

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,  
Petitioner,

v.

SAINT LAWRENCE COMMUNICATIONS, LLC,  
Patent Owner.

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Case IPR2017-01244  
Patent 6,807,524 B1

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Before DANIEL N. FISHMAN, ROBERT J. WEINSCHENK, and  
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

FISHMAN, *Administrative Patent Judge*.

DECISION  
Denying Institution of *Inter Partes* Review  
37 C.F.R. § 42.108

## I. INTRODUCTION

Apple, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–21 and 29–42 (hereinafter the “challenged claims”) of U.S. Patent No. 6,807,524 B1 (Ex. 1001, “the ’524 patent”) pursuant to 35 U.S.C. §§ 311–319. Saint Lawrence Communications, LLC. (“Patent Owner”) filed a Patent Owner Preliminary Response (Paper 7, “Prelim. Resp.”). We have authority to determine whether to institute a trial under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). An *inter partes* review may be instituted only if “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

We are not persuaded there is a reasonable likelihood that Petitioner would prevail in showing that the challenged claims are unpatentable. Pursuant to 35 U.S.C. § 314, we *deny* institution of an *inter partes* review as to all challenged claims of the ’524 patent.

### A. *Real Parties in Interest and Related Matters*

Petitioner identifies Apple Inc. as the real party in interest. Pet. 1. Patent Owner identifies itself (Saint Lawrence Communications LLC) as the owner of the entire interest in the ’524 patent. Paper 3, 1.

Both Petitioner and Patent Owner identify litigation matters relating to the ’524 patent in the U.S. District Court for the Eastern District of Texas captioned as: *Saint Lawrence Communications LLC v. ZTE Corp. et al.*, Case No. 2:15-cv-349-JRG; *Saint Lawrence Communications LLC v. Motorola Mobility LLC*, Case No. 2:15-cv-351-JRG; and *Saint Lawrence Communications LLC v. Apple Inc, et al.*, Case No. 2:16-cv-082-JRG. Pet.

5–6; Paper 3, 2. Petitioner also identifies six other litigations related to the '524 patent, all of which have been terminated. Pet. 5.

*B. The '524 Patent*

According to the '524 patent, digital encoding of speech/audio is widely applicable to numerous applications including audio/video teleconferencing, multimedia, and wireless applications. Ex. 1001, 1:19–23. Speech encoding (or any audio encoding) converts an audio signal (e.g., speech) into a digital bitstream that can be transmitted to a receiver with a decoder, or stored for later retrieval by a device with a decoder, to reproduce the encoded audio signal. *Id.* at 1:33–40. For speech applications, early techniques utilized a narrow band of speech signals encoding only audio signals ranging between 200–3400 Hz (so-called “narrowband” encoding). *Id.* at 1:24–26. Some techniques utilized wideband encoding to provide better quality of speech reproduction—encoding signals ranging from about 50 through about 7000 Hz. *Id.* at 1:26–30. In digital encoding, the speech signal is periodically sampled to generate a digitized value and the encoder is applied to the sequence of digitized values to reduce the number of bits required to represent each digitized sample value while maintaining good quality in the encoded sounds. *Id.* at 1:32–38.

According to the '524 patent, one widely accepted encoding technique for providing a good balance between the bit rate and the resulting quality is so-called Code Excited Linear Predictor (“CELP”) encoding. *Id.* at 1:41–43.

The '524 patent summarizes CELP encoding as follows:

[T]he sampled speech signal is processed in successive blocks of L samples usually called frames where L is some predetermined number (corresponding to 10-30 ms of speech). In CELP, a linear prediction (LP) synthesis filter is computed and transmitted every frame. The L-sample frame is then divided

into smaller blocks called subframes of size  $N$  samples, where  $L=kN$  and  $k$  is the number of subframes in a frame ( $N$  usually corresponds to 4-10 ms of speech). An excitation signal is determined in each subframe, which usually consists of two components: one from the past excitation (also called pitch contribution or adaptive codebook) and the other from an innovative codebook (also called fixed codebook). This excitation signal is transmitted and used at the decoder as the input of the LP synthesis filter in order to obtain the synthesized speech.

