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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 December 2011 (01.12.2011)

PCT

(10) International Publication Number
WO 2011/148230 A1

(51) International Patent Classification:
G10L 21/02 (2006.01) *G10L 19/02* (2006.01)

(21) International Application Number:
PCT/IB2010/052315

(22) International Filing Date:
25 May 2010 (25.05.2010)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant *(for all designated States except US)*: **NOKIA CORPORATION** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **MYLLYLA, Ville Mikael** [FI/FI]; Finninmaenkatu 41 A 4, FIN-33710 Tampere (FI). **LAAKSONEN, Laura** [FI/FI]; Hyljeveneentie 1 B 3, FIN-02260 Espoo (FI). **PULAKKA, Hannu Juhani** [FI/FI]; Rummunlyojankatu 2 A 8, FIN-02600 Espoo (FI). **ALKU, Paavo Ilmari** [FI/FI]; Eskelinsuo 16 B 2, FIN-00680 Helsinki (FI).

(74) Agents: **KELDA CAMILLA KAREN STYLE** et al.; Page White & Farrer, Bedford House John Street, London Greater London WC1N 2BF (GB).

(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, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: A BANDWIDTH EXTENDER

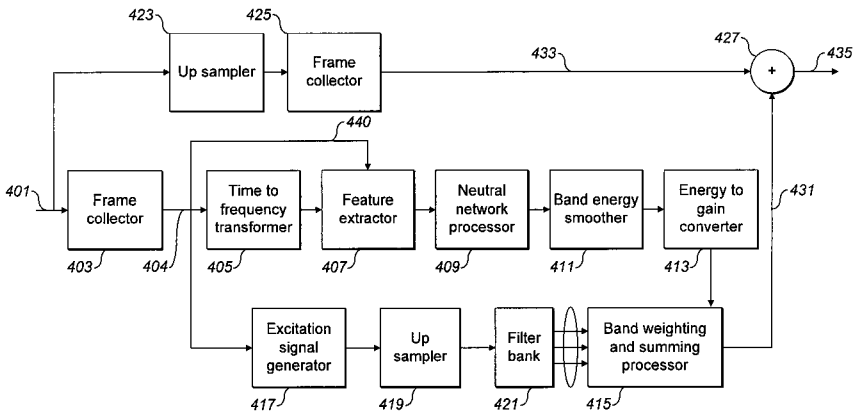


FIG. 4

(57) **Abstract**: An apparatus for extending the bandwidth of an audio signal, the apparatus being configured to: generate an excitation signal from an audio signal, wherein in the audio signal comprises a plurality of frequency components; extract a feature vector from the audio signal, wherein the feature vector comprises at least one frequency domain component feature and at least one time domain component feature; determine at least one spectral shape parameter from the feature vector, wherein the at least one spectral shape parameter corresponds to a sub band signal comprising frequency components which belong to a further plurality of frequency components; and generate the sub band signal by filtering the excitation signal through a filter bank and weighting the filtered excitation signal with the at least one spectral shape parameter.

WO 2011/148230 A1