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Paper No. 43
Filed: May 27, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTERNATIONAL BUSINESS MACHINES CORPORATION,
Petitioner,

v.

INTELLECTUAL VENTURES I LLC,
Patent Owner.

Case IPR2015-00302
Patent 6,819,271 B2

Before BRIAN J. McNAMARA, PATRICK R. SCANLON, and FRANCES L. IPPOLITO, *Administrative Patent Judges*.

IPPOLITO, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner, International Business Machines Corporation, filed a Petition on November 25, 2014, requesting an *inter partes* review of claims 1–7, 10, 35–37, 40–42, 45–47, and 57–61 of U.S. Patent No. 6,819,271 B2 (Ex. 1004, "the '271 patent"). (Paper 2, "Pet."). Patent Owner, Intellectual Ventures I LLC, filed a Preliminary Response to the Petition on March 4, 2015 (Paper 6, "Prelim. Resp.").

Based on these submissions, we instituted trial as to claims 1–7, 10, 35–37, 40–42, 45–47, and 57–61 of the '271 patent on the following grounds:

1. Claims 1–7, 10, and 57–61 as unpatentable under 35 U.S.C. § 103 over Glover;[1] and
2. Claims 35–37, 40–42, and 45–47 as unpatentable under 35 U.S.C. § 103 over Glover and Cheng.[2]

Paper 8, 20 ("Dec. to Inst."). After institution, Patent Owner filed a Patent Owner's Response (Paper 15, "PO Resp."), and Petitioner filed a Reply (Paper 26, "Reply").

Additionally, Patent Owner filed a Motion to Exclude (Paper 30, "PO's Mot. Exclude") to which Petitioner filed an Opposition (Paper 36, "Pet. Opp. Mot. Exclude."). Patent Owner filed a Reply (Paper 38, "PO Exclude Reply") to Petitioner's Opposition.

An oral hearing was conducted on February 16, 2016. A transcript of the oral hearing is included in the record. Paper 41 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(b). This decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the

[1] U.S. Patent No. 5,412,429, issued May 2, 1995 (Ex. 1010, "Glover").
[2] U.S. Patent No. 5,608,396, issued Mar. 4, 1997 (Ex. 1023, "Cheng").

patentability of claims 1–7, 10, 35–37, 40–42, 45–47, and 57–61. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that claims 1–7, 10, 35–37, 40–42, 45–47, and 57–61 are unpatentable.

A. Related Proceedings

Petitioner indicates that the '271 patent is involved in a United States District Court proceeding in the Southern District of New York captioned *Intellectual Ventures I LLC v. Citigroup, Inc.*, C.A. No. 1:14-cv-04638 (S.D.N.Y.). Pet. 1. Petitioner represents that it is not a party to that District Court proceeding. *Id.* The '271 patent is also involved in IPR2015-00303, IPR2015-00304, and IPR2015-00305.

B. The '271 Patent

The '271 patent is directed generally to systems and methods for performing data compression and decompression using a plurality of data compression/decompression engines in parallel. Ex. 1004, Abstract. Figure 1 of the '271 patent is reproduced below.

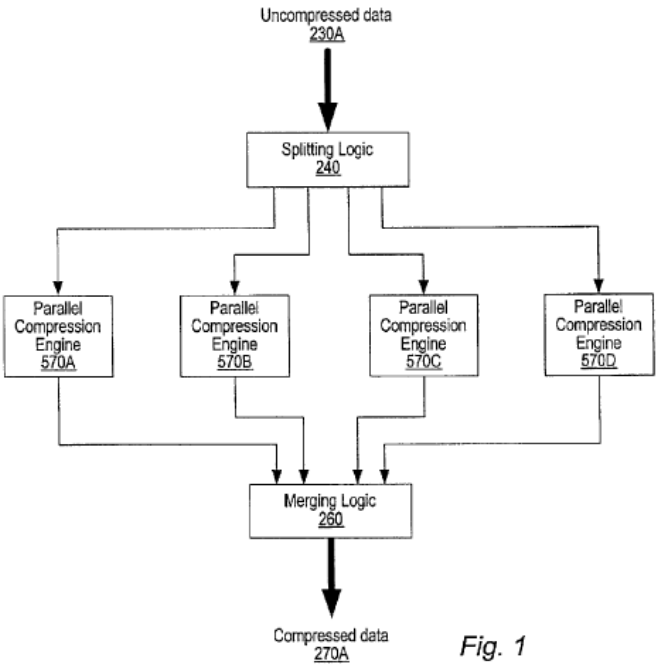


Fig. 1

Figure 1 shows splitting logic 240, parallel compression engines 570 that each may implement a parallel lossless data compression algorithm, and merging logic 260. Ex. 1004, 7:54–58, 8:6–10. As shown, uncompressed data 230A may be provided to an input of splitting logic 240. *Id.* at 8:31–32. Splitting logic 240 may divide uncompressed data 230A into a plurality of parts/portions with one portion for each of the compression engines 570 coupled to splitting logic 240. *Id.* at 8:32–36. Splitting logic 240 may provide the plurality of portions of uncompressed data 230A to compression engines 570. *Id.* at 8:36–38. Compression engines 570A–D may compress the received data concurrently in parallel. *Id.* at 8:43–52. The '271 patent further discloses that the parallel compression engines 570A–D may each have its own history buffer or share a common history buffer. *Id.* at 8:62–65. The compressed data portions then pass from compression engines 570A–D to merging logic 260 wherein the portions are combined into compressed data 270A. *Id.* at 8:66–9:1.

The ’271 patent also describes systems and methods for performing data decompression. Figure 2 is reproduced below.

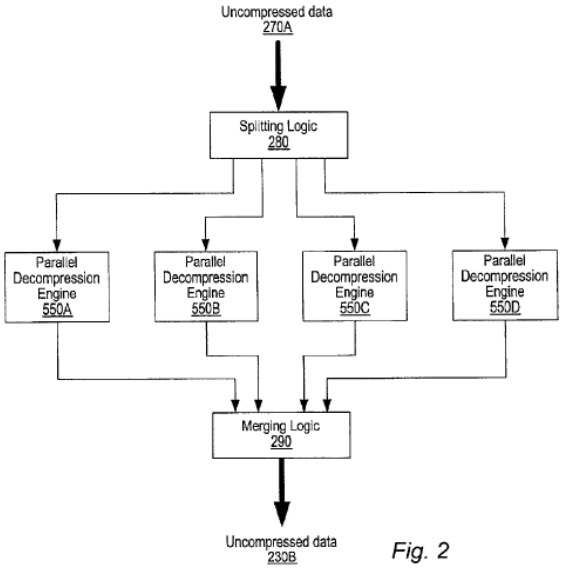


Fig. 2

Figure 2 shows splitting logic 280, parallel decompression engines 550A–D, and merging logic 290. Ex. 1004, Fig. 2. Parallel decompression engines 550A–D receive a portion of compressed data 270B divided by splitting logic 280. *Id.* at 9:66–10:14. Each of decompression engines 550A–D may then decompress the particular portion of the compressed data that was provided to it by splitting logic 280 to produce an uncompressed portion of the original compressed data. *Id.* at 10:15–22. Merging logic 290 may receive the decompressed portions and merge these into uncompressed data 230B. *Id.* at 10:41–54.

