

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUGHES NETWORK SYSTEMS, LLC and
HUGHES COMMUNICATIONS, INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case IPR2015-00059
Patent 7,916,781 B2

Before KALYAN K. DESHPANDE, GLENN J. PERRY, and
TREVOR M. JEFFERSON, *Administrative Patent Judges*.

PERRY, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Procedural History*

Hughes Network Systems, LLC and Hughes Communications, Inc.¹ (collectively “Petitioner” or “Hughes”) filed a Petition requesting an *inter partes* review of claims 1–7, 13–16, and 19 of U.S. Patent No. 7,916,781 B2 (Ex. 1005, “the ’781 Patent”). Paper 4 (“Pet.”).² California Institute of Technology (“Patent Owner” or “CIT”) timely filed a Preliminary Response. Paper 13 (“Prelim. Resp.”). We instituted trial as to claims 1 and 2 of the ’781 Patent as being anticipated by Divsalar³ and did not authorize trial as to the other grounds of unpatentability alleged in the Petition. Paper 18 (“Dec.”). Following institution of trial, Patent Owner filed its formal response. Paper 24 (“PO Resp.”). Petitioner replied. Paper 29 (“Pet. Reply”). Patent Owner moved to “strike” and to “exclude” various Petitioner exhibits. Paper 32 (“Mot.”). Petitioner opposed. Paper 35 (“Mot. Opp.”). We heard oral argument on February 10, 2016. Paper 39 (“Tr.”).

B. *Related Proceedings*

Petitioner states that the ’781 Patent is involved in a pending lawsuit titled *California Institute of Technology v. Hughes Communications, Inc.*, No. 13-CV-07245 (C.D. Cal.). Pet. 1 (citing Ex. 1015). In that lawsuit the following patents are asserted: (i) U.S. Patent No. 7,116,710; (ii) U.S. Patent No. 7,421,032; (iii) U.S. Patent No. 7,916,781; and (iv) U.S. Patent

¹ EchoStar Corporation is named in the Petition as the parent of Hughes Satellite Systems Corporation, which is the parent of Hughes Communications, Inc. Pet. 1.

² “Pet.” refers to the corrected Petition filed October 30, 2014 (Paper 4).

³ Dariush Divsalar, et al., *Coding Theorems for “Turbo-Like” Codes*, THIRTY-SIXTH ANNUAL ALLERTON CONFERENCE ON COMMUNICATION, CONTROL, AND COMPUTING 201–209 (1998) (Ex. 1011, “Divsalar”).

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No. 8,284,833. Petitioner has filed additional Petitions for *inter partes* review challenging other patents of the patent family. Pet. 1.

C. The '781 Patent

1. Background and Context

Error correcting codes are used to communicate information across a noisy communication channel. They enable recovery of a transmitted message that may have become distorted by noise on the communication channel. To error correction encode a message for transmission, its bits are parsed into groups of message bits that are “encoded” into “codewords” that include additional redundant information.⁴ Thus, the encoded codewords have more information than the original message had prior to encoding. The codewords are transmitted over the communication channel and are received at another location, where the codewords are “decoded” into the original message. No single coding scheme is optimal for all communication channels. There are design tradeoffs between the use of complex codes, which permit better error correction, and less complex codes, which are easier to decode. This has led to the development of many different encoding/decoding schemes. The '781 Patent describes one such scheme.

2. Disclosed Invention

The '781 Patent describes the serial concatenation of interleaved convolutional codes forming turbo-like codes. Ex. 1005, Title. It explains some of the prior art with reference to its Figure 1, reproduced below.

⁴ For example, message bits “10011” may be encoded into a codeword “100111” by adding a “parity” bit “1” to the original message.

100

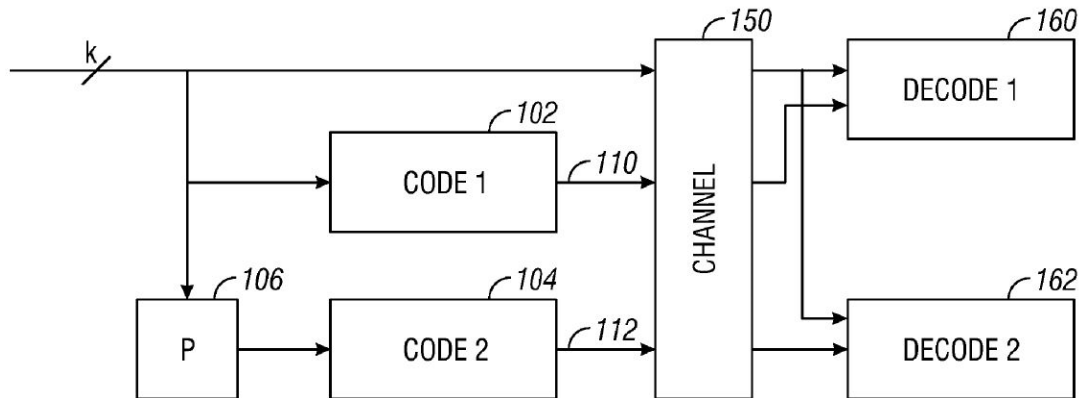


FIG. 1
(Prior Art)

Figure 1 is a schematic diagram of a prior “turbo code” system. Ex. 1005, 2:20–21. The ’781 Patent specification describes Figure 1 as follows:

A block of k information bits is input directly to a first coder 102. A k bit interleaver 106 also receives the k bits and interleaves them prior to applying them to a second coder 104. The second coder produces an output that has more bits than its input, that is, it is a coder with rate that is less than 1. The coders 102, 104 are typically recursive convolutional coders.

Three different items are sent over the channel 150: the original k bits, first encoded bits 110, and second encoded bits 112. At the decoding end, two decoders are used: a first constituent decoder 160 and a second constituent decoder 162. Each receives both the original k bits, and one of the encoded portions 110, 112. Each decoder sends likelihood estimates of the decoded bits to the other decoders. The estimates are used to decode the uncoded information bits as corrupted by the noisy channel.

Ex. 1005, 1:44–60.

A coder 200, according to a first embodiment of the invention, is described with respect to Figure 2, reproduced below.

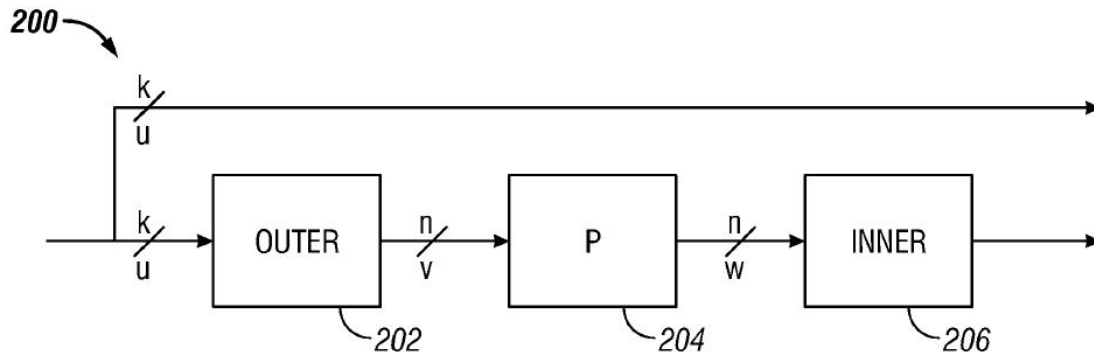


FIG. 2

Figure 2 of the '781 Patent is a schematic diagram of coder 200.

The coder 200 may include an outer coder 202, an interleaver 204, and inner coder 206. . . . The outer coder 202 receives the uncoded data [that] may be partitioned into blocks of fixed size, [e.g.] k bits. The outer coder may be an (n,k) binary linear block coder, where $n > k$. The coder accepts as input a block u of k data bits and produces an output block v of n data bits. The mathematical relationship between u and v is $v = T_0 u$, where T_0 is an $n \times k$ matrix, and the rate⁵ of the coder is k/n .

The rate of the coder may be irregular, that is, the value of T_0 is not constant, and may differ for sub-blocks of bits in the data block. In an embodiment, the outer coder 202 is a repeater that repeats the k bits in a block a number of times q to produce a block with n bits, where $n = qk$. Since the repeater has an irregular output, different bits in the block may be repeated a different number of times. For example, a fraction of the bits in the block may be repeated two times, a fraction of bits may be repeated three times, and the remainder of bits may be repeated four times. These fractions define a degree sequence or degree profile, of the code.