An innovative codebook in the CELP context, is an indexed set of  $N$ -sample-long sequences which will be referred to as  $N$ -dimensional codevectors. Each codebook sequence is indexed by an integer  $k$  ranging from 1 to  $M$  where  $M$  represents the size of the codebook often expressed as a number of bits  $b$ , where  $M=2^b$ .

To synthesize speech according to the CELP technique, each block of  $N$  samples is synthesized by filtering an appropriate codevector from a codebook through time varying filters modelling the spectral characteristics of the speech signal. At the encoder end, the synthesis output is computed for all, or a subset, of the codevectors from the codebook (codebook search). The retained codevector is the one producing the synthesis output closest to the original speech signal according to a perceptually weighted distortion measure. This perceptual weighting is performed using a so-called perceptual weighting filter, which is usually derived from the LP synthesis filter.

*Id.* at 1:44–2:8.

According to the '524 patent, CELP encoding has been widely adopted for encoding telephone band (narrowband) sound signals (i.e., ranging between 200 and 3400 Hz). *Id.* at 2:9–14. In such applications, the speech signal is typically sampled at a bit rate of about 8000 samples/second. *Id.* at 2:13–14. By contrast, wideband speech encoding applications typically sample the speech signal at a higher bit rate of about



Figure 1 of the '524 patent shows sampled input speech signal 114 comprising successive frames wherein each frame comprises a number of sub-frames. *Id.* at 6:51–59. Frames and sub-frames are represented as parameter values encoding the sampled speech signal. *Id.* at 6:60–7:37. Sampled input speech signal 114 is down-sampled by module 101 to increase encoding efficiency by down-sampling the input signal by a 4:5 ratio (i.e., reducing the number of sampled frames). *Id.* at 7:45–58. The down-sampled speech signal is applied to high-pass filter 102 to eliminate unwanted low frequency noise (e.g., below 50 Hz). *Id.* at 7:59–63. The output of high-pass filter 102 is applied to preemphasis filter 103 to enhance the higher frequency range of the speech signal. *Id.* at 7:66–8:18. The output of preemphasis filter 103 is applied to LP analysis quantization and interpolation calculator 104 and also applied to perceptual weighting filter 105. *Id.* at 8:19–9:31. Linear prediction analysis of the preemphasized speech signal is performed in module 104. *Id.* at 8:19–58. Perceptual weighting filter 105 applies weighting to the preemphasized speech signal to enable further processing to determine the optimal encoding for each frame to minimize any error between an encoded value to be later synthesized as a speech signal and the input speech signal. *Id.* 8:59–9:31. In an exemplary embodiment, the '524 patent discloses its perceptual weighting filter is new in that it uses a “fixed denominator.” *Id.* at 9:37–41. The ultimate parameters representing the optimal encoding of the input sampled speech signal are applied to multiplexor 112 for transmission to a receiver for decoding or for storage and later retrieval to decode the encoded speech.

*C. Illustrative Claim*

Claims 1, 8, 15, 29, and 36 are the challenged independent claims of the '524 patent.<sup>1</sup> Independent claim 1, reproduced below, is exemplary of the challenged claims:

1. A perceptual weighting device for producing a perceptually weighted signal in response to a wideband speech signal in order to reduce a difference between the wideband speech signal and a subsequently synthesized wideband speech signal, said perceptual weighting device comprising:

a) a signal preemphasis filter responsive to the wideband speech signal for enhancing a high frequency content of the wideband speech signal to thereby produce a preemphasised signal;

b) a synthesis filter calculator responsive to said preemphasised signal for producing synthesis filter coefficients; and

c) a perceptual weighting filter, responsive to said preemphasised signal and said synthesis filter coefficients, for filtering said preemphasised signal in relation to said synthesis filter coefficients to thereby produce said perceptually weighted signal, said perceptual weighting filter having a transfer function with fixed denominator

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<sup>1</sup> Patent Owner refers to claims 1, 8, 15, 29, and 36 as “independent claims.” *See generally* PO Resp. Claim 1, unquestionably an independent claim, recites a perceptual weighting device comprising a combination of elements. Claim 15 recites an encoder that comprises the perceptual weighting device of claim 1. Claims 29 and 36 recite a cellular transceiver and a cellular network, respectively, that each comprise an encoder of claim 15. We take no position as to whether claims 15, 29, and 36 are properly phrased as independent claims or whether they are simply further dependent claims dependent from claim 1. The distinction is irrelevant to our analysis and our Decision below.

whereby weighting of said wideband speech signal in a formant region is substantially decoupled from a spectral tilt of said wideband speech signal.

