 69716216 T2	10-07-2003
			EP 0843951 A1	27-05-1998
			WO 9742789 A1	13-11-1997
			JP 11509712 T	24-08-1999

US 5668884	A	16-09-1997	US 5432858 A	11-07-1995
			US RE38405 E1	27-01-2004
			AT 174183 T	15-12-1998
			AU 673372 B2	07-11-1996
			AU 4796593 A	03-03-1994
			CA 2139866 A1	17-02-1994
			DE 69322393 D1	14-01-1999
			DE 69322393 T2	27-05-1999
			EP 0653144 A1	17-05-1995
			JP 8500222 T	09-01-1996
			JP 3134254 B2	13-02-2001
			WO 9404010 A1	17-02-1994