The inner coder 206 may be a linear rate-1 coder, which means that the n -bit output block x can be written as $x = T_1 w$, where T_1 is a nonsingular $n \times n$ matrix. The inner coder 210 can have a

⁵ We understand that the “rate” of an encoder refers to the ratio of the number of input bits to the number of resulting encoded output bits related to those input bits.

rate that is close to 1, e.g., within 50%, more preferably 10% and perhaps even more preferably within 1% of 1.

Ex. 1005, 2:40–3:2. Codes characterized by a regular repeat of message bits into a resulting codeword are referred to as “regular repeat,” whereas codes characterized by irregular repeat of message bits into a resulting codeword are referred to as “irregular repeat.” The second (“inner”) encoder 206 performs an “accumulate” function. Thus, the two step encoding process illustrated in Figure 2, including a first encoding (“outer encoding”) followed by a second encoding (“inner encoding”), results in either a “regular repeat accumulate” (“RRA”) code or an “irregular repeat accumulate” (“IRA”) code, depending upon whether the repetition in the first encoding is regular or irregular.

Figure 4 of the '781 Patent is reproduced below.

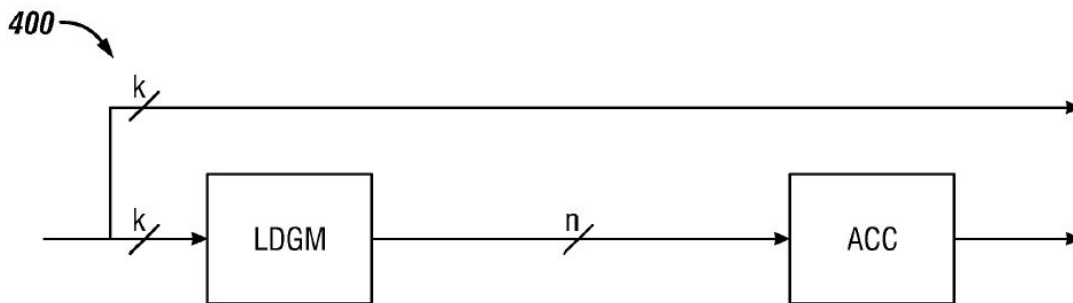


FIG. 4

Figure 4 shows an alternative embodiment in which the first encoding is carried out by a low density generator matrix. Low density generator matrix (LDGM)⁶ codes are a special class of low density parity check codes that allow for less encoding and decoding complexity. LDGM codes are

⁶ We understand that a “generator” matrix (typically referred to by “G”) is used to create (generate) codewords. A parity check matrix (typically referred to by “H”) is used to decode a received message.

systematic linear codes generated by a “sparse” generator matrix. No interleaver (as in the Figure 2 embodiment) is required in the Figure 4 arrangement because the LDGM provides scrambling otherwise provided by the interleaver in the Figure 2 embodiment.

3. Illustrative Claim

Independent claim 1 is reproduced below.

1. A method of encoding a signal, comprising:

[a] receiving a block of data in the signal to be encoded, the block of data including information bits;

[b] performing a first encoding operation on at least some of the information bits, the first encoding operation being a linear transform operation that generates L transformed bits; and

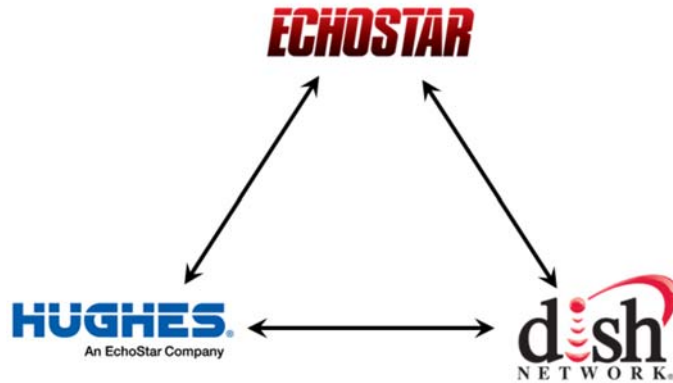
[c] performing a second encoding operation using the L transformed bits as an input, the second encoding operation including an accumulation operation in which the L transformed bits generated by the first encoding operation are accumulated, said second encoding operation producing at least a portion of a codeword, wherein L is two or more.

(bracketed alphabetic references are added to the claim limitations).

II. ANALYSIS OF PETITIONER’S CHALLENGES

A. Real Parties in Interest

Patent Owner argues that Petitioner failed to name all Real Parties-in-Interest (RPI) including EchoStar Corporation (“EchoStar”) and the “DISH” entities. Paper 16, PO Resp. 5–18. We held a conference call on Feb. 25, 2015 to discuss Patent Owner’s allegation of unnamed real parties-in-interest. The following figure is reproduced from page 9 of Patent Owner’s Preliminary Response.

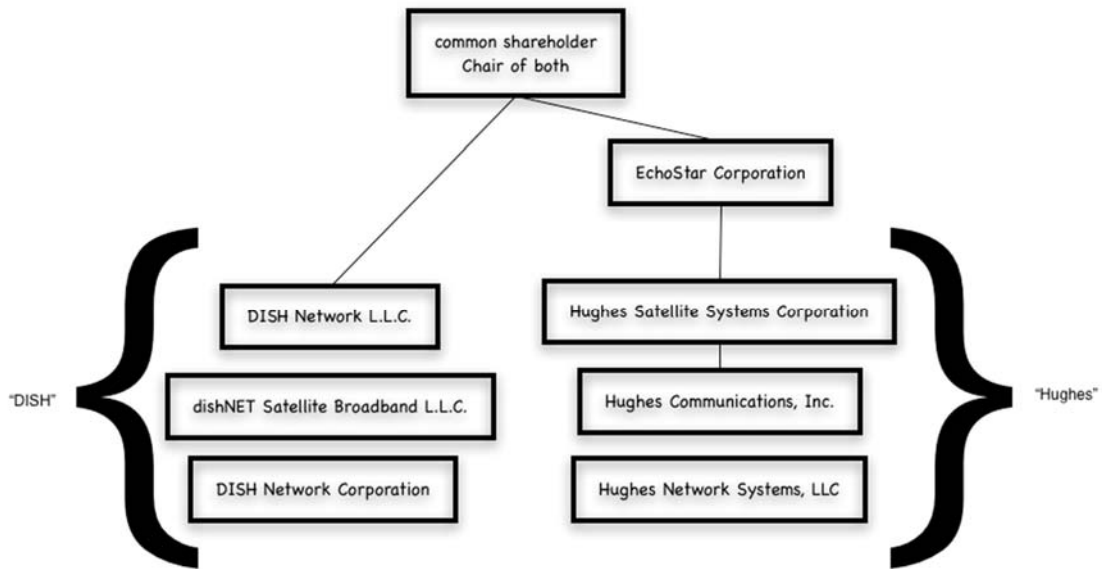


The figure purports to portray relationships among EchoStar, Hughes, and Dish entities.

We authorized additional briefing on the issue of potential unnamed real parties-in-interest. Petitioner (Paper 15) and Patent Owner (Paper 16) filed briefs directed to this issue. Petitioner also filed, without authorization and in support of Paper 15, a Declaration of T. Jezek, in house Intellectual Property Counsel of Hughes Network Systems, LLC. Ex. 1070.

The Petition names Hughes Network Systems, LLC and Hughes Communications, Inc. (collectively “Hughes”) as real parties-in-interest. The Petition further states that EchoStar Corporation is the parent of Hughes Satellite Systems Corporation which is the parent of Hughes Communications, Inc. Pet. 1.

Patent Owner argues that Petitioner failed to name EchoStar Corporation (“EchoStar”) and the “DISH” entities as real parties in interest in the Petition. We held a conference call on Feb. 25, 2015 to discuss this issue. The following diagram sets forth our understanding of relationships among various corporate entities.



1. EchoStar

Petitioner acknowledges that Hughes is wholly owned by EchoStar. Petitioner identified EchoStar in the Petition under the heading “Real Party-in-interest.” Pet. 1. During the conference call held on Feb. 25, 2015, Petitioner argued that the identification of EchoStar was in accordance with the PTO’s published guidance at 69 Fed. Reg. 49,960, 49,975 (Aug. 12, 2004). It argued that no “magic words” are required to identify a RPI and that its identification set forth in accordance with USPTO published guidance is sufficient.

Patent Owner argues that EchoStar should have been specifically named as a real party-in-interest. PO Resp. 5–8.

The evidence of record indicates that EchoStar is the parent company of Hughes. Petitioner identified EchoStar in the “Real Parties in Interest” section of the Petition as the parent of Hughes. There is no evidence that EchoStar controls this *inter partes* review.

