

PATENT N°: US 9053705 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 19

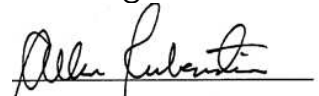
in the above referenced patent, is(are) essential to making, using in, selling within, or importing into, the countries of registration, any 3GPP product (the applicable Product Categories are given below) that is or purports to be in compliance with the following parts of the Third Generation Partnership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

- Document 3GPP TS 26.445 V12.1.0 (2014-12): Sections 1, 2, 4.4, 5.2.3.1.1, 5.2.3.1.2, 5.2.3.1.4.1, 5.2.3.1.5.3, 5.2.3.1.5.9, 5.2.3.1.6, 5.2.3.1.6.1 and 5.2.3.1.6.4; Figures 1 and 29

Claim 1 is relevant for 3GPP Terminal Products and 3GPP Base Station Products.
Claim 19 is relevant for 3GPP Terminal Products and 3GPP Base Station Products.

Authorized signature and date

August 21, 2017



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US009053705B2

(12) **United States Patent**
Bessette

(10) **Patent No.:** **US 9,053,705 B2**
(45) **Date of Patent:** ***Jun. 9, 2015**

(54) **FLEXIBLE AND SCALABLE COMBINED INNOVATION CODEBOOK FOR USE IN CELP CODER AND DECODER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 605 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/083,900**

(22) Filed: **Apr. 11, 2011**

(65) **Prior Publication Data**

US 2012/0089389 A1 Apr. 12, 2012

Related U.S. Application Data

(60) Provisional application No. 61/324,191, filed on Apr. 14, 2010.

(51) **Int. Cl.**

G10L 19/00 (2013.01)
G10L 21/00 (2013.01)
G10L 19/12 (2013.01)
G10L 19/02 (2013.01)
G10L 19/09 (2013.01)
G10L 19/24 (2013.01)

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

CPC **G10L 19/12** (2013.01); **G10L 19/0212** (2013.01); **G10L 19/09** (2013.01); **G10L 19/24** (2013.01)

(58) **Field of Classification Search**

None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,134,518	A *	10/2000	Cohen et al.	704/201
6,662,154	B2 *	12/2003	Mittal et al.	704/219
7,106,228	B2	9/2006	Bessette et al.	
7,430,329	B1 *	9/2008	Sarna	382/239
7,996,233	B2 *	8/2011	Oshikiri	704/500
8,306,827	B2 *	11/2012	Yamanashi et al.	704/500
8,515,767	B2 *	8/2013	Reznik	704/500

(Continued)

FOREIGN PATENT DOCUMENTS

AU	2001 255 422	12/2001
CA	2 347 735	5/2000

(Continued)

OTHER PUBLICATIONS

Yang et al., "Transform-Based CELP Vocoders with Low-Delay Low-Complexity and Variable-Rate Features", IEICE Trans. Inf. & Syst., vol. E85-D, No. 6, Jun. 2002, pp. 1003-1014.

(Continued)

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(57) **ABSTRACT**

In a CELP coder, a combined innovation codebook coding device comprises a pre-quantizer of a first, adaptive-codebook excitation residual, and a CELP innovation-codebook search module responsive to a second excitation residual produced from the first, adaptive-codebook excitation residual. In a CELP decoder, a combined innovation codebook comprises a de-quantizer of pre-quantized coding parameters into a first excitation contribution, and a CELP innovation-codebook structure responsive to CELP innovation-codebook parameters to produce a second excitation contribution.

34 Claims, 4 Drawing Sheets