*D. Alleged Grounds of Unpatentability*

The Petition sets forth the following asserted grounds of unpatentability:

| References                                                                    | Basis  | Challenged Claims                                           |
|-------------------------------------------------------------------------------|--------|-------------------------------------------------------------|
| Salami <sup>2</sup> and Kroon <sup>3</sup>                                    | 103(a) | 1, 8, 15, 29, and 36                                        |
| Salami, Kroon, and Makamura <sup>4</sup>                                      | 103(a) | 2, 3, 9, 10, 16, 17, 30, 31, 37, and 38                     |
| Salami, Kroon, Lim <sup>5</sup> , and Admitted Prior Art (“APA”) <sup>6</sup> | 103(a) | 6, 13, 20, 34, and 41                                       |
| Salami, Kroon, Lim, APA, and Makamura                                         | 103(a) | 4, 5, 7, 11, 12, 14, 18, 19, 21, 32, 33, 35, 39, 40, and 42 |

The Petition also relies on the Declaration of Dr. Jordan Cohen (Ex. 1003) as support for the various contentions. Patent Owner relies on the Declaration of Dr. Oded Gottesman (Ex. 2004) in support of its contentions.

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<sup>2</sup> R. Salami et al., *Real-Time Implementation Of A 9.6 Kbit/S ACELP Wideband Speech Coder*, Globecom’92 – IEEE Global Telecommunications Conference (1992). Ex. 1008 (“Salami”).

<sup>3</sup> P. Kroon, *Regular-Pulse Excitation—A Novel Approach To Effective And Efficient Multipulse Coding Of Speech*, IEEE Transactions on Acoustics, Speech, & Signal Processing (1986). Ex. 1005 (“Kroon”).

<sup>4</sup> U.S. Patent No. 5,295,224. Ex. 1021 (“Makamura”).

<sup>5</sup> J. S. Lim et al., *Enhancement & Bandwidth Compression Of Noisy Speech*, Proceedings of the IEEE, Vol. 67, No. 12 (1979). Ex. 1014 (“Lim”).

<sup>6</sup> Petitioner identifies certain claimed features as admitted prior art based on citations within the ’524 patent. Pet. 57.

## II. ANALYSIS

### A. *General Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are “such that the subject matter[,] as a whole[,] would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

### B. *Claim Construction*

As a step in our analysis for determining whether to institute a review, we determine the meaning of the claims for purposes of this Decision. In an *inter partes* review, a claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016) (upholding the use of the broadest reasonable interpretation standard).

Under the broadest reasonable construction standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). “[A] claim construction analysis must begin and remain centered on

the claim language itself.” *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). “Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim.” *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). Only terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner proposes interpretations of a number of terms in the ’524 patent. Pet. 15–19. Petitioner points to a *Markman* Order in a litigation related to the ’524 patent in the U.S. District Court for the Eastern District of Texas in support of many of Petitioner’s proposed interpretations. *Id.* (citing Ex. 1019).

Patent Owner “opposes the Petitioner’s proposed claim constructions.” PO Resp. 13. However, with the exception of the term “wideband speech signal,” Patent Owner does not identify a problem with any of Petitioner’s proposed interpretations. Although the parties express some slight difference in their respective interpretations of “wideband speech signal,” we determine that it is unnecessary to construe any claim terms for this Decision.

*B. Alleged Obviousness Over Salami and Kroon*

The Petition asserts that claims 1, 8, 15, 29, and 36 (all independent claims of the challenged claims) would have been obvious over the combined teachings of Salami and Kroon. Pet. 14–46.