Patent Owner notes that aside from Mr. Jezek's declaration, Hughes has not provided evidentiary support for its contention that it properly named the real parties-in-interest beyond a single exhibit containing a portion of a motion for summary judgment filed by Hughes and DISH in one of the related district court cases.

We find that Petitioner has identified EchoStar in accordance with the Board of Patent Appeals and Interferences guidance of August 12, 2004. As such, we are not persuaded that Petitioner has failed to name EchoStar as a real party in interest.

2. Dish Entities

Dish is not identified in the Petition as a real party-in-interest. During the conference call of February 25, 2015 Petitioner indicated that Dish is a spinout of EchoStar.

Patent Owner argues that public documents describe EchoStar as "calling the shots" for its subsidiaries. Paper 16, 1. Patent Owner recounts various activities with respect to the District Court litigation that suggest Dish is a real party-in-interest. Paper 16, 2. In particular, Patent Owner refers to the voting power of Charles W. Ergen, SEC documents indicating "common control," R. Stanton Dodge being both Dish General Counsel and an EchoStar Director, EchoStar V.P. Roger J. Lynch being responsible for technology that is important to EchoStar and Dish, and Dish and Hughes having common counsel in the District Court proceeding. *Id.*

Patent Owner argues that as a result of this "evidence," the burden has shifted to Petitioner to demonstrate that Dish is not a real party-in-interest. We disagree.

Although Petitioner has the ultimate burden of persuasion in an *inter partes* review, once the Petitioner has represented what it believes to be a proper identification of the real parties-in-interest, Patent Owner has the burden of production in establishing that a real party-in-interest has not been named. Patent Owner has not carried that burden with respect to establishing that Dish is an unnamed real party-in-interest.

Petitioner persuasively argues that Patent Owner failed to show that the Petition was filed at the behest of Dish. Paper 15, 1. The key to a real party-in-interest inquiry is the relationship between the potential unnamed real party-in-interest and the proceeding, not the relationship between parties. For example, “[a] common consideration is whether the non-party exercised or could have exercised control over a party’s participation in a proceeding.” 77 Fed. Reg. at 48,759.

There is no persuasive evidence of record that Dish controls or even had an opportunity to control Hughes’ decision to file or maintain this *inter partes* review.

3. Conclusion

Patent Owner has not met its burden of production in establishing that Petitioner has failed to name a real party-in-interest.

B. Claim Construction

In an *inter partes* review, claim terms of an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary

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skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

In this case, our construction discussed below would be the same using the broadest reasonable construction or the claim construction standard required by *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

1. “linear transformation”(claim 1)

Petitioner argues that Divsalar teaches linear transformation within its broadest reasonable construction. However, it does not propose a formal construction for the term “linear transformation.” Pet. 11–14.

Patent Owner argues that when the claims are properly construed, Divsalar fails to teach a “first encoding operation being a linear transform operation that generates L transformed bits,” and “the second encoding operation including an accumulation operation in which the L transformed bits generated by the first encoding operation are accumulated.” PO Resp. 2.

According to Patent Owner, it is clear from the context of the ’781 Patent that the first encoding operation is not so broad as to encompass any linear transformation. Rather, read in view of the specification, the first encoding operation must involve irregular repetition and scrambling of bits. PO Resp. 31–32 (citing Ex. 1005 at 1:63-2:10). Patent Owner provides declaration testimony of Dr. Solomon Golomb (Ex. 2024), who explains that the specification consistently refers to the invention as comprising two main aspects—an “outer coder” and an “inner coder” (Ex. 2024 ¶ 21)—and that a person of ordinary skill, upon reading the specification, would understand

that the outer coder must include irregular repetition of input bits. Ex. 2024 ¶ 22.

We construe the term “linear transformation” in order to apply the Divsalar reference. The term “linear transformation” is used in the context of a transformation between two vector spaces. We adopt a linear algebra definition⁷ that a linear transformation is one that obeys the laws of linear algebra including distributive and associative properties, e.g., the transform of vectors $a+b$ is equal to the transform of a + the transform of b . The linear transform of x (a scalar) times a vector y is equivalent to x times the transform of vector y . We decline to read into the claim limitation the requirement of an irregular repeat.

2. Additional Claim Terms

We find it unnecessary to construe additional claim terms.

C. Divsalar (Ex. 1011) as a Publication

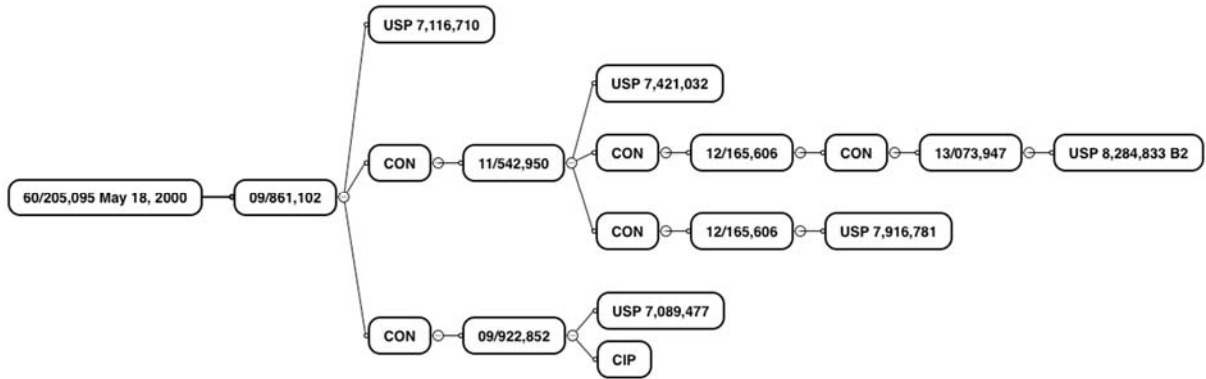
The Petition relies upon Divsalar (Ex. 1011) being a printed publication citable against the '781 Patent. Divsalar is an article written by Dariush Divsalar, Hui Jin, and Robert J. McEliece. Robert J. McEliece is listed as a co-inventor of the '781 Patent at issue. The authorship of Divsalar is different from the inventorship of the '781 Patent because only Robert J. McEliece is common to both.

Patent Owner argues that Petitioner has not established that Divsalar is a printed publication within the meaning of 35 U.S.C. § 311(b) that can be relied upon to anticipate the claims of the '781 Patent. PO Resp. 20–28.

⁷ This definition is explained by “Wolfram MathWorld” at <http://mathworld.wolfram.com/lineartransformation.html> (Ex. 3000).

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The '781 Patent is part of a family of applications and patents as illustrated in the following diagram.



We prepared the above diagram based on related cases data found on the cover page of the '781 Patent. The '781 Patent derives an earliest effective filing date, through a series of continuation applications, from the filing date of Provisional Application 60/205,095 which was filed on May 18, 2000. Petitioner does not challenge the May 18, 2000 effective filing date for the '781 Patent.

The cover page of Divsalar (Exhibit 1011) is reproduced below.



Proceedings

**THIRTY-SIXTH ANNUAL ALLERTON CONFERENCE
ON COMMUNICATION, CONTROL AND COMPUTING**

September 23 - 25, 1998

Allerton House, Monticello, Illinois
Sponsored by the
Coordinated Science Laboratory and the
Department of Electrical and Computer Engineering of the
University of Illinois at Urbana-Champaign

Hughes, Exh. 1011, p. 1

The above image is taken directly from Exhibit 1011. The hallmark of whether a document is a printed publication within the meaning of the

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America Invents Act is whether it has been made available to those of ordinary skill in the art in a manner such that those seeking it can find it. *See e.g., SRI Int'l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008). The record includes sufficient evidence that Divsalar is a “printed publication” within the meaning of 35 U.S.C. § 311(b) and that it predates the earliest effective filing date of the '781 Patent.

The Petition states that Divsalar was “published at least by April 30, 1999.” Pet. 2. Petitioner provides a Declaration by Robin Fradenburgh (Ex. 1064), Librarian at the University of Texas (“UT”). The Fradenburgh Declaration includes an “acquisition record” pasted into an email. Ex. 1064, 4–6. Fradenburgh states that the exact date of acquisition of Divsalar by the UT library is unknown. *Id.* at ¶ 5. However, the acquisition record states at the bottom “UT Created 1999-04-30.” *Id.* at 6. We take this to mean that the acquisition record was created April 30, 1999. We infer from this date that Divsalar was received at the library no later than April 30, 1999. Patent Owner correctly notes that there are no details in the declaration or acquisition record concerning how Divsalar was treated at the library after the acquisition record was created; e.g., there are no details concerning its shelving and cataloging.

