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Paper 39
Entered: December 11, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

FASTVDO LLC,
Patent Owner.

Case IPR2016-01203
Patent 5,850,482

Before KARL D. EASTHOM, JEFFREY S. SMITH, and PATRICK M. BOUCHER, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner filed a Petition for *inter partes* review of claims 1–3, 5–14, 16, 17, 22–26, 28, and 29 of U.S. Patent No. 5,850,482 (Ex. 1001, "the '482 patent"). Paper 2 ("Pet."). Patent Owner filed a Preliminary Response. Paper 10 ("Prelim. Resp."). We instituted trial for claims 1–3, 5–14, 16, 17, 22–26, 28, and 29. Paper 14. Patent Owner filed a response. Paper 27 ("PO Resp."). Petitioner filed a reply. Paper 30 ("Reply"). The record includes a transcript of the oral hearing. Paper 36.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a). Petitioner has shown by a preponderance of the evidence that claims 1–3, 5, 7–10, 12–14, 16, 22–25, 28, and 29 of the '482 patent are unpatentable.

A. Related Matters

The '482 patent is the subject of the following related litigations:

FastVDO LLC v. AT&T Mobility LLC et al., Case No. 3:16-cv-00385 (S.D. Cal.), filed Feb. 11, 2016;

FastVDO LLC v. LG Electronics, Inc. et al., Case No. 3:16-cv-00386 (S.D. Cal.), filed Feb. 11, 2016;

FastVDO LLC v. NEC Corp. et al., Case No. 3:16-cv-00389 (S.D. Cal.), filed Feb. 11, 2016 (terminated);

FastVDO LLC v. Nokia Corp. et al., Case No. 3:16-cv-00390 (S.D. Cal.), filed Feb. 11, 2016;

FastVDO LLC v. ZTE Corp. et al., Case No. 3:16-cv-00394 (S.D. Cal.), filed Feb. 11, 2016;

FastVDO LLC v. Dell Inc. et al., Case No. 3:16-cv-00395 (S.D. Cal.), filed Feb. 11, 2016; and

FastVDO LLC v. Huawei Technologies Co., et al., Case No. 3:16-cv-00396 (S.D. Cal.), filed Feb. 11, 2016. Pet. 1; Paper 6 (Patent Owner's Mandatory Notice).

The '482 patent is also the subject of IPR2016-01179. Paper 6 (Patent Owner's Mandatory Notice).

B. The '482 Patent

The '482 patent relates generally to error resilient methods and apparatus for entropy coding, and the application of error resilient coding to image compression. Ex. 1001, 1:5–11. Entropy coding reduces the number of bits required to represent a data set by using variable length coding in a manner that exploits the statistical probabilities of various symbols in the data set. *Id*. at 4:36–39. For example, entropy coding assigns shorter code words to those symbols that occur frequently, and assigns longer code words to those symbols that occur less frequently. *Id*. at 4:40–43. Error resilient entropy coding can utilize unequal error protection techniques, isolate effects of a bit error to a single code word, and constrain the resulting error to an interval. *Id*. at 6:33–47.

The error resilient method and apparatus include a code word generator that encodes data pursuant to split field coding, in which each code word includes a prefix field and an associated suffix field. *Id.* at Abstract. The prefix field includes information representing a characteristic of the suffix field, such as the length. *Id.* The suffix field includes information representing at least some of the original data. *Id*. If the prefix field is

decoded without any errors, the method and apparatus can correctly determine the length of the suffix field and the range of values represented by the suffix field such that the suffix field is resilient to errors. *Id.* To increase the probability that the prefix field is correctly decoded, the prefix field is protected to a greater degree than the suffix field, such that the data can be more efficiently compressed. *Id.* Figure 1 of the '482 patent is reproduced below.