1. *Salami (Ex. 1008)*

According to Salami, known CELP algorithms suffered from computational complexity that precluded real-time implementation for transmission of high quality digitized voice signals. Ex. 1008, 22.<sup>7</sup> Salami purports to resolve this problem by disclosing an improved CELP coding structure (Salami refers to its structure as “Algebraic” CELP or simply “ACELP”). *Id.*

Figure 1 of Salami is reproduced below with our annotation in red.

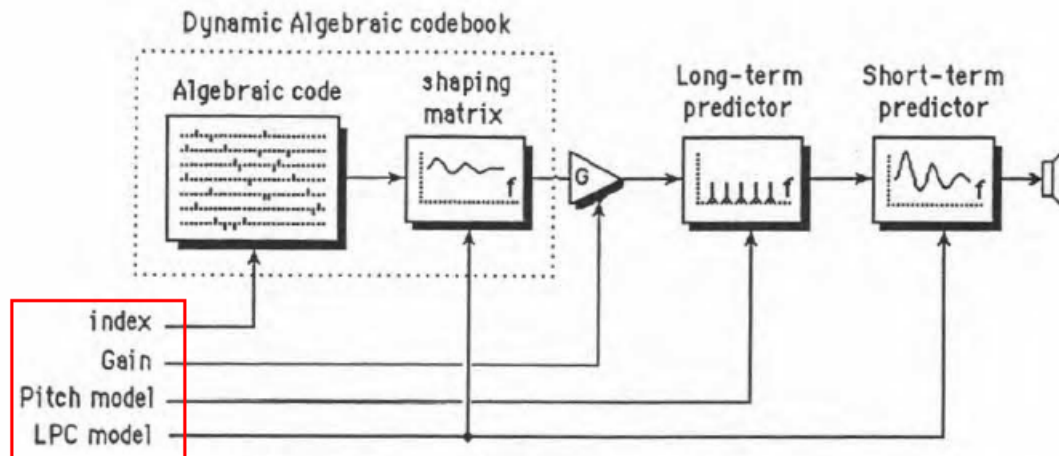


Figure 1: Synthesis model of an ACELP speech coder.

Figure 1 of Salami shows a synthesis model (a decoder) for decoding a block of speech samples. Ex. 1008, 23. The speech samples are represented as encoded parameters enclosed by our added red box annotation. Each encoded sample is applied to algebraic codebook and shaping filter within dynamic algebraic codebook. *Id.* The decoded value is scaled by a gain factor (“G”) determined by the encoded parameters and the result thereof is

<sup>7</sup> Although the Petition cites portions of Exhibit 1008 and other exhibits using the page numbers of the underlying publication, we cite to the page numbering added to the Exhibits in compliance with our rules.

applied to two time varying filters—first, long-term predictor (“LTP”) followed by short-term predictor (“STP”).

The LTP filter is expressed in Salami as:

$$\frac{1}{B(z)} = \frac{1}{1 - \beta z^{-\alpha}}$$

where  $\beta$  is the pitch gain parameter and  $\alpha$  is the pitch delay parameter. *Id.* The STP filter (also known as the linear prediction (“LP”) filter) is represented in Salami as:

$$\frac{1}{A(z)} = \frac{1}{\sum_{i=0}^p a_i z^{-i}}$$

where  $p$  is the predictor order and  $a_i$  are the predictor coefficients. *Id.*

Speech samples may be encoded as shown in Salami’s Table 2 reproduced below.

| <i>parameter</i>   | <i>update interval (ms)</i> | <i>bit no</i> |
|--------------------|-----------------------------|---------------|
| LP filter          | 30                          | 54            |
| pitch delay        | 6                           | 8             |
| pitch gain         | 6                           | 4             |
| 1st codebook index | 6                           | 12            |
| 1st codebook gain  | 6                           | 6             |
| 2nd codebook index | 6                           | 13            |
| 2nd codebook gain  | 6                           | 3             |
| unused bits        | 30                          | 4             |

**Table 2: Bit allocation for 9.6 kbit/s wideband ACELP coding.**

Salami’s Table 2 describes the allocation of bits in encoded speech samples. *Id.* at 25.