Based on the cover page of Divsalar, we find that it is a print-out of a paper from a collection of papers in the Proceedings of the Allerton Conference that occurred September 23–25, 1998, about 20 months before the earliest effective filing date of the '781 Patent. There is no evidence in the record suggesting otherwise.

Petitioner further presents Declaration testimony of Henry D. Pfister, Ph.D. (Ex. 1010) stating that

[t]he Allerton Conference is generally regarded as one of the main conferences in the field of information theory and communications and generally occurs in September. In 1999, the conference occurred from September 22-24, 1999 with the paper being published on the author's websites in October of 1999. The proceedings were published later.

Ex. 1010 ¶ 29.

Petitioner further provides the Declaration testimony (Ex. 1060) of David J.C. Mackay, Ph.D. generally describing that he was active in the community of those engaged in error correction coding and in the period of 1991 to present published papers, software, abstracts and other information on his own website regarding publications that he made available to others on his own website. Ex. 1060 ¶¶ 13–33. Dr. Mackay states that he attended talks given by Dr. Robert McEliece including those given in 1998 and 1999 at the Allerton Conferences held by the University of Illinois. Ex. 1060 ¶ 11. He describes his process for publishing papers in detail in paragraph 21 of his Declaration. Dr. Mackay further states that “more commonly final articles summarizing all or part of the conference presentation were completed *immediately* after the conference and sent to the organizers for publication.” *Id.* ¶ 21. Dr. Mackay does not provide testimony specifically directed to Allerton's publication of its papers from its 1998 Allerton Conference. *See id.* However, he testifies (verified by Wayback Machine) that he placed a copy of his own paper, “Comparison of Constructions of Irregular Gallager Codes” on his website as of May 7, 1999. Ex. 1060 ¶ 27. *See* Tr. 13–14. His own paper cites Divsalar (see table below). We find, based on Dr. Mackay's testimony, that Divsalar had been distributed to him prior to his posting of his own paper on his website in May, 1999.

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Petitioner asserts that the “at least as early” publication date (i.e., April 30, 1999) is based on the acquisition record of the UT library. Pet. 2 (citing Ex. 1064). According to Patent Owner, the Fradenburgh Declaration fails to establish that Divsalar was published by the alleged publication date. PO Resp. 24–25. Patent Owner argues that the Fradenburgh Declaration does not explain the acquisition record and does not explain the circumstances of Divsalar having been cataloged and shelved, such that it would have been made available to one of ordinary skill exercising reasonable diligence. *Id.*

However, paragraph 7 of the Fradenburgh Declaration states: “The library’s records reflect that this reference was made available to members of the public on ___ 1999-04-30_____.” Paragraph 8 of the Fradenburgh Declaration states: “[If made-available date not available:]] [a]t the time of the acquisition of this reference, the library typically made newly acquired items available to the public with ___ days of acquisition.” There is no number filled in the blank before “days” and the paragraph begins with a double bracketed phrase suggesting that it is an optional portion of a form.

Petitioner argues that Divsalar is not an “obscure paper.” Tr. 45. Rather, it was an important paper to the field because it “proved that the IGE conjecture was true.” *Id.* As discussed below, there is evidence in the record that a significant portion of this “target” audience was actually aware of the Divsalar paper, indicating not only its availability, but its actual distribution.

The Divsalar paper was co-authored by Robert McEliece, Ph.D., who is also a co-inventor of the patent at issue. Reply 15 (citing Ex. 1011). Dr. McEliece lists Divsalar as a “publication” in his C.V. Ex. 1075 ¶ 228. Further, David MacKay published several papers prior to the earliest

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effective filing date of the '781 Patent. Those papers cite to Divsalar. *See, e.g.,* Ex. 1041, 2, 11 (citing Divsalar); Ex. 1042, 1, 3 (citing Divsalar); Ex. 1060 ¶¶ 30–33.

Finally, we note that Divsalar is listed as being of record among the “References Cited” in the '781 Patent itself. It was not of record in the prosecution of its grandparent application, which issued as the '710 Patent.⁸

The following table summarizes evidence of record regarding Divsalar including citations to the Divsalar paper suggesting to us that Divsalar’s peers had actual knowledge of the paper and considered it in preparing their own work.

Date	Evidence	Comment
April 29, 1999	Fradenburgh Declaration	States “[t]he UT library’s records reflect that Divsalar was made available to the public on 1999-04-30.”
1999	David MacKay, <i>Gallager Codes – Recent Results</i> (1999)(Ex. 1041, 2, 11); MacKay Decl., Ex. 1060 ¶ 30 (testifying that MacKay placed a copy of this paper on his website by July 16, 1999).	Cites to “Divsalar, D., Jin, H., and McEliece, R.J., (1998) Coding theorems for 'turbo like' codes, In Proceedings of the 36th Allerton Conference on Communication, Control, and Computing, Sept. 1998, pp. 201-210, Monticello, Illinois. Allerton House.” Ex. 1041, 2, 11

⁸ The Board understands that citation in an Information Disclosure Statement does not constitute an admission that the cited reference qualifies as prior art as of a particular date. Its mention here, however, is one more piece of circumstantial evidence which, taken with others, suggests public accessibility of the document. We weigh it accordingly.

1999	David MacKay, <i>Gallager Codes – Recent Results</i> , Abstract (1999) (Ex. 1042, 1, 3); MacKay Decl., Ex. 1060 ¶ 31 (testifying that MacKay placed a copy of this abstract on websites on June 2, 1999 and that paper copies of the abstract with a link to his website were distributed at a conference in July 1999) .	Cites to “Divsalar, D., Jin, H., and McEliece, R. J., (1998) Coding theorems for ‘turbo like’ codes.” Ex. 1042, 1, 3.
	David MacKay Declaration (Ex. 1060) explains MacKay papers. Par 30–33	
1999	Henry D. Pfister and Paul H. Siegel, <i>The Serial Concatenation of Rate-1 Codes Through Uniform Random Interleavers</i> , Proceedings from the Thirty-Seventh Allerton Conference on Communication, Control, and Computing, Sept. 22–24, 1999 (Ex. 1057, 1, 11) (cited at Pfister Decl., Ex. 1010 ¶ 32 n.22).	Dr. Pfister’s paper presented at 1999 Allerton Conference cites to Divsalar presented at the previous year’s Allerton Conference. Ex. 1057, 1, 11 (Ref. [4]).
1999	Audrey M. Viterbi & Andrew J. Viterbi, <i>New results on serial concatenated and accumulated-convolutional turbo code performance</i> , 54 Ann. Telecomms., 173–182 (1999). Ex. 1031 at 1, 10 (cited at Pfister Decl., Ex. 1010 ¶ 32 n.22).	Cites “Divsalar et al.” (Ex. 1031, 1 (Abstract)) and “DIVSALAR (D.), JIN (H.), MCELIECE (R.), Coding theorems for turbo-like codes, <i>Jet Propulsion Laboratory</i> , Pasadena, CA, (September 1998)” (<i>id.</i> at 10 (Reference [5])).

Copyright 2000 ⁹	CODING, COMMUNICATIONS AND BROADCASTING (2000) (Ex. 1043, 1 (showing copyright date), 9).	Cites to “Divsalar, D., Jin, H., and McEliece, R.. J. (1998) Coding theorems for 'turbo-like' codes. In <i>Proceedings of the 36th Allerton Conference on Communication, Control, and Computing, Sept. 1998</i> , pp. 201-210, Monticello, Illinois. Allerton House.” Ex. 1043, 9.
	File History of '781 Patent (Ex. 1006) includes an IDS dated June 30, 2008 which lists reference BD.	Citing as “BD”: “Divsalar, D., et al., “Coding Theorems for ‘Turbo- Like’ Codes,” <i>Proceedings of the 36th Annual Allerton Conference on Communication, Control, and Computing</i> , Monticello, Illinois, pp. 201–210, September 1998.” Ex. 1006, 4.

The various citations, in the table above, by others of skill in the error correction coding art demonstrate that they acknowledged the contributions of Divsalar and built upon them during the relevant time period.

Based on the same named authors that appear in bibliographic citations in the 1998–1999 time frame, we find that the evidence of record supports that a relatively small community of artisans worked in error correction coding, several of whom referenced the Divsalar paper. Under

⁹ The presence of the citation in a book copyrighted in 2000 suggests that the author of that portion of the book (here, David Mackay) would have received the article prior to the book’s publication.

these circumstances, we find that the Divsalar paper was published to the relevant community of skilled artisans well before the earliest effective filing date of the patent at issue.