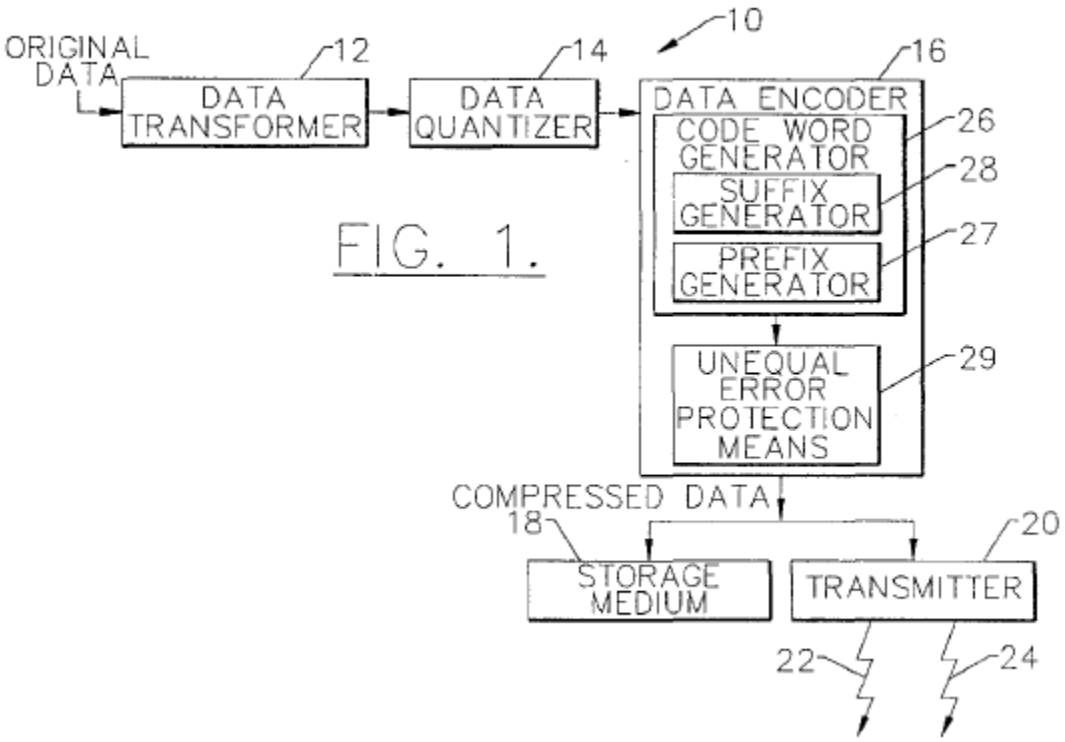

FIG. 1.

Figure 1 above shows a block diagram of error resilient data compression apparatus 10, including error resilient data encoder 16. *Id.* at 8:48–51. Original data is initially transformed by data transformer 12. *Id.* at 9:30–32. The original data can be transformed based upon one of a number of predetermined functions, such as a cosine function, a complex exponential function, or a wavelet transform. *Id.* at 9:41–52. The transformed data is then quantized by data quantizer 14 such that the

quantized data has fewer unique data values or coefficients than the transformed data. *Id*. at 11:36–38. In one embodiment, transformed coefficients whose magnitudes fall below a certain level, called a clipping threshold, are designated as insignificant and set to zero. *Id*. at 11:55–61.

Entropy encoder 16 shown in Figure 1 above includes code word generator 26 to generate code words that represent the quantized significant coefficients. *Id.* at 13:36–39. Each code word includes a first portion, or prefix field, and an associated second portion, or suffix field. *Id.* at 13:41–43. Code word generator 26 includes prefix generator 27 for generating the prefix field of each code word and suffix generator 28 for generating the associated suffix field of each code word. *Id.* at 13:44–48. Since each code word is formed of two fields, this method of coding is termed split field coding. *Id.* at 13:48–50.

According to split field coding, the prefix field includes information representative of the associated suffix field, such as the number of characters that form the suffix field, or the range of coefficient values represented by the suffix field. *Id.* at 13:51–63. If the prefix field is decoded correctly, the length of the suffix field and the range of values represented by the suffix field can be determined. *Id*. at 15:61–66. Bit errors within the suffix field will not result in loss of code word synchronization, but instead will be isolated to that single code word. *Id.* at 16:1–4. Also, the resulting error will be within the range of coefficient values included in the prefix field. *Id*. at 16:4–9.

The prefix fields are encoded at an appropriately high level of error protection in order to provide a high probability that the prefix fields will be decoded correctly. *Id*. at 16:15–18. The suffix field can be encoded with a

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