

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC.,
Petitioner,

v.

BROADCOM CORPORATION,
Patent Owner.

Case IPR2017-01544
Patent 7,342,967 B2

Before THOMAS L. GIANNETTI, PATRICK M. BOUCHER, and
NORMAN H. BEAMER, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

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

On June 13, 2017, LG Electronics, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–5 of U.S. Patent No. 7,342,967 B2 (“the ’967 patent”). On September 19, 2017, Broadcom Corporation (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Applying the

standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we grant the Petition and institute an *inter partes* review of claims 1–5.

I. BACKGROUND

A. *The '967 Patent*

The '967 patent is titled “System and Method for Enhancing Performance of Personal Video Recording (PVR) Functions on HITS Digital Video Streams.” Ex. 1001. The patent relates to video recorder and playback systems, and more particularly to controlling the presentation of content. *Id.* col. 1, ll. 26–28.

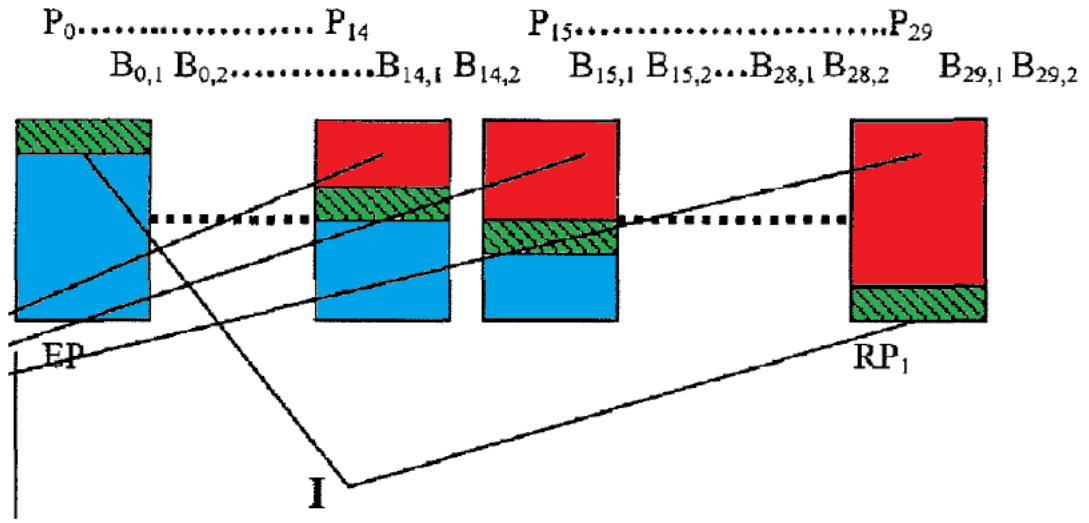
Currently, distribution of digital video content for TV display is dominated by use of the MPEG-2 video compression standard. *Id.* col. 1, ll. 30–33. An MPEG-encoded stream may have three types of pictures: Intra-coded (I), Predicted (P), and Bi-directionally predicted (B). I-pictures are not compressed using any temporal predictions and can be decoded without the need of any other picture. P-pictures perform temporal predictions from a picture that comes before it in the display order. B-pictures are bi-directionally predicted and use two pictures for prediction, one from the past and another from the future (in display order). *Id.* col. 1, ll. 35–47.

A special class of MPEG-2 streams, known as “Headend In The Sky” or “HITS” streams, do not include I-pictures, in order to increase the video compression and reduce the bandwidth required to transmit a video stream. Instead, HITS streams use a progressive refresh mechanism to build reference pictures. *Id.* col. 2, ll. 1–6.

The progressive refresh mechanism of HITS mandates that each P-picture have at least one intra-coded or I-slice, where a slice is 16 horizontal lines of pictures. *Id.* col. 2, ll. 6–9. Furthermore, the intra-coded slice(s) in a P-picture will be just below the intra-coded slice(s) of the previous P-picture, and the top slice is intra-coded for a P-picture following a P-picture with an intra-coded slice at the bottom of the picture. *Id.* col. 2, ll. 9–13.

Additionally, the HITS streams ensure that the slices above the intra-coded slice(s) predict only from those slices of the previous P-picture that are above the current I slice(s). *Id.* col. 5, ll. 53–56. Thus, the slices are progressively refreshed from top to bottom. *Id.* col. 2, ll. 19–20. This ensures that if a series of pictures is decoded starting from a P-picture whose first-slice is intra-coded, then a “clean” refreshed picture will be built after all slices have been progressively refreshed. *Id.* col 5, ll. 56–59.

The P-picture whose first-slice is intra-coded is called an Entry Point (EP) picture. The P-picture immediately before the EP picture, i.e., the P-picture with the I-slice(s) at the bottom of the picture, will be referred to as a clean reference picture RP. *Id.* col. 5, ll. 60–64. This is illustrated by Figure 4 of the '967 patent, reproduced below as annotated by Petitioner (Pet. 5):



In annotated Figure 4, each of a first P-picture P_{14} and second P-picture P_{15} includes slices (indicated in red) above an intra-coded slice (shaded in green), and slices (shaded in blue) below the intra-coded slice. Pet. 4. The downward progression of intra-coded slices from picture to picture enables predicting slices above an intra-coded slice in a later picture (e.g., P_{15}) based on only the slices of the previous P-picture (e.g., P_{14}) that are above the current intra-coded slice. *Id.*

During rewind of a HITS stream, the video decoder builds a clean reference picture.¹ The clean reference picture is built by decoding each of the P-pictures in the EP-EP segment. Ex. 1001, col. 2, l. 65–col. 3, l. 1. However, because the P-pictures are not displayed, the decoder does not decode the portion of the P-picture below the last I slice. *Id.* col. 3, ll. 1–3. The decoder can build the clean reference picture without decoding the portions of the P-pictures below the last I-slice because the subsequent

¹ Pausing, fast forwarding, rewinding, and skipping portions of the video stream are sometimes referred to as “trick modes.” Delp Decl. ¶ 96.

pictures do not use those portions for prediction. *Id.* col. 3, ll. 3–7. Omitting decoding the portion of the P-pictures below the I-slice advantageously reduces the processing required to build a clean reference picture. *Id.* col. 3, ll. 8–10.

B. Illustrative Claims

Challenged claim 1 of the '967 patent is the only independent claim. Claim 1 is reproduced here:

1. A system for displaying pictures, said system comprising:
 - a host processor for transmitting transport packets, said transport packets providing a plurality of instructions;
 - a video decoder for executing the plurality of instructions; andwherein execution of the instructions by the video decoder comprises causing:
 - selecting a picture, said picture comprising an intracoded slice and at least one slice above the intracoded slice, and at least one slice below the intracoded slice;
 - decoding the at least one slice above the intracoded slice;
 - decoding the intracoded slice; and
 - decoding at least a portion of another picture after decoding the at least one slice above the intracode slice and the intracode slice without having decoding the at least one slice below the intracoded slice.

Ex. 1001, col. 8, ll. 8–27.

C. References

Petitioner relies on the following patent publications:

MacInnis US 2002/0061183 A1 Pub. May 23, 2002 Ex. 1003

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