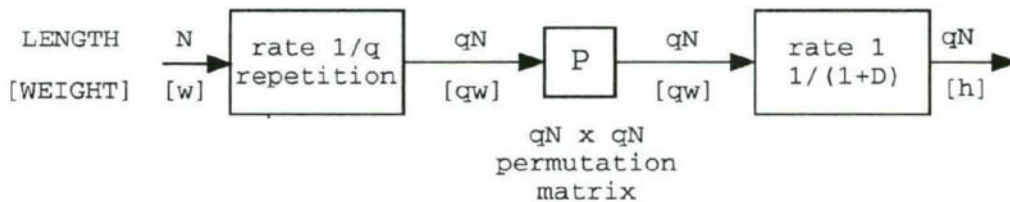
We determine, based on the totality of the evidence discussed above, that Divsalar is prior art with respect to the '781 Patent. We conclude that the preponderance of evidence establishes that Divsalar is a printed publication available as prior art against the '781 Patent as required by 35 U.S.C. § 311(b).

D. Challenge to Claims 1 and 2 based on Divsalar

1. Claim 1

a. Limitation [a]

Petitioner argues that Divsalar describes limitation [a] because Divsalar's Figure 3, reproduced below, describes an encoder for a (qN, N) repeat and accumulate code. The numbers above the input-output lines indicate the length of the corresponding block, and those below the lines indicate the weight of the block. Pet 13 (citing Ex. 1011, 7).



Divsalar Fig. 3 shows an encoder for a (qN, N) repeat and accumulate code. The numbers above the input-output lines indicate the length of the corresponding block, and those below the lines indicate the weight of the block. Ex. 1011, 7. Divsalar encodes information block of length N , which is a block of data obtained from a signal to be encoded. See Divsalar Fig. 3

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and Ex. 1010 ¶ 142. Petitioner argues that the subject of Divsalar is the encoding and decoding of error-correcting codes, and it would be clear to a person having ordinary skill in the art that all block encoding methods necessarily perform this step. *Id.* ¶ 143.

Patent Owner argues that Divsalar does not explicitly describe “receiving a block of data in the signal to be encoded.” PO Resp. 46. We do not find this argument to be persuasive. Reading Divsalar as a whole, one of ordinary skill would recognize that the encoding described by Divsalar would be operable on a block of data from a signal to be encoded. If one describes adding a cup of water to a pot as part of a cooking recipe, it is not necessary to describe taking a measuring cup to the faucet and filling that cup to its one cup marker.

b. Limitation [b]

Petitioner argues that Divsalar describes limitation [b] (first encoding). Divsalar’s Figure 3 shows “[a]n information block of length N is repeated q times, scrambled by an interleaver of size qN , and then encoded by a rate 1 accumulator.” Pet. 14 (citing Ex. 1011, 5). According to Petitioner, “[t]he combination of Divsalar’s repetition and permutation constitute a linear transform operation that generates L transformed bits.” Pet. 14 (citing Ex. 1010 ¶ 144). According to Petitioner, as shown in Figure 3, these steps produce qN bits. Petitioner argues that Divsalar discloses the use of $q=3$ and $q=4$. Ex. 1011, 9.

Patent Owner disagrees, arguing that Petitioner has not demonstrated why this is so. Prelim. Resp. 23–27. Patent Owner argues that the claimed “first encoding operation is not so broad as to encompass *any* linear transformation. . . . [Rather,] the first encoding operation must involve irregular repetition and scrambling of bits.” PO Resp. 31.

Patent Owner draws a distinction between the '781 Patent being directed to “irregular” repeat codes and Divsalar being directed to “regular” repeat codes, noting that Divsalar does not disclose an encoding operation utilizing irregular repetition. *Id.* at 47–48. Patent Owner argues “[n]othing in the '781 patent would indicate to a person of skill in the art that the encoder in Figure 2 could be a ‘regular repeat accumulate’ code.” *Id.* at 49.

We agree with Patent Owner that the specification explains how irregular coding is achieved. However, we do not read limitation [a] of claim 1 as being limited to irregular repeat coding, as discussed above in our claim construction. Claim 1 requires “performing a first encoding operation on at least some of the information bits, the first encoding operation being a linear transform operation that generates L transformed bits.” The first encoding can be on “at least some” of the information bits. Thus, it could also be on all of the information bits. Also, according to the claim, the first encoding operation must produce “L” transformed bits. There is no explanation in the claim as to the relationship of “L” to the incoming block of bits being transformed. All that claim 1 recites, at the end of the claim, is that L is 2 or more. Thus, claim 1 could produce a regular repeat code by repeating all of the information bits to generate L (more than 2) transformed bits. Although Patent Owner argues that claim 1 is limited to producing irregular codes, there is no language in the claim that so limits it. Claim 1 is in contrast to claims 9 and 22 (not at issue) which require information bits to appear in a “variable number of subsets.”

If limitation [a] were limited to “irregular” codes, Patent Owner’s position would have merit. However, claim 1 embraces more than just “irregular” repeat codes. It includes first and second encoding operations that may produce regular and irregular repeat codes. Thus, on the full

record, Patent Owner's argument is not commensurate in scope with the actual language of claim 1.

Petitioner cross-examined Patent Owner's expert, Dr. Solomon W. Golomb, and asked whether "linear transformation" requires irregular repetition of the k input bits." His answer was "no." Ex. 1073, 29:9–21; Pet. Reply 4.

The family of patents including the '781 Patent includes multiple continuation patents. Thus far, five patents have issued in this family. We have reviewed a number of claims of other patents of the family (not at issue) and find clear references to "irregular repeats" and "scramble the repeated bits." Ex. 1003, 7:61–8:20; Ex. 1001, 8:1–6; Pet. Reply 6. Claim 9 of the '781 Patent (not at issue) recites "information bits [that] appear in a variable number of subsets." Thus, claim 9 is limited to an irregular repeat, but Patent Owner did not similarly limit claim 1 in this way.

Given the evidence discussed above, we are unwilling to read into limitation [b] a requirement that it produce irregular codes. As such, we find that Divsalar describes limitation [b]. *See* Divsalar Fig. 3.

c. Limitation [c]

Petitioner argues that Divsalar describes limitation [c]. Pet. 15. According to Petitioner, Divsalar's accumulator performs an accumulate operation on the qN bits that are input to the accumulator and output as a codeword. Pet. 15 (citing Ex. 1011, 5; Ex. 1010 ¶ 145). The transformed bits that are input to Divsalar's accumulator are qN in size. Ex. 1011, 5; Ex. 1010 ¶ 146. Divsalar discloses the use of $q=3$ and $q=4$. Ex. 1011, 9. Therefore, even for a trivial block length of a single bit, Divsalar discloses that more than two transformed bits are generated. Ex. 1010 ¶ 146.

Patent Owner argues that the claimed “second encoding operation” corresponds to the “inner coder” described in the specification. PO Resp. 24, 41. Thus, according to Patent Owner, the claimed “second encoding operation” should be read to require a specific type of accumulation operation. PO Resp. 40–41.

Specifically, Patent Owner argues it should be read to require addition of a previously generated parity bit and more than one input bit in order to generate a second parity bit and that therefore Divsalar would not meet the claim limitation. PO Resp. 45.

The specification describes an accumulator embodiment of the inner coder.

In an embodiment, the inner coder **206** is an accumulator, which produces outputs that are the modulo two (mod-2) partial sums of its inputs. The accumulator may be a

truncated rate-1 recursive convolutional coder with the transfer function $1/(1+D)$. Such an accumulator may be considered a block coder whose input block $[x_1, \dots, x_n]$ and output block $[y_1, \dots, y_n]$ are related by the formula

$$y_1 = x_1$$

$$y_2 = x_1 \oplus x_2$$

$$y_3 = x_1 \oplus x_2 \oplus x_3$$

$$y_n = x_1 \oplus x_2 \oplus x_3 \oplus \dots \oplus x_n.$$

where “ \oplus ” denotes mod-2, or exclusive-OR (XOR), addition. An advantage of this system is that only mod-2 addition is necessary for the accumulator. The accumulator may be embodied using only XOR gates, which may simplify the design.

Ex. 1005, 3:3–23; *see also* Pet. Reply, 9–10. We do not read this embodiment as requiring addition of a previously generated parity bit and more than one input bit in order to generate a second parity bit. Furthermore, this embodiment is identical to the inner coder described in Divsalar. Ex. 1011, 7.

Given the evidence discussed above, we are unwilling to read limitation [c] as requiring any specific type of accumulation operation. As such, Divsalar meets the requirements of limitation [c].

We conclude that Petitioner has established by a preponderance of the evidence that Divsalar anticipates claim 1.

2. Applying Divsalar to Claim 2

Claim 2 depends from claim 1 and further requires that a codeword resulting from the claim 1 encoding process include parity bits. Divsalar adds parity bits by outputting more bits than are input. *See* Ex. 1011, Figure 3 (showing a first encoding having a rate less than 1). Nothing in claim 2 limits it to producing irregular repeat codewords.

