PATENT N°: US 8825475 B2

Jurisdiction: US

Names of the Evaluators		
Lead Evaluator	**Assistant Evaluator #1**	**Assistant Evaluator #2**
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The above mentioned Evaluators hereby declare that the following claim(s):

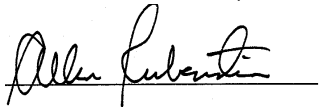
- Claim 1
- Claim 17

in the above referenced patent, is(are) essential to making, using in, selling within, or importing into, the countries of registration, any 3GPP product (the applicable Product Categories are given below) that is or purports to be in compliance with the following parts of the Third Generation Partnership Program (3GPP) technical standards:

- Document 3GPP TS 26.445 V12.1.0 (2014-12): Sections 2, 4.4, 4.4.1, 5.2.3.1.1, 5.2.3.1.2, 5.2.3.1.4.1, 5.2.3.1.4.2, 5.2.3.1.5.9, 5.2.3.1.6, 5.2.3.1.6.1, 5.2.3.1.6.2, 5.2.3.1.6.3, 5.2.3.1.6.4, 5.2.3.1.6.5, 5.2.3.1.6.6, 5.2.3.1.6.7 and 5.2.3.1.7.1; Figures 1, 29 and 30

Claim 1 is relevant for 3GPP Terminal Products and 3GPP Base Station Products.
Claim 17 is relevant for 3GPP Terminal Products and 3GPP Base Station Products.

Authorized signature and date
December 12, 2017



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(12) **United States Patent**
Eksler

(10) **Patent No.: US 8,825,475 B2**
(45) **Date of Patent: *Sep. 2, 2014**

(54) **TRANSFORM-DOMAIN CODEBOOK IN A CELP CODER AND DECODER**

(75) Inventor: **Vaclav Eksler**, Sherbrooke (CA)

(73) Assignee: **Voiceage Corporation**, Town of Mount Royal, Quebec (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/469,744**

(22) Filed: **May 11, 2012**

(65) **Prior Publication Data**

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Related U.S. Application Data

(60) Provisional application No. 61/484,968, filed on May 11, 2011.

(51) **Int. Cl.**

G10L 19/12	(2013.01)
G10L 19/00	(2013.01)
G10L 21/00	(2013.01)
G10L 21/04	(2013.01)

(52) **U.S. Cl.**

CPC ***G10L 19/12*** (2013.01)
USPC **704/219**; 704/220; 704/222; 704/223; 704/500; 704/501; 704/502; 704/503; 704/504

(58) **Field of Classification Search**

None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,108,626	A *	8/2000	Cellario et al.	704/230
6,134,518	A *	10/2000	Cohen et al.	704/201
6,453,289	B1 *	9/2002	Ertem et al.	704/225
7,106,228	B2	9/2006	Bessette et al.	
2003/0009325	A1 *	1/2003	Kirchherr et al.	704/211

(Continued)

FOREIGN PATENT DOCUMENTS

WO	2009/033288	3/2009
WO	2011/048094	4/2011

OTHER PUBLICATIONS

Bessette et al., "Universal Speech/Audio Coding Using Hybrid ACELP/TCX Techniques", 2005 IEEE International Conference on Speech, Acoustics and Signal Processing, ICASSP '05, vol. 3, Mar. 23, 2005, pp. III/301-III/304.

(Continued)

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(57) **ABSTRACT**

Codebook Arrangement for use in coding an input sound signal includes First and Second Codebook Stages. First Codebook Stage includes one of a time-domain CELP codebook and a transform-domain codebook. Second Codebook Stage follows the first codebook stage and includes the other of the time-domain CELP codebook and the transform-domain codebook. Codebook Stage includes an adaptive codebook may be provided before First Codebook Stage. A selector may be provided to select an order of the time-domain CELP codebook and the transform-domain codebook in First and Second Codebook Stages, respectively, as a function of characteristics of the input sound signal. The selector may also be responsive to both the characteristics of the input sound signal and a bit rate of the codec using Codebook Arrangement to bypass Second Codebook Stage. Codebook Arrangement can be used in a coder of an input sound signal.

32 Claims, 6 Drawing Sheets