Salami teaches that the encoded parameters (pitch delay, pitch gain, codebook address, and codebook gain) are determined “using an analysis-by-synthesis technique” in which an encoded signal is selected from all candidate innovation sequences that minimizes a difference from the “original signal according to a perceptually weighted distortion measure.” *Id.* at 23. The error weighting filter is expressed in Salami as:

$$W(z) = \frac{A(z)}{A(z/\gamma)}$$

where  $0 < \gamma < 1$ . *Id.*

To improve the LP analysis in encoding, Salami discloses, *inter alia*, that a preemphasis filter is applied to the input speech signal to emphasize higher frequencies. *Id.*

## 2. Kroon (Ex. 1005)

Kroon discloses a speech encoding/decoding technique asserted to have lower computational complexity. Ex. 1005, 5. Kroon discloses, in pertinent part, that time-varying weighting filters contribute to computational complexity and, thus, discloses a time-invariant error-weighting filter to reduce computational complexity. *Id.* at 8.

## 3. Analysis: Independent Claims 1, 8, 15, 29, and 36

Petitioner identifies the recited features of independent claim 1 in the combined disclosures of Salami and Kroon. Pet. 27–37. Specifically, the preamble of claim 1 recites, “A perceptual weighting device for producing a perceptually weighted signal in response to a wideband speech signal in order to reduce a difference between the wideband speech signal and a subsequently synthesized wideband speech signal.” Petitioner argues Salami

discloses such a device in that Figure 1, as reproduced *supra*, discloses a decoder that decodes perceptually weighted signals received from an encoder, the signals representing a wideband speech signal, and discloses the encoded signals reduce the difference between the synthesized speech signal and the original speech signal. Pet. 27–30 (citing Ex. 1008, 22–23, Fig. 1; Ex. 1003 ¶¶ 114 et seq.<sup>8</sup>).

Claim 1 further recites the elements that comprise the claimed perceptual weighting device as including: a preemphasis filter; a synthesis filter calculator responsive to the preemphasis filter output; and a perceptual weighting filter responsive to the preemphasis filter output and the synthesis filter calculator output. The Petition identifies the recited preemphasis filter as Salami’s disclosure of applying a preemphasis filter to the input speech signal to enhance a high frequency range of the signal. Pet. 30–31 (citing Ex. 1008, 23). The Petition identifies the recited synthesis filter calculator as a linear prediction (LP) filter disclosed in Salami as the short-term predictor (STP) and asserts this filter is responsive to the preemphasized signal generated by the preemphasis filter. *Id.* at 31–32 (citing Ex. 1008, 23). Lastly, the Petition identifies the recited perceptual weighting filter as Salami’s disclosure of an error-weighting filter and asserts the error-weighting filter is responsive to the preemphasized signal of the preemphasis filter. *Id.* at 32–35 (citing Ex. 1008, 23–24; Ex. 1003 ¶¶ 94–98, 114 et seq.).

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<sup>8</sup> Petitioner cites paragraphs “114 et seq.” of Dr. Cohen’s Declaration (Ex. 1003) in support of several of its contentions. Pet. 30, 33, 35, 39, 40, 42–46. Petitioner’s non-specific references to all paragraphs numbered 114 and beyond are improper. Petitioner leaves it to this panel to determine which of paragraphs 114 through 161 of the Declaration are offered in support of its contentions.

Petitioner acknowledges that Salami fails to disclose that the transfer function of the recited perceptual weighting filter has a fixed denominator (*id.* at 23), but argues Kroon, in combination with Salami, discloses a fixed (time-invariant) denominator for such a filter transfer function (*id.* at 35–36 (citing Ex. 1005, 8–9; Ex. 1003 ¶¶ 90–92, 104–113)).