Petitioner argues that bits output by Divsalar’s accumulator are parity bits. Pet. 16 (citing Ex. 1010 ¶ 148); Ex. 1011, 5. We agree with Petitioner that Divsalar therefore meets the broadest reasonable interpretation of “outputting the codeword, wherein the codeword comprises parity bits.” Ex. 1010 ¶ 148.

Patent Owner does not separately argue claim 2 and relies only upon its arguments made with respect to claim 1. As discussed above, we did not find those arguments persuasive. We conclude that Petitioner has shown by a preponderance of the evidence that Divsalar anticipates claim 2.

E. Motion to Strike and Exclude

Patent Owner moves to “strike” and to “exclude” evidence. Paper 32 (“Mot.”). In particular, Patent Owner moves to strike Ex. 1064 (Fradenburgh Declaration) (Mot. 2–6), Petitioner’s “new theory” of unpatentability (Mot. 6–9), and Exhibit 1076 (Jezek Declaration) (Mot. 9–11). Patent Owner moves to exclude exhibits 1001–1004, 1007–1009, 1012, 1013, 1017–1021, 1023, 1030, 1032–1036, 1038–1040, 1043–1044, 1046–1056, 1058, 1059, 1060 (¶¶ 13–29, 34–38 and 40–83), 1061–1063, 1065, and 1066 for failing to meet the admissibility requirements of the Federal Rules of Evidence. 37 C.F.R. § 42.64(c); Mot. 11–13.

1. Strike Fradenburgh Declaration

Patent Owner asks that we strike the Fradenburgh Declaration because Petitioner “refused to make Ms. Fradenburgh available for cross-examination.” Mot. 2. We understand the series of events surrounding the potential cross-examination of Ms. Fradenburgh as follows:

Patent Owner asked to cross-examine Ms. Fradenburgh by sending an email dated June 12, 2015 to Petitioner’s Counsel requesting availability dates for cross-examination of Ms. Fradenburgh. Mot. 3 (citing Ex. 2025). Petitioner responded on July 7, 2015 by email stating that Ms. Fradenburgh would not appear voluntarily and informed Patent Owner that it would have to seek a subpoena to compel her to appear for cross examination. *Id.* (citing Ex. 2026). Petitioner sent a further email to Counsel for Patent Owner on July 9, 2015 indicating that Petitioner had learned “late last week” that Ms. Fradenburgh would not appear voluntarily. *Id.* (citing Ex. 2027). Patent Owner immediately requested that Petitioner take the necessary steps to make Ms. Fradenburgh available for cross-examination or formally

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withdraw her testimony. *Id.* (citing Ex. 2028). Petitioner remained silent on the issue until after Patent Owner filed its Patent Owner Response (Paper 24). In that Response, Patent Owner again pointed out what it considered to be flaws in the Fradenburgh declaration and argued Petitioner's failure to make Ms. Fradenburgh available for cross-examination. PO Resp. 24–27; Mot. 4.

During a teleconference with the Board on September 4, 2015 related to a Petitioner request for discovery, Petitioner admitted that it could have taken the steps necessary to obtain the required subpoena:

Could we have subpoenaed [Ms. Fradenburgh] or requested leave from the Board to subpoena her? I think the answer is yes, but, again, we already have her direct testimony by declaration, which does establish a publication date of this document that's, you know, well within the critical time period.

Ex. 2030, 18:17–22. Petitioner's position is that it was capable of producing Ms. Fradenburgh for cross-examination, but did not do so because it saw no benefit to itself. In Petitioner's view, if Patent Owner wanted to cross-examine Ms. Fradenburgh, compelling her to appear was Patent Owner's burden. *Id.* at 19:1–7.

Patent Owner argues that because Petitioner did not meet its obligation to make Ms. Fradenburgh available, that we should strike the Fradenburgh Declaration.

Petitioner argues that Patent Owner has waived this issue. Petitioner argues that the first time Patent Owner formally raised this issue in its briefing was in its Patent Owner Response, where it argued that "Petitioner should . . . be precluded from relying on" the Fradenburgh Declaration. PO Resp. 21, 27–29. Prior to that, the parties had exchanged emails regarding the deposition of Ms. Fradenburgh, but no formal papers had been filed and

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no conference call had been conducted. According to Petitioner, the exchange of emails demonstrates that Petitioner followed the procedure established by the Board in *Marvell Semiconductor, Inc. v. Intellectual Ventures I LLC*, IPR2014-00553 (PTAB April 8, 2015) (Paper 28).

Specifically, Petitioner attempted to obtain the voluntary appearance of Ms. Fradenburgh. When it was unable to do so, Petitioner suggested to Patent Owner that if a deposition was necessary (which seemed unlikely in this case given the apparent lack of a dispute over Divsalar's availability as prior art), Patent Owner could subpoena Ms. Fradenburgh. Patent Owner made no attempt to seek that subpoena and made no formal objection to Ms. Fradenburgh's testimony. Indeed, no objection to the testimony of Ms. Fradenburgh was ever filed in this proceeding. *See* Ex. 2032 (Patent Owner's objections).

Petitioner further argues that, prior to receiving the Patent Owner Response, Petitioner believed the dispute over Ms. Fradenburgh had been resolved. According to Petitioner, Patent Owner falsely suggests that Petitioner "remained silent on the issue [of whether Ms. Fradenburgh's testimony would be withdrawn] until after [Patent Owner] filed its Patent Owner Response." Paper 32, 4. Petitioner argues it made clear in an email to Patent Owner's counsel—well before Patent Owner's response was due—that Ms. Fradenburgh's testimony was not being withdrawn, and proposed that a subpoena be issued if her deposition was still being requested:

As to Ms. Fradenburgh, we will not be withdrawing her testimony. As I previously indicated, we understand that she will appear in response to a subpoena. Accordingly, if CalTech remains interested in taking her deposition, we suggest that you request the Board's approval to issue such a subpoena.

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Ex. 1078 (email dated July 9, 2015). However, Petitioner never received a response to this email.

We find that if Patent Owner intended to strike Ms. Fradenburgh's testimony, it should have timely objected to it, or requested a call with the Board to move to strike her testimony during the discovery period in this *inter partes* review, when Petitioner could have sought a subpoena. We find Patent Owner is not permitted to raise this issue after the close of discovery.

Petitioner further argues that even if this issue had not been waived, Patent Owner's motion fails on the merits.

In light of the circumstances, Petitioner suggested the proper procedure would be for the Patent Owner to simply seek a subpoena to compel the deposition. In response to Petitioner's suggestion, Patent Owner took no further action to compel Ms. Fradenburgh's testimony, and sat on this issue until its Response. Furthermore, Patent Owner has made no showing that such a deposition would have been helpful to its position

Patent Owner cites to the Trial Practice Guide's discussion of "Witness Expenses" to support its assertion that Petitioner was required to take every possible action to make Ms. Fradenburgh available. Paper 32 (citing Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,761 ("TPG") (§ I(F)(1)(b))). Petitioner suggests that this section relates to "witness expenses," not the procedure to be followed when a third-party witness is unwilling to sit for a deposition voluntarily. We find that while that section might entitle Patent Owner to shift any expenses associated with Ms. Fradenburgh's deposition to Petitioner, no such expenses were incurred because Patent Owner did not proceed with efforts to compel her deposition, and never notified Petitioner that it intended to seek to strike her testimony, which would have prompted Petitioner to seek Board authorization to

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compel her testimony.

Moreover, even if this section of the TPG were to apply to compelling witness testimony, and it does not, it would still not support Patent Owner's contention that the testimony should be struck. First, the portion of the TPG cited by Patent Owner does not set forth a mandatory requirement. The TPG simply states that the party presenting a witness's testimony "should arrange to make the witness available for cross-examination." TPG at 48,761 (emphasis added). Such aspirational language cannot support the drastic measure of striking evidence, particularly when, as here, the party seeking to strike the evidence did not timely object to it.

Second, the "Witness Expenses" portion of the TPG cited by Patent Owner is silent on the issue of compelling involuntary testimony and only mentions expenses associated with "non-party witnesses." TPG at 48,761. Instead, the issue of obtaining involuntary testimony is addressed three paragraphs later under the heading "Compelled Testimony." *Id.* If the TPG was intended to require that Petitioner must compel involuntary cross-examination testimony, it would have set out such a requirement in the section addressed to that issue.