C. Illustrative Claim

Of the challenged claims, claims 1, 35, 40, 45, and 57 are independent. Claims 1 and 35, reproduced below, are illustrative of the subject matter of the ’271 patent:

1. A data compression system comprising:

a plurality of parallel compression engines, wherein each of the plurality of parallel compression engines operates independently and implements a parallel data compression algorithm;

wherein each of the plurality of parallel compression engines is operable to:

receive a different respective portion of uncompressed data; and

compress the different respective portion of the uncompressed data using the parallel data compression algorithm to produce a respective compressed portion of the uncompressed data; and

output the respective compressed portion;

wherein the plurality of parallel compression engines are configured to perform said compression in a parallel fashion to produce a plurality of respective compressed portions of the uncompressed data.

35. A memory controller, comprising:

memory control logic for controlling a memory; and

a plurality of parallel compression engines, wherein each of the plurality of parallel compression engines operates independently and implements a lossless parallel data compression algorithm;

wherein each of the plurality of parallel compression engines is operable to:

receive a different respective portion of uncompressed data; and

> compress the different respective portion of the uncompressed data using the parallel data compression algorithm to produce a respective compressed portion of the uncompressed data; and
>
> output the respective compressed portion;
>
> wherein the plurality of parallel compression engines are configured to perform said compression in a parallel fashion to produce a plurality of respective compressed portions of the uncompressed data;
>
> wherein the respective compressed portions output from the plurality of parallel compression engines are combinable to form compressed data corresponding to the uncompressed data.

II. ANALYSIS

A. Claim Construction

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 In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1277–79 (Fed. Cir. 2015) ("We conclude that Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA" and "the standard was properly adopted by PTO regulation."), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 890 (mem.) (2016). There is a presumption that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. "independently" (claims 1, 35, 40, 45, and 57)

In the Petition, Petitioner proposes that "independent" means "without depending on others." Pet. 4–5. For the Decision to Institute, we agreed

with Petitioner's proposal and adopted that construction for the purposes of the Decision to Institute. Dec. to Inst. 7–8.

At this juncture, Patent Owner does not oppose our construction or propose an alternative construction. PO Resp. 7, 44. Nonetheless, we observe that Patent Owner argues that Glover does not teach parallel compression engines that operate "independently" because one of ordinary skill in the art would understand Glover to use a shared dictionary and lookup table. PO Resp. 56 ("Glover does not disclose compression engines that 'operate independently' because the compression engines in Glover depend on each other to build shared look up tables, in the case of Huffman coders, and shared dictionaries, in the case of Lempel-Ziv coders."). To the extent that Patent Owner relies on a construction of "independently" that excludes the use of shared dictionaries, we determine that Patent Owner has not presented any persuasive explanation or evidence that supports this position, nor will we endeavor to scour the record to generate these arguments for Patent Owner.[3] Thus, based on the complete record before us, we discern no reason to alter our construction.

[3] We note the Petition refers to the prosecution history of the '271 patent and observes that

> [a]s an example of how the engines of their claimed invention operate independently, Applicants stated that 'they do not use a logically shared dictionary, but have their own independent dictionaries which do not affect the other dictionaries.' (Ex. 1018 at 6-7.) Applicants repeated these arguments when appealing the rejection of the claims. (Ex. 1020 at 7-11.) In finally allowing the claims, the Examiner stated that 'it is now recognized that the compression engine's separate history buffers provide reasonable support for the independent operation asserted in the remarks.' (Ex. 1021 at 2.)

Moreover, we observe that the Specification does not expressly define "independently." Under such circumstances, "in determining the ordinary and customary meaning of the claim term as viewed by a person of ordinary skill in the art, it is appropriate to consult a general dictionary definition of the word for guidance." *Comaper Corp. v. Antec, Inc.*, 596 F.3d 1343, 1348 (Fed. Cir. 2010) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1322–23 (Fed. Cir. 2005) (en banc)). One dictionary provided by Petitioner, *Webster's II New College Dictionary*, defines "independent" as "[f]ree from the influence, guidance, or control of another or others." Ex. 1013, 4. Accordingly, we maintain that the plain and ordinary meaning of "independently" means "without depending on others."

2. "in parallel fashion" (claims 1, 35, 40, 45, and 57)

For the Decision to Institute, we construed the claim phrase "in a parallel fashion" to mean "in a manner that is parallel." Dec. to Inst. 8. Patent Owner does not object to this construction. PO Resp. 7–8. Based on the complete record before us, we maintain that the term "in a parallel fashion" means "in a manner that is parallel" under the broadest reasonable interpretation. This construction is consistent with the Specification, which describes the parallel engines 550A–D, 570A–D shown in Figures 1 and 2 as performing "in . . . parallel fashion." Ex. 1004, 8:46–49, 10:22–25. Accordingly, based on the entire record, we discern no reason to alter our construction.

Pet. 5. Patent Owner has not proposed a construction based on prosecution history disclaimer. PO Resp. 7, 44.

3. "concurrently" (claim 2, 36, 41, 46, and 57)

For the Decision to Institute, we determined that the claim phrase "concurrently" should be construed as "occurring at the same time." Dec. to Inst. 8. Patent Owner does not object to this construction. PO Resp. 8–9. Accordingly, based on the entire record, we discern no reason to alter our construction of "concurrently" as "occurring at the same time."

B. Claims 1–7, 10, and 57–61 — Asserted Obviousness over Glover (Ex. 1010)

1. Relevant Legal Principles

A 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) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966) ("the *Graham* factors"). The level of ordinary skill in the art usually is evidenced by the references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

For an obviousness analysis, prior art references must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (quoting *In re Samour*, 571

F.2d 559, 562 (CCPA 1978)). Moreover, "it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). That is because an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418; *see also Translogic Tech., Inc.*, 504 F.3d at 1259.

2. Summary of Glover (Ex. 1010)

Glover discloses a data compression coder using subband/transform coding with a Lempel-Ziv based coder. Ex. 1010, Title. Figure 1 of Glover is reproduced below.

