

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
20 August 2020 (20.08.2020)



(10) International Publication Number
WO 2020/165262 A2

- (51) **International Patent Classification:**
H04L 1/00 (2006.01) *G10L 19/005* (2013.01)
- (21) **International Application Number:**
PCT/EP2020/053617
- (22) **International Filing Date:**
12 February 2020 (12.02.2020)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
- | | | |
|-------------------|-------------------------------|----|
| 19157036.5 | 13 February 2019 (13.02.2019) | EP |
| 19156997.9 | 13 February 2019 (13.02.2019) | EP |
| 19157042.3 | 13 February 2019 (13.02.2019) | EP |
| 19157047.2 | 13 February 2019 (13.02.2019) | EP |
| PCT/EP2019/065205 | 11 June 2019 (11.06.2019) | EP |
| PCT/EP2019/065209 | 11 June 2019 (11.06.2019) | EP |
| PCT/EP2019/065172 | 11 June 2019 (11.06.2019) | EP |
- (71) **Applicant:** **FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.** [DE/DE]; Hansastraße 27c, 80686 München (DE).
- (72) **Inventors:** **TOMASEK, Adrian**; c/o Fraunhofer-Institut für Integrierte Schaltungen IIS, Am Wolfsmantel 33, 91058 Erlangen (DE). **SPERSCHNEIDER, Ralph**; c/o Fraunhofer-Institut für Integrierte Schaltungen IIS, Am Wolfsmantel 33, 91058 Erlangen (DE). **BÜTHE, Jan**; c/o Fraunhofer-Institut für Integrierte Schaltungen IIS, Am Wolfsmantel 33, 91058 Erlangen (DE). **TSCHEKALINSKI, Alexander**; c/o Fraunhofer-Institut für Integrierte Schaltungen IIS, Am Wolfsmantel 33, 91058 Erlangen (DE). **LUTZKY, Manfred**; c/o Fraunhofer-Institut für Integrierte Schaltungen IIS, Am Wolfsmantel 33, 91058 Erlangen (DE).
- (74) **Agent:** **ZINKLER, Franz** et al.; Schoppe, Zimmermann, Stöckeler, Zinkler, Schenk & Partner mbB, Radlkofenstr. 2, 81373 München (DE).
- (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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

(54) **Title:** AUDIO TRANSMITTER PROCESSOR, AUDIO RECEIVER PROCESSOR AND RELATED METHODS AND COMPUTER PROGRAMS

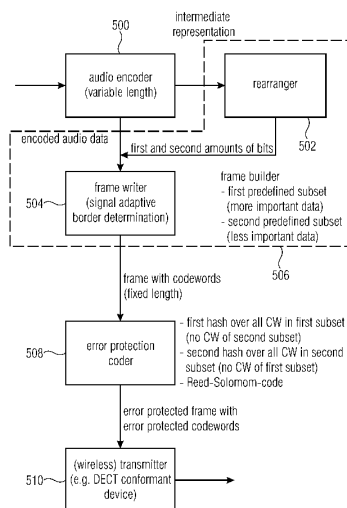


Fig. 5

(57) **Abstract:** An audio transmitter processor for generating an error protected frame using encoded audio data of an audio frame, the encoded audio data for the audio frame comprising a first amount of information units and a second amount of information units, comprises: a frame builder (506) for building a codeword frame having a codeword raster defining reference positions for a predefined total number of codewords, wherein the frame builder (506) is configured to write the information units of the first amount of information units starting at reference positions of a first predefined subset of the codewords; and to write the information units of the second amount of information units starting at reference positions of a second predefined subset of the codewords, wherein the frame builder (506) is configured to determine a border between the first amount of information units and the second amount of information units so that a starting information unit of the second amount of information units coincides with a codeword border; and an error protection coder (508) for processing one or more of the codewords of the first predefined subset of the codewords to obtain a first processing result or for processing one or more of the codewords of the second predefined subset of the codewords to obtain a second processing result and for adding the first processing result or the second processing result to the predefined number of codewords to obtain a plurality of processed codewords representing the error protected frame, or for processing the codewords of the first predefined subset of the codewords or of the second predefined subset of the codewords individually to obtain a plurality of processed codewords representing the error protected frame.

[Continued on next page]

HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*