Patent Owner argues, *inter alia*, the proposed combination of references fails to teach the recited preemphasis filter and the recited perceptual weighting filter. PO Resp. 32–37. More specifically, Patent Owner argues all challenged independent claims include an encoder, but Salami discloses a decoder. *Id.* at 33. Patent Owner contends claims 15, 29, and 36 explicitly recite an encoder while claims 1 and 8 are directed to an encoder because they each recite features that generate synthesized wideband speech with minimal differences from a wideband speech signal—i.e., a wideband speech signal is input to generate (encode) a synthesized wideband speech signal therefrom. *Id.* (citing Ex. 2004 ¶ 86). Patent Owner contends the ordinarily skilled artisan would have understood that a perceptual weighting filter would only exist in an encoder and that the decoder of Salami does not have a preemphasis filter. *Id.* Patent Owner asserts Petitioner’s argument is mere speculation regarding the components of an encoder based on Salami’s disclosure of a decoder. *Id.* at 34. Regarding the recited preemphasis filter, Patent Owner acknowledges that Salami discusses a preemphasis process, but contends Salami discloses preemphasis to improve LP analysis—not for the recited purpose of claim 1 to enhance a high-frequency range of the wideband voice signal before further filter processing within the encoder. *Id.* 35–36. Therefore, Patent Owner argues, “[a]ccordingly, Salami would not have taught ‘**a perceptual**

**weighting filter**, responsive to said preemphasized signal and said synthesis filter coefficients, **for filtering said preemphasized signal**” as required by the claims. *Id.* at 36–37.

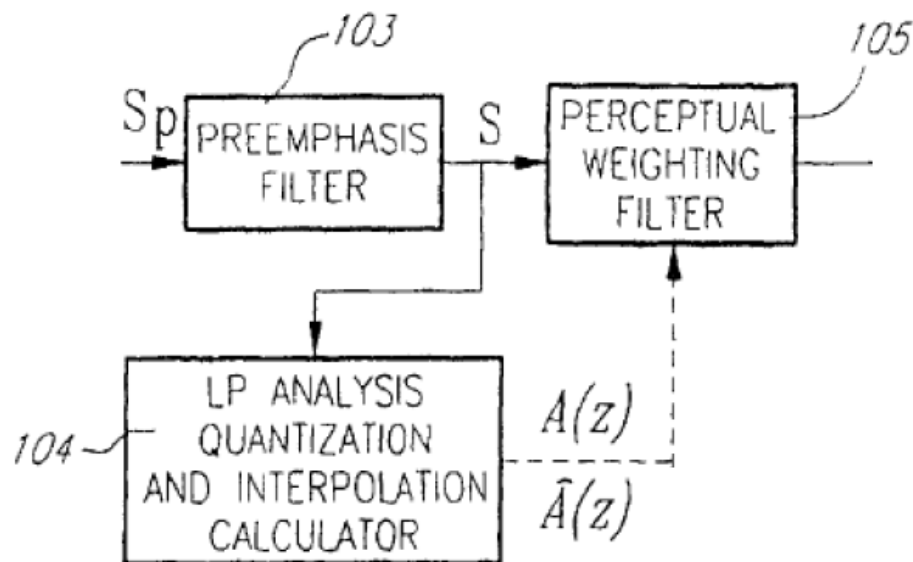
After considering the parties’ arguments and cited evidence, we determine that Petitioner has not shown sufficiently that Salami teaches the identified limitations of claim 1. Figure 1 of Salami is a decoder of encoded speech signals—i.e., a “synthesis model” capable of decoding speech encoded according to the ACELP techniques disclosed in Salami. Ex. 1008, 23 (“Figure 1 shows the synthesis model in ACELP coders.”). Although Salami’s Figure 1 shows encoded speech signals received by the decoding elements, the figure does not disclose the structure of an encoder that generates those encoded signals.

Although Salami does not provide a figure depicting the structure of an encoder, we find Salami discloses use of a preemphasis filter in speech encoding. Ex. 1008, 23 (“The first is to preemphasize the input speech signal. . . . it emphasizes the higher frequencies in the speech signal”). We also find that Salami discloses some form of perceptual weighting and an element that generates linear predictor (LP) coefficients:

The LP coefficients are determined using the method of linear prediction analysis by minimizing the mean-squared prediction error. The pitch parameters (delay and gain) and the codebook [sic] parameters (address and gain) are determined at the encoder using an analysis-by-synthesis technique. In this technique, the synthetic speech is computed for all candidate innovation sequences in the codebook retaining the particular codeword that produces the output closer to the original signal according to a perceptually weighted distortion measure.