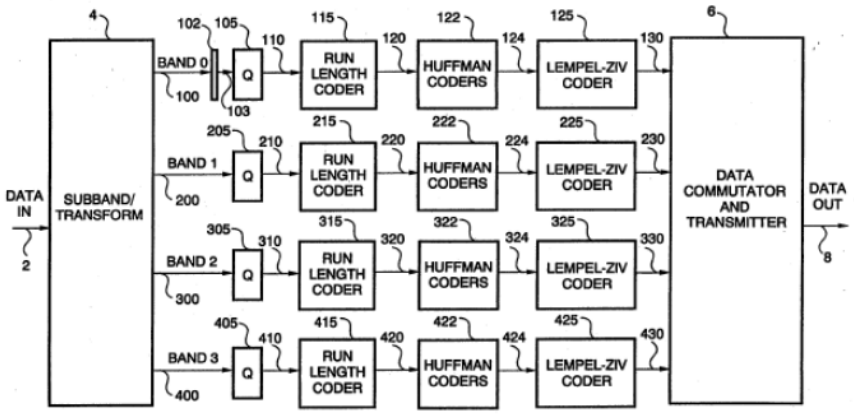


FIG. 1

Figure 1 shows a block diagram of a lossy coder. Ex. 1010, 3:11. In Figure 1, data is fed into subband transform 4. *Id.* at 5:16–17. Subband transform 4 separates the signal into a plurality of subbands 100, 200, 300 and 400. *Id.* at 5:17–19. Lowband signal 100 is first fed into Digital Pulse Code Modulator (DPCM) 102, which then produces DPCM subband 103. *Id.* at 5:19–21. DPCM subband and the other subbands are then fed into a

plurality of quantizers 105, 205, 305, 405, respectively. *Id.* at 5:22–24. Quantizers 105, 205, 305, 405 reduce the variability in the signal by removing some of the data thereby producing quantized signals 110, 210, 310, and 410 with less variation. *Id.* at 5:24–27. This data is then fed into a plurality of run-length coders 115, 215, 315, 415, which group the data into values thereby producing grouped signals 120, 220, 320, 420. *Id.* at 5:27–30. Grouped signals 120, 220, 320, 420 may be compressed using Huffman coders and Lempel-Ziv coders. *Id.* at 5:30–38. These compressed subbands then can be used as inputs to data commutator/transmitter 6, which combines the subbands and produces coded signal output at 8. *Id.* at 5:39–6:3.

Glover further discloses decompression in Figure 2. Figure 2 is reproduced below.

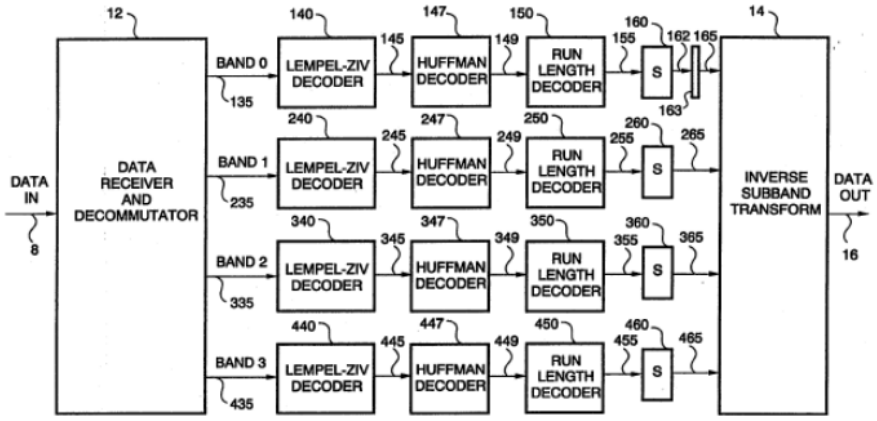


FIG. 2

Figure 2 is a block diagram of a lossy decoder. Ex. 1010, 3:13. In Figure 2, coded data signal 8 is found into data receiver and decommutator 12, which produces subband signal outputs 135, 235, 335, 435. *Id.* at 6:4–7. These subband signal outputs are fed into a plurality of Lempel-Ziv decoders 140, 240, 340, 440 and other decoders. *Id.* at 6:7–18. The signals then are

combined through inverse subband transform 14 to produce decoded signal 16. *Id.* at 6:23–25.

3. Analysis

Petitioner challenges claims 1–7, 10, and 57–61 under 35 U.S.C. § 103 based on Glover. Pet. 38–47, 53–58. Patent Owner contests Petitioner's position. PO Resp. 8–60. As explained below, we have considered the arguments and evidence presented by both parties, and we determine Petitioner has shown by a preponderance of the evidence that claims 1–7, 10, and 57–61 would have been obvious over Glover.

a. Claims 1–3, 5–7, 10, 57, and 59–61

Below we discuss claim 1, which is illustrative of the subject matter of claims 2, 3, 5–7, 10, 57, and 59–61.

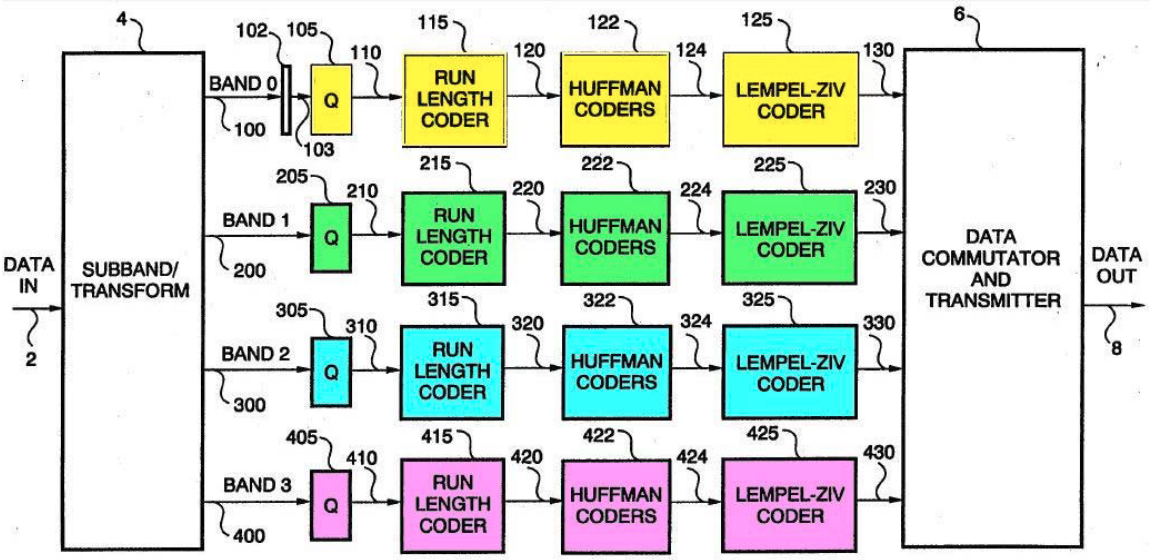
Claim 1 is directed to a data compression system that includes "a plurality of parallel compression engines."

Petitioner asserts that Glover teaches a "plurality of parallel compression engines" because Glover discloses a quantizer and Run Length, Huffman, and Lempel-Ziv coders for each of subbands 0–3. Pet. 39 (citing Ex. 1010, Fig. 1, 5:22–37); *see* Reply 2. Petitioner further asserts these coders perform compression of the respective subband. Pet. 39 (citing Ex. 1010, 5:14–15, 5:27–38).

Patent Owner responds that Petitioner's arguments inconsistently include or exclude the quantizers and/or DPCM as part of the "parallel compression engine." PO Resp. 16–20. Patent Owner argues "[r]egardless of which interpretation Petitioner presents, Glover's use of the DPCM process and quantization process is essential to the efficiency of Glover's compression algorithm." *Id.* at. 18. Patent Owner adds that Glover's "passing mention of a lossless compression possibility" does not explain

why or how a skilled artisan would exclude the DPCM or quantizer. *Id.* at 19 (citing Ex. 1010, 1:63–2:8); *see* Exhibit 2001 ¶ 73.