We conclude that the burden to make Ms. Fradenburgh available was on Petitioner. However, Patent Owner did not avail itself of appropriate remedies when it could have done so. If Patent Owner was not satisfied with the exchange of emails between counsel related to arranging the Fradenburgh deposition, it should have simply requested a conference call with the Board. Had such a call been timely conducted, we would have instructed Counsel that the burden was on Petitioner to obtain the subpoena. However, Patent Owner did not do so. Rather, it simply abandoned its efforts to cross-examine Ms. Fradenburgh and chose instead to argue the

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insufficiency of Petitioner's proof in its Response. Given the long delays in dealing with this issue and Patent Owner's failure to seek an appropriate remedy from the Board, its now requested remedy of striking the Declaration is not appropriate. We deny Patent Owner's requested relief.

2. "New Theory"

Patent Owner argues (Mot. 6–9) that Petitioner has shifted its theory of unpatentability from Divsalar constituting § 102(b) prior art to Divsalar constituting § 102(a) prior art. Patent Owner asks us to strike this new argument. Mot. 6–9 (citing Pet. Reply 14-16)

Petitioner's Reply states that "Divsalar was presented and published in connection with the Allerston Conference held in September 1998 and was publically available to interested members of the public by at least April 30, 1999." *Id.*

Patent Owner argues that Petitioner, for the first time, cites to four exhibits (Ex. 1031, 1041, 1042, 1057) and contends that these exhibits "corroborate[] the publication of Divsalar before the effective filing date of the '781 patent." *Id.* at 15–16. None of these exhibits, or the corresponding provisions of Dr. McKay's declaration, were ever cited in the Petition. Further, none of these exhibits, or the testimony of Petitioner's declarant, Dr. McKay, comport with Petitioner's original § 102(b) theory of unpatentability. Instead, each of these exhibits is newly advanced by Petitioner as admittedly post-dating the "April 30, 1999" publication date originally asserted in the petition. *See* Ex. 1060 (MacKay) ¶ 30 (asserting Ex. 1041 was posted to a website on July 16, 1999), ¶ 31 (asserting Ex. 1042 was posted to a website on June 2, 1999); Ex. 1057 (bearing May 11, 2000 stamp); Ex. 1031 (stating on its face only "1999" and citing to unknown "Divsalar" reference). Petitioner's Reply at this stage pivots to an entirely

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new § 102(a) theory of unpatentability, a theory never previously advanced, and is untimely and improper.

Patent Owner argues that Petitioner never contended Divsalar was § 102(a) prior art in the Petition, and so Patent Owner has been denied the chance to scrutinize the exhibits specifically, or to explore the new § 102(a) issue generally, to pursue relevant discovery, and respond to the new contention. For example, Exhibit 1031 provides no specific publication date and cites to a “Divsalar” reference making no mention of the Allerton Conference (Ex. 1031, 10). Exhibits 1041 and 1042 are unpublished manuscripts purportedly posted on Dr. McKay’s personal webpage. Patent Owner had no opportunity to explore the sufficiency of Dr. MacKay’s testimony, which was not cited or discussed in the Petition and our institution decision. Exhibit 1057 includes a stamp listing the date “11 May 2000,” but that stamp is largely illegible and of unknown origin and significance. Additionally, Exhibit 1057 is incomplete—the document is partially redacted and missing several pages. Even if the date “11 May 2000” in Exhibit 1057 was demonstrated as a publication date for the Divsalar reference (which it has not been), the uncontested priority date for the ’781 Patent (i.e., May 18, 2000) is only days later. Ex. 1005, 1. To the extent it would have been necessary, Patent Owner was denied the chance to present evidence antedating any § 102(a) publication date.

In fact, Patent Owner argues, even in its Reply, Petitioner never identifies any particular asserted date of publication for its new § 102(a) contention. Thus, in addition to being belated and untimely, Petitioner’s new theory lacks the requisite specificity. Patent Owner would be unable to meaningfully respond to Petitioner’s new and amorphous theory of unpatentability even if the schedule in this proceeding allowed it.

We conclude that there is no “new theory” that must be barred from this proceeding. According to 35 U.S.C. § 311(b), a petitioner in an *inter partes* review may request to cancel as unpatentable 1 or more claims of a patent only on a ground that could be raised under § 102 or § 103 and only on the basis of prior art consisting of patents or printed publications. The Petition clearly alleged that Divsalar is a publication citable against the ’781 Patent and is relied upon. Note the excerpt from Petition page 2 reprinted below.

A. Publications Relied Upon

Petitioner relies upon the following patents and publications:

Exhibit 1011 - “Coding Theorems for “Turbo-like” Codes” by D. Divsalar, H. Jin, and R. J. McEliece (“*Divsalar*”), published at least by April 30, 1999 and available as prior art under 35 U.S.C. § 102(b); *see also* Ex. 1064.

The quoted Petition passage placed Patent Owner on notice that the petitioned challenge was based on Divsalar and that Petitioner considered Divsalar to be a citable printed publication *at least* by virtue of its publication date and the operation of 35 U.S.C. § 311(b).

Exhibits 1031, 1041, 1042 and 1057 are listed in the Petition itself at pages v–viii. Our records reflect that these exhibits were uploaded to its PRPS system on the day the Petition was uploaded.

We conclude that the issue has not changed. The issue, has, from the beginning, been whether or not Divsalar is a “printed publication” within the meaning of 35 U.S.C. § 311(b) and whether its publication date is early enough that it is citable against the ’781 Patent. As set forth above, there is substantial evidence that we find to be persuasive that Divsalar qualifies as a “printed publication” in accordance with 35 U.S.C. § 311(b). Furthermore,

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we conclude, based on a preponderance of evidence of record that the Divsalar was published prior to the earliest effective date of the '781 Patent. Divsalar is therefore citable as a "printed publication" against the '781 Patent.

Petitioner correctly notes that the Decision to Institute did not limit Petitioner to arguing any particular portion of § 102. Our Decision to Institute (Paper 18) orders a trial to be conducted based on the challenge: "claims 1 and 2 as anticipated by Divsalar." Patent Owner has had clear notice as to the basis for challenge. Accordingly, Patent Owner's requested relief is denied.

3. Strike Jezek Declaration

Exhibit 1076 is a declaration submitted by Timothy Jezek, identified as in-house counsel for Petitioner Hughes Network Systems, LLC. The Declaration was filed on October 28, 2015 along with Petitioner's Reply to Patent Owner's Response. Patent Owner asks that we expunge Exhibit 1076 as being untimely, thereby providing no opportunity for Patent Owner to challenge it. Mot. 9–11.

According to Patent Owner, Petitioner should have sought authorization to submit the Jezek Declaration prior to the filing of Patent Owner's last formal briefing. Petitioner earlier presented (March 18, 2015) an identical declaration as Exhibit 1070 in support of Petitioner's Reply Brief Regarding Identification of Real Parties-in-Interest. Paper 15. After the original submission of the Jezek Declaration, Patent Owner asked the Board to expunge the unauthorized exhibit or to authorize cross examination of Mr. Jezek. The Board expunged Exhibit 1070. Paper 21.

Patent Owner argues that its Preliminary Response put Petitioner on notice that it disputes that the Petition properly identifies all real parties-in-

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interest. Prelim. Resp. 3–14. According to Patent Owner, Petitioner should have understood as early as March 2015, well before institution, that the Jezek Declaration might have been required to rebut Patent Owner’s argument in its Preliminary Response. *See* Paper 15, 5 (citing Ex. 1070). Yet Patent Owner argues, once trial was instituted, Petitioner never requested authorization to file a motion to submit supplemental information pursuant to 37 C.F.R. § 42.123, which would have allowed Patent Owner to address the Jezek Declaration in its last substantive paper, the Patent Owner response. Rather, Patent Owner argues Petitioner filed the Jezek Declaration after Patent Owner could no longer respond with its own argument or evidence.

Patent Owner argues that there was ample opportunity earlier for Petitioner to submit the Jezek Declaration – twice. Petitioner could have requested authorization to file the Jezek Declaration in March 2015. It did not. After the declaration was expunged, Petitioner could have timely filed a request to submit supplemental information. It did not. Patent Owner argues that Petitioner’s inclusion of the Jezek Declaration with its Reply avoids the sanction of the Board’s previous ruling (Paper 21), and Patent Owner asks that we not endorse Petitioner’s abuse of process and instead should strike the exhibit. 37 C.F.R. § 42.12(a)(6) & (b)(2). Alternatively, Patent Owner asks the Board to expunge the Jezek declaration as an unauthorized motion pursuant to 37 C.F.R. § 42.123.