*Id.*

Thus, we determine Salami discloses the individual elements of the encoding device of, for example, claim 1. However, we agree with Patent Owner that Salami does not disclose that the preemphasized input speech signal is used as an input to a perceptual weighting filter as recited in claim 1. *See* PO Resp. 35–37. Specifically, claim 1 specifies both the synthesis filter calculator and the perceptual weighting filter are responsive to the preemphasized signal generated by the preemphasis filter, which is, in turn, responsive to the input wideband speech signal, and further specifies that the perceptual weighting filter is also responsive to the coefficients generated by the synthesis filter calculator. In other words, the claim requires an arrangement of the various elements of an encoder in which the output of the preemphasis filter (the preemphasized signal) is applied to the synthesis filter calculator and applied to the perceptual weighting filter, and the coefficients generated by the synthesis filter calculator are applied to the perceptual weighting filter. An excerpt of Figure 1 of the '524 patent, reproduced below, shows a block diagram of relevant portions of such an encoder arrangement.



The above excerpt of Figure 1 of the '524 patent depicts preemphasis filter 103, coupled to receive wideband speech signals ("Sp") and configured to generate preemphasized speech signal ("S"). Ex. 1001, 7:64–8:18. The output of preemphasis filter 103 ("S") is applied to LP analysis quantization and interpolation calculator 104 and perceptual weighting filter 105. *Id.* at 8:19–9:45. Petitioner directs us to no disclosure in Salami of such an arrangement of filters in an encoding device.

Specifically regarding the perceptual weighting filter, Petitioner argues:

Second, Salami discloses that the perceptual weighting filter is responsive to the pre-emphasized signal. For instance, Salami discloses that the pre-emphasis filter operates on the original input wideband speech signal (see [1.1]), and the preemphasized signal is sent to the LP filter for LP analysis (see [1.2]); then, the preemphasized signal is input to the perceptual weighting filter:

***"The LP coefficients are determined using the method of linear prediction analysis"; then, Salami discloses that "the synthetic speech is computed . . . according to a perceptually weighted distortion measure."***

Ex-1008, [23]. Therefore, Salami states here that the pre-emphasized wideband speech signal is first used for LP analysis, and next, the pre-emphasized signal is perceptually weighted and used to compute the excitation codeword. Ex-1003, ¶¶ 114 *et seq.*

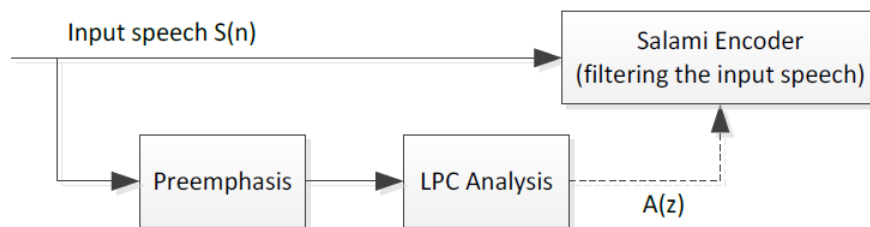
Pet. 33 (emphases in original). We are not persuaded by Petitioner's argument. Petitioner highlights two quotations from Salami and excludes significant text between the two quotes. Including and highlighting the text excluded by Petitioner, Salami discloses:

The LP coefficients are determined using the method of linear prediction analysis ***by minimizing the mean-squared prediction error. The pitch parameters (delay and gain) and the***

***codebook [sic] parameters (address and gain) are determined at the encoder using an analysis-by-synthesis technique. In this technique, the synthetic speech is computed for all candidate innovation sequences in the codebook retaining the particular codeword that produces the output closer to the original signal according to a perceptually weighted distortion measure.***

Ex. 1008, 23. We discern no teaching or suggestion in this text of Salami that the preemphasized signal is used on a perceptual weighting filter. We find no support in the cited portions of Salami for Petitioner's assertion that the preemphasized signal is first applied to LP analysis and then the same preemphasized signal is perceptually weighted (i.e., applied to a perceptually weighted filter). Petitioner's argument in the Petition does not explain specifically how the cited text teaches the identified claim limitations and, thus, amounts to little more than an unsupported conclusory remark. Dr. Cohen merely repeats the same argument without providing any further explanation. Ex. 1003, 65 (the portion of the claim chart of paragraph 114 for this element of claim 1).