Based on the complete record, Petitioner's arguments are persuasive. On page 39 of the Petition, Petitioner provides an annotated version of Glover's Figure 1 (shown below). Pet. 39.



Petitioner explains that "[i]n annotated Figure 1 . . . , each compression engine is its own color." *Id.* at 39. In its Reply, Petitioner confirms that "[i]n Glover, the parallel compression engines are comprised of the quantizers and the Run-Length, Huffman, and Lempel-Ziv coders." Reply 2. Further, Petitioner argues that the parallel compression algorithm is executed by the coders, but not the quantizer. Reply 8 ("In the case of Glover, the PCEs implement a PCA by pipelining the Run-Length, Huffman, and Lempel-Ziv coders. They also implement a quantizer.").

In other words, Petitioner does not exclude or ignore the DPCM and quantizer processes. Instead, Petitioner asserts that the DPCM and quantizers process "uncompressed data in some way, but it is the Run-Length, Huffman, and Lempel-Ziv coders in Glover that perform

compression." *Id.* at 1–2. Based on the complete record, including Petitioner's explanation of Glover's Figure 1, Petitioner's arguments are persuasive and explain sufficiently how Glover discloses a "plurality of parallel compression engines."

Claim 1 further recites that "each of the plurality of parallel compression engines operates independently."

For this limitation, Petitioner argues that each of Glover's compression engines operates independently of the other engines to process and compress a specific subband of a video signal. Pet. 40 (citing Ex. 1010, 5:17–19, 5:38–39, Fig. 1). Petitioner relies on the testimony of Dr. James A. Storer to support the proposition that the purpose of separating the video signal into subbands, as disclosed by Glover, is to allow each subband to be processed independently. *Id.* (citing Ex. 1001 ¶¶ 222–223).

Patent Owner counters that Petitioner's arguments are unsupported by Glover's disclosure. In particular, Patent Owner argues that Figure 1 and column 5, lines 17–19 and 38–39 of Glover do not teach compression engines that do not share resources or that have respective inputs and outputs. PO Resp. 45–47. Patent Owner adds that there are "many purposes for separating data into subbands," and that US Patent No. 5,729,228 (Exhibit 2009, "Franaszek"), which was cited during the prosecution of the '271 patent, teaches that "someone skilled in the art would implement Glover with Franaszek's shared dictionaries." Tr. 47:14–18; *see also* PO Resp. 47 (citing Ex. 2009, Fig. 2, 2:66–3:4) ("[E]ven if data is separated into subbands . . . it would be advantageous for the compression engines to depend on each other").

Further, Patent Owner asserts that the primary objective of Glover is "increased compression efficiency," and that independent operation of

Glover's compression engine would not achieve this purpose because a skilled artisan would "use a single, shared dictionary for Lempel-Ziv coding across the subbands." PO Resp. 47–48, 54 (citing Ex. 2001 ¶¶ 115, 117). Patent Owner argues that Glover does not disclose compression engines that "operate independently" because the compression engines in Glover depend on each other to build shared look up tables, in the case of Huffman coders, and shared dictionaries, in the case of Lempel-Ziv coders. *Id.* at 56–57 (citing Exhibit 2001 ¶ 122).

Patent Owner also relies on the testimony of Dr. Richardson, (PO Resp. 48–53), which states that Dr. Richardson "attempted to model the preliminary processing stages of Glover" by creating

> a Matlab script file (a series of commands), subband_example.m. Exhibit 2004. This script file makes use of a public-domain Matlab implementation of a Discrete Wavelet Transform, which is a transform that separates a signal into subbands, available at the following web address: http://fresourcecode.net/sites/default/files/57785.zip. The specific modules that are called by the subband_example.m script file are collected as Exhibit 2007.

Ex. 2001 ¶¶ 45, 52. Based on Dr. Richardson's model, Patent Owner argues that the purpose of Glover's processing stages is to produce a similar statistical profile across each subband. PO Resp. 54 (citing Ex. 2001 ¶ 117). Patent Owner further argues that "[b]oth Huffman coding and Lempel-Ziv coding provide more efficient compression performance with larger sets of statistically similar data." *Id.* (citing Ex. 2001 ¶ 117). Patent Owner then concludes that a skilled artisan would have used a single, shared lookup table for Huffman coding and a single, shared dictionary for Lempel-Ziv coding across subbands for efficiency. *Id.* at 54–57. Finally, Patent Owner adds that separate dictionaries in Glover would reduce compression

efficiency and unnecessarily increase hardware and implementation complexity. *Id.* at 55 (citing Ex. 2001 ¶ 119).

Based on the entire record, we agree with Petitioner's position that Glover teaches or suggests "each of the plurality of parallel compression engines operates independently." We credit the testimony of Dr. Storer, who states that Glover teaches "dividing" a video signal into four subbands and then feeding each subband into a different compression engine "to allow compression of each subband to occur independently of the other subbands." Ex. 1001 ¶¶ 222–223; *see* Ex. 1024, 171:6–16. Dr. Storer's testimony is consistent with and supported by Glover's disclosure, which provides that an incoming video signal is separated into subbands, and each subband is processed (compressed or decompressed) by separate sets of coders/decoders (i.e., "engines"). Ex. 1010, 5:17–38, 6:4–21, Figs. 1, 2. For example, in Figure 1 and column 5, Glover teaches that the subband transform separates the signal into subbands 100, 200, 300, and 400. Ex. 1010, 5:17–19, Fig. 1. Each of these subbands is fed separately (e.g., input) into a quantizer and coders, and then compressed and output as separate compressed subbands 130, 230, 330, and 430 that are combined as a coded signal. Ex. 1010, 5:19–6:3.

Additionally, we agree with Petitioner's argument that Glover also "discloses treating each subband independently by identifying 'four quantizer designs,' and tailoring the quantizer used in each subband to the data in that subband to balance improved compression with image quality." Reply 20 (citing Ex. 1010, 2:55–62; 6:35–37, claims 3–4; Ex. 1029 ¶ 33). For example, Glover shows in Table I that the design of the quantizer for each band is different based on the subband. Ex. 1010, Table I, 2:55–62 (describing "fine," "coarse," and "very coarse" quantizers).

Furthermore, we do not agree with Patent Owner that one of ordinary skill in the art must read Glover as using a shared dictionary/lookup table for compression. First, Glover discloses the use of a "dictionary based compression scheme," but does not describe this "scheme" as using a shared dictionary or a lookup table. Ex. 1010, 3:63–66; *see* Tr. 51:16–19. Second, with respect to Patent Owner's reliance on Dr. Richardson's modeling of Glover's system, (PO Resp. 48–54), Dr. Richardson states that his simulation is "illustrative in nature . . . and [*is*] *not intended to be an exact implementation of Glover*." Ex. 2001 ¶ 46 (emphasis added). While Dr. Richardson's model is illustrative, when considered in the context of the complete the record before us, we are persuaded that Petitioner has the better position, especially in light of Glover's actual disclosure that describes, among other things, separate subbands compressed by separate sets of coders and a specialized quantizer for each subband. Ex. 1010, Fig. 1, Table I.

Third, Patent Owner's reliance upon Franaszek is unpersuasive because, as Petitioner pointed out during Oral Hearing, Franaszek was filed after Glover issued on May 2, 1995. Ex. 2009 (filing date July 6, 1995). We are not persuaded by Patent Owner's argument that Franaszek's later-filed disclosure informs how one of ordinary skill in the art would have understood Glover's compression engines at the time of Glover's invention. Nevertheless, even considering Franaszek's disclosure of a shared dictionary, we are not persuaded that the term "operates independently" excludes the use of a shared dictionary. Our claim construction does not require this exclusion and Patent Owner has not presented any argument, evidence, or explanation supporting an alternative construction. PO Resp. 7, 44; *see supra* Claim Construction.

Finally, Dr. Richardson's testimony that separate dictionaries in Glover would reduce compression efficiency and unnecessarily increase hardware and implementation complexity is unpersuasive. *See* Ex. 2001 ¶ 119; Tr. 43:18–44:8 ("[T]o achieve this maximum efficiency and compression with the statistically similar data across all those subbands, you would use shared lookup tables for each of the subbands and shared dictionaries for each of the subbands"). Dr. Richardson's testimony regarding the difficulties and efficiencies of implementing separate dictionaries is unpersuasive as our construction of "operates independently" does not require a particular type of dictionary scheme (e.g., separate dictionaries). *See supra* Claim Construction. Moreover, even considering Dr. Richardson's testimony in this regard, we observe that during cross-examination, Dr. Richardson conceded that it was within the skill of one of ordinary skill in the art to implement Glover with a separate "tree" for each Huffman coder and a separate dictionary for each Lempel-Ziv coder. Ex. 2014, 195:22–197:21. Accordingly, we are persuaded that Petitioner has explained sufficiently how Glover discloses "each of the plurality of parallel compression engines operates independently" as required by claim 1.

Claim 1 further requires that each of the plurality of parallel compression engines "implements a parallel data compression algorithm."

For this limitation, Petitioner argues that one of ordinary skill in the art would have recognized that in each compression engine in Glover, the compression algorithm sequence would have used "pipelining" to reduce processing time. Pet. 40–41 (citing Ex. 1001 ¶¶ 225–36; Ex. 1010, 5:27–38, Fig. 1). Petitioner asserts "[p]ipelining is a well-known form of parallel processing that increases the speed at which data can be processed." Pet. 41 (citing Ex. 1011, 436; Ex. 1001 ¶¶ 228–230).

Further, based on Dr. Storer's testimony, Petitioner provides an example of how one of ordinary skill in the art would have understood pipelining in Glover. *Id.* (citing Ex. 1001 ¶¶ 231–236). In this example, Petitioner notes that

> [t]his parallel implementation of the compression algorithm sequence disclosed in Glover would have been plainly obvious to one of ordinary skill in the art, and would have proceeded as follows:
>
> First, each subband of a first video signal would have been processed by the Run Length coders. (Ex. 1001 ¶¶ 231-232.) Next, each subband of the first video signal would have been processed by the Huffman coders. Simultaneously, each subband of a second video signal would have been processed by the Run Length coders. (Ex. 1001 ¶ 233.)
>
> Next, each subband of the first video signal would have been processed by the LZ coders. Simultaneously, each subband of the second video signal would have been processed by the Huffman coders, and each subband of a third video signal would have been processed by the Run Length Coder. (Ex. 1001 ¶ 234.)
>
> This process would have continued until all video signals exited the pipeline. (Ex. 1001 ¶¶ 235-236.)

Id.; *see* Tr. 19:10–20:17. Petitioner concludes that "[t]his basic pipelining approach would have provided an efficient way to compress video signals using a parallel compression algorithm." Pet. 41 (citing Ex. 1001 ¶¶ 228–230).

In response, Patent Owner argues that Glover's disclosure does not teach pipelining or "motivate one of ordinary skill in the art to seek methods of concurrent implementation or efficient parallel processing." *See* PO Resp. 32–33 ("Nowhere does Glover direct the reader towards seeking parallel implementation efficiencies."). Patent Owner argues that the most straightforward way to implement Glover is through serial algorithms. *Id.* at

36. Patent Owner adds that pipelining Glover would require "significant" storage and "complex additional hardware" such as multiple buffer memories and synchronization mechanisms. *Id.* at 37–41 (citing Ex. 2001 ¶¶ 94–108, 110). Patent Owner further argues that Petitioner has not explained how a skilled artisan would address these problems, which are "beyond the capabilities of what Petitioner has alleged is one of ordinary skill in the art in the context of pipelining Glover, and even further, any solution would require significant experimentation." *Id.* at 41 (citing Ex. 2001 ¶ 109; Ex. 1011, 520).

Petitioner counters that pipelining was a well-known method of parallel processing and a skilled artisan would have been motivated to improve the speed and efficiency of Glover by pipelining the operation of the coders. Reply 10–11 (citing Ex. 1001 ¶¶ 228–230; Ex. 1011, 436; Ex. 2014, 207:23–208:5); Tr. 68:1–11 ("[A] component of efficiency is speed."). Petitioner further argues that Patent Owner overstates the difficulties of using pipelining with Glover, and this modification would have been within the abilities of a skilled artisan. Reply 12–14 (citing Ex. 1029 ¶¶ 10–17).

Petitioner's arguments are persuasive. There is no dispute among the parties that pipelining was known at the time of the invention. Ex. 1001 ¶ 228; Ex. 2014, 207:23–208:5. More particularly, Patent Owner's declarant, Dr. Richardson, acknowledges in his cross-examination testimony that, by 1999, there were existing compression systems that implemented pipeline processing. Ex. 2014, 207:23–208:5. Thus, we agree with Petitioner that the background knowledge of a skilled artisan in the relevant timeframe included pipelined compression systems. *See* Reply 10–11.

Further, we agree with Petitioner that one of ordinary skill in the art would have understood that a "basic pipelining approach [in Glover] would

have provided an efficient way to compress video signals using a parallel compression algorithm." Pet. 41 (citing Ex. 1001 ¶¶ 228–230). In this regard, Dr. Storer's testimony is persuasive. Specifically, Dr. Storer explains that

> [i]n a pipeline, a set of processing elements in a series are ordered such that the output of one is the input to the next. Each of these elements is generally called a "stage" of the pipeline. As data (or a car, in the case of the Ford assembly line) moves through the pipeline, each processing element operates at the same time to perform its function. Then, each processing element passes the data to the next processing element. In this way, the processing occurs in parallel.

Ex. 1001 ¶ 229. Dr. Storer further explains persuasively how Figure 1 of Glover teaches or suggests a pipeline structure having a set of processing elements in a series (e.g., coders) in which data output from one processing element is input into the next processing element. Ex. 1001 ¶¶ 229, 231–236. Additionally, we agree with Petitioner that compression *speed* factors into efficiency, especially for low data rates where a longer compression time may further delay transmission. *See* Tr. 39:13–20, 68:1–11; Ex. 1001 ¶ 230 ("Pipelining increases the speed at which data can be processed.").