Patent Owner argues, “[i]n contrast to the ’524 patent in which the preemphasised signal is used for both the LPC analysis and the perceptual weighting filter (Ex. 1001, Figure 1 (reproduced above)), a POSITA would have understood Salami's encoder to filter the input speech as shown below.” PO Resp. 36; *see also* Ex. 2004 ¶ 92. Patent Owner's diagram of a possible alternate arrangement of elements in an encoder of Salami is reproduced below.



Patent Owner's proposed alternate arrangement shows an input speech signal ("S(n)") applied to preemphasis filter, the output of which is applied to LPC analysis to generate linear prediction coefficients ("A(z)") applied to "Salami Encoder" along with the original input speech signals ("S(n)").

We have no basis for presuming Patent Owner's suggested arrangement of elements for an encoder in Salami is a correct interpretation. Nonetheless, we agree that, in the absence of disclosure within Salami regarding the specific structure of its encoder, Petitioner has not shown sufficiently that the ordinarily skilled artisan would have perceived Salami to disclose the particular arrangement recited in, for example, claim 1. Thus, Petitioner has not shown sufficiently that the ordinarily skilled artisan would have understood Salami to disclose or suggest application of a preemphasized signal to a perceptual weighted filter as required by claim 1.

Independent claim 8 includes a similar recitation of encoder features for which Petitioner relies on the same argument as for claim 1. Pet. 37–38. Claim 15 recites "a perceptual weighting device as recited in claim 1" and, thus, incorporates the same encoder limitations for which Petitioner relies on the same arguments as for claim 1. *Id.* at 38. Claims 29 and 36 each recite "an encoder for encoding a wideband speech signal as recited in claim 15" and, thus, each incorporates the same encoder features as claim 1. For these encoder features of claims 29 and 36, Petitioner relies on the same arguments as for claim 1. *Id.* at 44, 46.

Accordingly, we are not persuaded Salami teaches or suggests the particular structure of elements within an encoding device as recited in independent claim 1 and as similarly recited in claims 8, 15, 29, and 36. The Petition does not rely on Kroon to cure this deficiency in the proposed

combination with Salami. Specifically, we are not persuaded Salami teaches or suggests a signal preemphasis filter responsive to a wideband speech signal to produce a preemphasized signal applied to a perceptual weighting filter as required in claims 1, 8, 15, 29, and 36.

For at least the above reasons, we are not persuaded that Petitioner has established a reasonable likelihood that it would prevail in showing any of claims 1, 8, 15, 29, and 36 are unpatentable as obvious over the proposed combination of Salami and Kroon.

*C. Other Alleged Grounds Of Obviousness*

All dependent claims (2–7, 9–14, 16–21, 30–35, and 37–42) of the challenged claims depend, directly or indirectly, from one of claims 1, 8, 15, 29, or 36. Petitioner contends Salami and Kroon in combination with one or more additional references (Makamura, Lim, or APA) render these challenged dependent claims unpatentable as obvious. *See generally* Pet. 47–74. The Petition does not rely on any of the additional references to cure the above-identified deficiency of Salami. For the same reasons as their respective, base, independent claim, we are not persuaded Salami teaches or suggests a signal preemphasis filter responsive to a wideband speech signal to produce a preemphasized signal applied to a perceptual weighting filter as required in dependent claims 2–7, 9–14, 16–21, 30–35, and 37–42.

For at least the above reasons, we are not persuaded that Petitioner has established a reasonable likelihood that it would prevail in showing dependent claims 2–7, 9–14, 16–21, 30–35, and 37–42 are unpatentable as obvious over the respective proposed combinations.

*D. Conclusion*

On this record, we determine that there is not a reasonable likelihood that Petitioner would prevail in showing that claims 1–21 and 29–42 of the '524 patent are unpatentable.

III. ORDER

After due consideration of the record before us, and for the foregoing reasons, it is:

ORDERED that the Petition is *denied*.

PETITIONER:

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