Moreover, we are not persuaded that modifying Glover to include pipelining would have presented significant or insurmountable challenges. *See* PO Resp. 41. Dr. Richardson acknowledges that any implementation of Glover's coders would require storage/memory, and that generally one of ordinary skill in the art would have be able to implement Glover's system in hardware with a few "design choices." Ex. 2014, 159:22–163:15. Additionally, we are persuaded by Dr. Storer's testimony that existing coders at the time of the invention included methods for dealing with variable rates of compression. Ex. 1029 ¶¶ 13–14. Thus, to the extent that

synchronization presented a technical challenge, we agree with Petitioner that resolving such challenges was well within the abilities of one of ordinary skill in the art.

Accordingly, we are persuaded that Petitioner has explained persuasively how Glover discloses that each of the plurality of parallel compression engines "implements a parallel data compression algorithm."

Claim 1 further recites

> wherein each of the plurality of parallel compression engines is operable to:
>
> receive a different respective portion of uncompressed data; and
>
> compress the different respective portion of the uncompressed data using the parallel data compression algorithm to produce a respective compressed portion of the uncompressed data; and
>
> output the respective compressed portion.

For these limitations, Petitioner asserts Glover discloses that uncompressed video signal 2 is separated into four subbands 0–3 where each subband is provided to a set of compression encoders. Pet. 42 (citing Ex. 1010, 5:16–30, Fig. 1). Petitioner argues the four sets of encoders each receive a different subband of the uncompressed video signal. *Id.* Petitioner further argues that Glover discloses that each set of encoders compresses its respective portion of the uncompressed video signal using a sequence of compression algorithms to produce a compressed portion of the video signal. *Id*. at 42–43 (citing Ex. 1010, 5:38–39). Petitioner adds that Glover suggests implementing the Run Length, Huffman, and Lempel-Ziv data compression algorithm sequence in each set of encoders to perform compression, using pipelining. *Id.* (citing Ex. 1001 ¶¶ 226–36). Petitioner argues Glover

discloses its "coding technique then produces compressed subbands at 130, 230, 330, and 430. These compressed subbands can then be used as inputs to a data commutator/transmitter." *Id.* at 43 (citing Ex. 1010, 5:38–6:3, Fig. 1).

Patent Owner responds that Glover does not disclose that each of the plurality of parallel compression engines is operable to "receive a different respective portion of uncompressed data" because the data received from the subband transformer, as shown in Figure 1 of Glover, is not original, unmodified, and uncompressed. PO Resp. 20–22. Patent Owner argues that an example described in Dr. Glover's *technical memo* (Ex. 2005) illustrates that subbands in Glover (Ex. 1010) would have been modified and filtered. *Id.* Patent Owner asserts that "the lowest subband in Fig. 5 [of Ex. 2005] is a modified version of the original image that has been compressed and contains only a fraction of the information contained in the original image." *Id.* at 22 (citing Ex. 2001 ¶ 78).

Patent Owner's argument is unpersuasive. To start, the language of claim 1 does not require *original* or *unmodified* data. Claim 1 only requires that each of the recited compression engines is operable to receive "respective portion of *uncompressed* data." Emphasis added. Further, in describing subband coding, Dr. Glover's technical memo states

> [t]he original signal is split up into N frequency bands (subbands). . . . If the proper conditions are met, the *resulting total number of values in the subbands is the same as in the original signal.* ***No compression has been achieved yet****; the subbanding process prepares the data for compression coding.*

Ex. 2005, 3 (emphases added). This is consistent with Glover's disclosure that incoming data is "separated into subbands," and "[o]nce the data is separated into these subbands it can be coded and then decoded by statisical

coders such as the Lempel-Ziv based coder." Ex. 1010, Abstract. Thus, we are not persuaded that the discussion in Exhibit 2005 supports Patent Owner's position that the subband transform disclosed in Glover (Ex. 1010) compresses data before the data is received by the DPCM, quantizers, and coders shown in Figure 1 of Glover.

Next, Patent Owner argues that the data output from DPCM 102 (Ex. 1010, Fig. 1) is compressed. PO Resp. 22–25. Patent Owner further argues that Glover would be rendered inoperable for its intended purpose if subband 0 or the DPCM process were ignored. *Id.* at 28. Additionally, Patent Owner asserts Dr. Richardson's simulation of the Lena image shows that

> subband 0 is now much more similar to the other bands than if the DPCM prediction equation disclosed in Glover had not been used. One would expect that the increased similarity of this data, after using DPCM, would result in an increase in efficiency when using dictionary-based compression.

Id. at 25 (citing Ex. 2001 ¶ 62).

These arguments are also unpersuasive. Patent Owner relies on Dr. Richardson's testimony for the proposition that DPCM is a form of compression. *Id.* at 23 (citing Ex. 2001 ¶ 80). Paragraph 80 of Dr. Richardson's declaration states that

> The DPCM process described in Glover is a well-known form of compression. As such, the output of DPCM 102 is not uncompressed data, but rather is transformed and DPCM compressed data. *See also* Paragraphs 60-62 above (showing how DPCM compresses data and makes the subband data for Band 0 similar to that of Bands 1, 2, and 3).

Id. Initially, we observe that the statement "DPCM process described in Glover is a well-known form of compression" is unsupported. Further, looking to paragraphs 60 through 62 of Dr. Richardson's declaration, Dr. Richardson testifies that the DPCM process makes subband data for Band 0

similar to that of Bands 1, 2, and 3. Ex. 2001 ¶¶ 60–62. However, Dr. Richardson does not explain how increasing data similarity is the same as compression. *See* Reply 5. Moreover, this position is contradicted by Glover's disclosure, which teaches that compression occurs after quantization. Ex. 1010, 5:9–15 ("After quantization, an adaptive Huffman coder or Lempel-Ziv based coder is used to perform compression."). According to Glover, the DPCM process takes place before quantization. Ex. 1010, 5:19–24.

Patent Owner further argues that the data received by the coders is not "uncompressed" because quantizers 105, 205, 305, and 405 output compressed data. PO Resp. 29–31. This argument is unpersuasive because Petitioner argues that the quantizers are part of the Glover's parallel compression engine. Reply 7. Further, as discussed, we are persuaded that data received by the quantizers, which is output from the subband transform and DPCM, is uncompressed. *See* Ex. 1010, 5:19–24.

Claim 1 further recites "wherein the plurality of parallel compression engines are configured to perform said compression *in a parallel fashion* to produce a plurality of respective compressed portions of the uncompressed data." Emphasis added.

Petitioner argues that Glover discloses compression engines that are configured in parallel "so that each PCE can compress its subband without interfering with the other PCEs. (Ex. 1010 at Fig. 1, 5:16-39; Ex. 1001 ¶¶ 218-220, 222-223, 241-243, 251.)." Pet. 44. Petitioner asserts that this architecture allows Glover's compression engines to operate in parallel to compress their respective portions of the uncompressed data and produce a respective compressed portion of that uncompressed data. *Id.*

Patent Owner contends Glover does not mention "parallel" or

"concurrent" operation, and that there is no evidence that the processing chains in Figure 1 of Glover would perform compression in a parallel fashion or concurrently. PO Resp. 58. Patent Owner further argues that implementing parallel processing in Glover requires undue experimentation because additional storage and processing resources would be required. PO Resp. 58–59 (citing Ex. 2001 ¶¶ 124–125).

Petitioner responds that a skilled artisan would understand that the architecture shown in Figure 1 of Glover depicts operation in a "parallel fashion" or "concurrently." Reply 22–23 (citing Ex. 1010, Fig. 1; Ex. 1029 ¶¶ 34–35). Petitioner further argues that any implementation of Glover, serial, parallel, concurrent etc., would require storage and buffers not identified in Glover. Reply 24. Additionally, Petitioner asserts that "[e]ven if Glover did not disclose PCEs that are in operation at the same time, a PHOSITA would have been motivated to implement the PCEs such that they were in operation at the same time to increase the efficiency of Glover." Reply 23; *see id.* at 24 ("the additional processing power needed to operate the PCEs at the same time would increase the efficiency and throughput of the system while having a minimal impact on the design. Ex. 1029 ¶¶ 10-12, 35.").

Petitioner's arguments are persuasive. Although Glover does not explicitly use the terms "parallel" or "concurrently," Figure 1 of Glover depicts the flow of data in a parallel manner with each subband flowing through a set of quantizers and coders. Ex. 1010, Fig. 1. The accompanying description of Figure 1 is consistent with this reading and does not dictate serial processing of one subband after another. For example, Glover teaches that the lowband signal 100 is *first* fed into DPCM 102. Ex. 1010, 5:19–20. However, when describing subsequent processing, Glover does not

distinguish any of the subbands as processed in any particular order. *See id.* at 5:19–6:3. Moreover, we additionally agree with and adopt as our own Petitioner's argument that a skilled artisan would have been motivated to implement Glover's compression engines such that they were in operation at the same time to increase the efficiency of Glover. *See* Reply 23–24.

Further, we are not persuaded by Patent Owner's argument that implementing parallel processing in Glover would require undue experimentation. Here, the issue is whether the amount of required experimentation is undue, not whether any experimentation is necessary. *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991). *In re Angstadt*, 537 F.2d 498, 504 (CCPA 1976).

The testimony of Dr. Richardson does not explain, with sufficient specificity, what and how much experimentation would have been required by one with ordinary skill, and why that amount of experimentation should be regarded as "undue." *See* Ex. 2001 ¶¶ 123–127. Moreover, Dr. Richardson agrees any implementation of Glover's coders would require storage/memory, and that generally one of ordinary skill in the art would have been able to implement Glover's system in hardware with a few "design choices." Ex. 2014, 159:22–163:15. Additionally, we are persuaded by Dr. Storer's testimony that existing coders at the time of the invention included methods for dealing with variable rates of compression. Ex. 1029 ¶¶ 13–14. Further, we observe that much discussion has been made of Franaszek with regard to the use of a shared dictionary for compression. In this context, Patent Owner has described Franaszek as disclosing "parallel compression" with the use of individual compressors. Tr. 46:14–47:3. Patent Owner's reading is consistent with disclosure of Franaszek, which is titled "*Parallel Compression and Decompression* Using

a Cooperative Dictionary." Ex. 2009, Title (emphasis added). At a minimum, Patent Owner acknowledges that the state of the prior art at the time of the invention included *parallel* operation of individual compressors. Even if the required experimentation may be complex, that does not make it undue, if the art typically engages in such experimentation. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

Accordingly, for the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103 over Glover.

Additionally, we determine that Petitioner provides detailed explanations of how each limitation recited in claims 2, 3, 5–7, 10, 57, and 59–61 are obvious over Glover. Pet. 44–47, 53–58. For these claims, we agree with and adopt Petitioner's arguments as our own. In the Patent Owner's Response, Patent Owner relies on arguments presented for claim 1 that are discussed above. PO Resp. 8–60. For the reasons set forth in the Petition (*see* Pet. 44–47, 53–58), we conclude that Petitioner has established by a preponderance of the evidence that these claims are rendered obvious by Glover. Accordingly, based on the complete record, Petitioner has established by a preponderance of the evidence that claims 2, 3, 5–7, 10, 57, and 59–61 are unpatentable under 35 U.S.C. § 103 over Glover.

b. Claims 4 and 58

Claims 4 and 58 depend from claims 1 and 57 respectively. Claims 4 and 58 further require a parallel lossless data compression algorithm.

For these limitations, Petitioner argues that Glover discloses parallel compression engines that use Run Length, Huffman, and Lempel-Ziv data compression algorithms and suggests using a parallel implementation via a pipelined architecture. Pet. 46 (citing Ex. 1010, 5:27–38, Fig. 1; Ex. 1001

¶¶ 225–236). Petitioner argues that Glover further discloses that the Run Length, Huffman, and Lempel-Ziv algorithms are lossless and would implement a lossless parallel data algorithm. Pet. 46 (citing Ex. 1010, 2:1–2, 2:17–19), 52. In Petitioner's Reply, Petitioner also argues that the claim language at issue does not require the recited compression engines to *only* implement a lossless parallel data compression algorithm. Reply 15; Tr. 20:19–22:9. Petitioner argues that Glover's coders perform lossless compression even if the quantizer may separately execute a lossy process. Reply 15.

Patent Owner counters that Glover's quantizers perform *lossy* not lossless compression. PO Resp. 42–43. At the Oral Hearing, Patent Owner argued for the first time in the proceeding that *Kustom Signals, Inc. v. Applied Concepts, Inc.*, 264 F.3d 1326 (Fed. Cir. 2001) stands for the proposition that the claim language in the instant proceeding cannot be read to include a lossy algorithm in addition to a lossless algorithm.[4] Tr. 55:4–16.

We agree with Petitioner that Glover discloses the Run Length, Huffman, and Lempel-Ziv algorithms are lossless and would implement a lossless parallel data algorithm. *See* Pet. 46 (citing Ex. 1010, 2:1–2, 2:17–19), 52. Furthermore, based on the facts before us in the instant case, *Kustom Signals* is not controlling. In *Kustom Signals*, the patent at issue covered a traffic radar system having user-selectable modes of operation, whereby the operator selects whether to identify and display the speed of either the strongest target or the fastest target vehicle. *Kustom Signals*, 264

[4] Patent Owner did not rely on this case prior to the Oral Hearing. Nonetheless, in this Decision, we address Patent Owner's arguments raised for the first time at the Oral Hearing.

F.3d at 1329. The Federal Circuit determined that the disjunctive claim terms "or" and "either-or" excluded an accused infringing device that performs both a strongest and a fastest analysis of the return signal, and, which was not subject to operator selection. *Id.* at 1333. Here, the claim language before us only requires that the recited compression engines implement a lossless parallel data compression algorithm, but does not exclude other types of algorithms through the use disjunctive language, which was the focus in *Kustom Signals*.

Accordingly, for the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that claims 4 and 58 are unpatentable under 35 U.S.C. § 103 over Glover.

C. Claims 35–37, 40–42, and 45–47 — Asserted Obviousness over Glover and Cheng (Ex. 1023)

1. Summary of Cheng (Ex. 1023)

Cheng discloses Ziv-Lempel data compression system using variable code fields. Ex. 1023, Title. Cheng further discloses various systems that incorporate the described compression and decompression systems. *Id.* at 4:50–65. As an example, Figure 11 of Cheng is reproduced below.

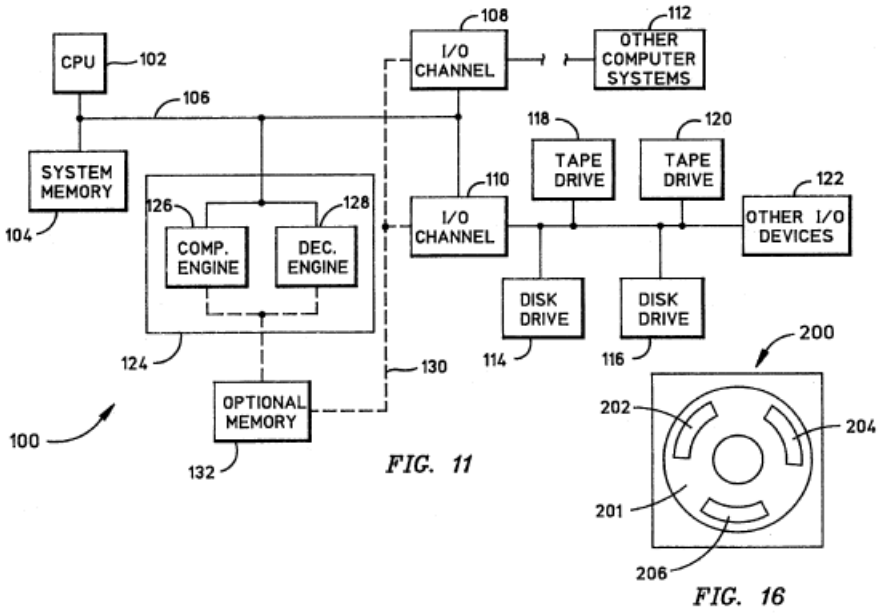


Figure 11 shows computer system 100 includes central processing unit (CPU) 102 that communicates with system memory 104. *Id.* at 17:8–10. Computer system 100 further includes compression/decompression engine 124 that contains data compression engine 126 and data decompression engine 128. *Id.* at 17:19–22. Cheng further teaches that compression/decompression engine 124 includes means necessary to implement the data compression and decompression process, which may be embodied as program objects and data objects stored in a memory means to direct CPU 102 to perform processes. *Id.* at 17:22–27. Engine 124 may use system memory 104 or optional memory 132 while performing the desired compression or decompression processes. *Id.* at 17:33–35. Additionally, referring to Figure 13, Chen further discloses that encoder 176 incorporating microprocessor 178 is coupled to data memory 180, which includes the program and data objects necessary to the data compression process. *Id.* at 18:5–8.

Further, according to Petitioner, Cheng discloses a network device

that includes a terminal, an interface, and an encoder (compression system) "arranged to transmit and receive data over a communications link." Pet. 52 (citing Ex. 1023, 18:19–22; Fig. 15). This network device "operates transparently to increase the data transmission capacity of the communication link by maximizing the information content per bit in the link data stream." *Id.* (citing Ex. 1023, 18:23–26, Fig. 15).

2. Analysis

Petitioner asserts claims 35–37, 40–42, and 45–47 are unpatentable under 35 U.S.C § 103 over the combination of Glover and Cheng. Pet. 47–53. Based on the entire record, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims 35–37, 40–42, and 45–47 are unpatentable over the combination of Glover and Cheng. Illustrative claim 35 is discussed below.

Claim 35 is directed to a memory controller having "memory control logic for controlling a memory." For this limitation, Petitioner asserts Cheng discloses that a compression engine can be inserted as a memory controller that is embodied in a memory means and uses system memory. Pet. 48 (citing Ex. 1023, 17:22–27, 17:33–35, Fig. 11). Petitioner adds that Cheng discloses "the computer systems discussed above in connection with [Figures] 11–15 may be programmed or otherwise designed to facilitate" the compression system of Cheng. *Id.* (citing Ex. 1023, 18:27–32). Petitioner reasons that one of ordinary skill in the art would have understood that the memory controller included memory control logic in order to use the system memory, and that Cheng, thus, discloses memory control logic for controlling a memory. *Id.* (citing Ex. 1001 ¶ 325).

For the remaining limitations recited in claim 35, Petitioner relies on the disclosure in Glover that Petitioner previously argued teaches or suggests

similar limitations recited in claims 1, 3, and 4. *See* Pet. 48–49. Petitioner further argues that one of ordinary skill in the art "would have understood that the system taught by Glover could have been implemented on a network device, memory module, or memory controller, as disclosed in Cheng, to provide compression when storing or transmitting data, the two most common applications of compression." *Id.* at 38 (citing Ex. 1001 ¶¶ 23, 357–58).

Patent Owner does not present arguments for this ground separate from those discussed with respect to Petitioner's challenge based on Glover alone. *See* PO Resp. 1–2, 8–60.

Based on the complete record, we agree with Petitioner's arguments and, for these same reasons, determine that Petitioner has demonstrated, by a preponderance of the evidence, how the combination of Glover and Cheng teaches or suggests teaches or suggests each limitation recited in claims 35–37, 40–42, and 45–47. *See* Pet. 47–53.

Further, with respect to claims 35, 40, and 45, these claims require lossless parallel data compression algorithm. Petitioner relies on arguments presented for a similar limitation recited in claim 4. Pet. 45–46, 48–52. Particularly, Petitioner argues that Glover discloses that the Run Length, Huffman, and Lempel-Ziv algorithms are lossless and would implement a lossless parallel data algorithm. Pet. 46 (citing Ex. 1010, 2:1–2, 2:17–19). For the same reasons discussed with respect to claims 4 and 58, we are persuaded by Petitioner's arguments.

Accordingly, based on the complete record, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims 35–37, 40–42, and 45–47 are unpatentable under 35 U.S.C. § 103 over the combination of Glover and Cheng.

D. Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude. Paper 30 ("PO Mot. Exclude"). Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 36, "Pet. Exclude Opp."), and Patent Owner filed a Reply (Paper 38, "PO Exclude Reply").

Patent Owner moves to exclude Exhibits 1025–1028. PO Mot. Exclude 1–9. Patent Owner's Motion to Exclude these exhibits is dismissed as moot because this Decision does not rely on these exhibits.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–7, 10, 35–37, 40–42, 45–47, and 57–61 of the '271 patent have been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude Exhibits 1025–1028 is *dismissed as moot*; and

FURTHER ORDERED that any party to the proceeding seeking judicial review of this Final Written Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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