Petitioner argues that in its Patent Owner Response to the Petition, Patent Owner continued to assert that the Petition did not name all real parties-in-interest. Now, Petitioner argues Patent Owner seeks to exclude the only direct evidence offered on this issue by either party—a declaration by Timothy Jezek, in-house counsel for Petitioner, which responds to the

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Patent Owner's unfounded assertion that Dish is an unnamed real party-in-interest. Mot. 9 (citing Exhibit 1076 ("Jezek Declaration")).

We find that Petitioner is allowed to fully reply to Patent Owner's arguments made in response to the Petition. 37 C.F.R. § 42.23(b) (The reply may "respond to arguments raised in the corresponding opposition or patent owner response."). The submission of rebuttal evidence with Petitioner's reply is both permitted and customary. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1078 (Fed. Cir. 2015) (affirming denial of motion to exclude declaration in support of petitioner's reply brief that responds to the patent owner's response to the petition).

Notably, Patent Owner does not allege that the Jezek Declaration raises any new issue. For example, there is no allegation that the Jezek Declaration was necessary to establish a prima facie case of unpatentability. Petitioner correctly identified each RPI in the Petition as required—the rebuttal evidence submitted in response to Patent Owner's allegations to the contrary merely confirms this fact. We note that Patent Owner seems to agree that the content of the Jezek Declaration "might rebut" its argument related to identification of the real party-in-interest. Paper 32, 10.

Patent Owner's only complaint appears to be that it cannot respond to Petitioner's Reply "with its own argument or evidence." *Id.* This is specious. First, Patent Owner did not even attempt to cross-examine or submit observations on that cross-examination, as permitted by the Scheduling Order and TPG. *See* Paper 19, 5 ("A motion for observation on cross-examination provides the parties with a mechanism to draw the Board's attention to relevant cross-examination testimony of a reply witness because no further substantive paper is permitted after the reply."). Second, if such argument or evidence were likely to be fruitful, Patent Owner could

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have sought leave for a sur-reply. *See* Belden at 1081 (“[A]lthough no rule provides patent owners the right to file surreplies to a petitioner’s Reply, the Board has allowed such surreplies in *inter partes* reviews.”).

Finally, the substance of the Jezek Declaration was no surprise. As Patent Owner admits, the Jezek Declaration mirrors the declaration that it moved to expunge from the record prior to institution. Paper 32, 9. Patent Owner was well aware of Petitioner’s position, which it had the opportunity to address as part of its response to the Petition. However, Patent Owner chose to simply reassert the same arguments already rejected by the Board in the Institution Decision.

Therefore, Patent Owner has failed to carry its burden on its motion to strike.

The record shows that Petitioner submitted the Jezek Declaration along with its Reply to respond directly to the Patent Owner argument that not all RPIs were initially named by the Petitioner. Patent Owner’s relief is therefore denied.

4. Exclude Exhibits 1001-1004, 1007–1009, 1012, 1013, 1017–1021, 1023, 1030, 1032–1036, 1038–1040, 1043-1044, 1046–1056, 1058, 1059, 1061–1063, 1065, and 1066, and Paragraphs 13–29, 34–38, and 40–83 of Exhibit 1060.

Patent Owner requests that we exclude Exhibits 1001–1004, 1007–1009, 1012, 1013, 1017–1021, 1023, 1030, 1032–1036, 1038–1040, 1043-1044, 1046–1056, 1058, 1059, 1061–1063, 1065, and 1066, as well as paragraphs 13–29, 34–38, and 40–83 of Exhibit 1060. According to Patent Owner, these exhibits and paragraphs 1) are not discussed, relied upon, or cited in the petition or anywhere else in the record; and 2) are irrelevant and

unduly prejudicial. Mot. 11–12 (citing Ex. 2032, 1–3).

Petitioner argues that contrary to Patent Owner’s assertion, the listed exhibits are all discussed, relied upon and cited either in the Petition, Reply or supporting declarations. Paper 35 lists examples of citation. *See, e.g.*, Pet. 5 (citing prosecution histories and related patents in the ’781 Patent family); Pet. 23 (citing Ex. 1038); Pet. Reply 16 (citing Exs. 1042, 1060); Ex. 1010 (Pfister Decl.) ¶ 2 (citing prosecution histories and related patent family); *id.* ¶ 24 (citing Ex. 1061); *id.* ¶ 26 (citing Ex. 1062); *id.* ¶ 29 (citing Exs. 1012, 1066); *id.* ¶ 30 (citing Ex. 1032, 1063); *id.* ¶ 40 (citing Ex. 1018); *id.* ¶ 41 (citing Exs. 1013, 1017, 1019, 1033, 1043, 1047); *id.* ¶ 106 (citing Ex. 1023). Additionally, Exhibits 1021, 1036, and 1060 are actually cited in Patent Owner’s filings. Prelim. Resp. 3 n.3, 39.

We note that each of these Exhibits was listed as such in the Petition. Pet. iii–viii. We fail to see how the Board would be prejudiced by these exhibits which appear to be mostly file histories and patents related to the ’781 Patent at issue.

As to paragraphs 13–29, 34–38, and 40–83 of Exhibit 1060, Patent Owner has not provided persuasive reasoning as to why the Board would be confused or prejudiced by those paragraphs.

Therefore, we deny Patent Owner’s requested relief as to these exhibits.

*5. Exclude Exhibits 1031, 1041, 1042, 1057, and
Paragraphs 30–33 of Exhibit 1060*

Patent Owner moves that we exclude exhibits 1031, 1041, 1042, and 1057, and paragraphs 30–33 of Exhibit 1060. We summarize these exhibits in the following table.

Exhibit	Content
1031	“New results on serial concatenated and accumulated-convolutional turbo code performance” by Audrey M. Viterbi and Andrew J. Viterbi
1041	McKay “Recent Results”
1042	“Sparse Graph Codes” by McKay
1057	Pfister paper citing Divsalar
1060 ¶¶ 30–33	Dr. McKay Declaration describing his and other authored papers posted to his website.

According to Patent Owner, these exhibits were filed with the Petition but were not cited, discussed, or otherwise relied on in the Petition. The record reflects that these exhibits are among those listed in the Petition at pages iii–viii (Exhibit List).

Patent Owner states that it timely objected to the exhibits within ten business days of institution, based on Federal Rules of Evidence (“FRE”) 401 and 403. Mot. 12. Patent Owner filed a copy of its objection as Exhibit 2032. Exhibit 2032 states that

[e]ach of the exhibits listed is not cited in the petition that initiated this proceeding. As such, each of these exhibits is not relevant to the instituted ground of review or any other aspect of this proceeding as it has no tendency to make a fact more or less probable than it would be without the evidence. Moreover, each of these exhibits is additionally not relevant to the instituted ground because any asserted facts to which the exhibit relates are of no consequence in determining this proceeding.

According to Patent Owner, Petitioner relied on the exhibits for the first time in its reply (Pet. Reply 16). Patent Owner indicates that it timely renewed its objections to these exhibits, based on FRE 401 and 403, to

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provide updated reasoning for the objections in view of Petitioner's new reliance on them. Paper 30, 2–3.

Patent Owner argues that Petitioner relies on Exhibits 1031, 1041, 1042, 1057 and 1060 (¶¶ 30–33) in its reply to support its improper and belated argument that Divsalar is § 102(a) prior art. Pet. Reply, 16.

According to Patent Owner, because the Petition does not assert Divsalar as § 102(a) prior art, these exhibits do not support the asserted April 30, 1999 publication date, so each of these exhibits cannot be relevant to the instituted ground of review as they have no tendency to make a fact more or less probable than it would be without the evidence. Furthermore, according to Patent Owner, Exhibits 1031, 1041, 1042, 1057 and 1060 (¶¶ 30–33) are untimely relied upon and unreliable, and more likely to mislead or confuse than have probative value. Patent Owner argues each of these exhibits should also additionally be excluded pursuant to FRE 403, which reads as follows.

Rule 403. Excluding Relevant Evidence for Prejudice, Confusion, Waste of Time or Other Reasons. The court *may* exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.

We do not find these exhibits to be prejudicial or confusing and decline to exercise our discretion to exclude them. In fact, we find these exhibits to be helpful in understanding background and context related to the advances described in the '781 Patent and in understanding the community of those who might be considered to be skilled in the art to which the '781 Patent pertains.

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The dangers guarded against by FRE 403 are not present in this case. There is no jury that might be prejudiced or confused. Nor has significant time been wasted in reading and understanding these exhibits. Therefore Patent Owner's requested relief is denied.

III. CONCLUSION REGARDING PATENTABILITY

For the foregoing reasons, we determine that Petitioner has established by a preponderance of the evidence that claims 1 and 2 of the '781 Patent are anticipated by Divsalar.

IV. ORDER

For the reasons given, it is

ORDERED that Patent Owner's Motion to Strike and Exclude is DENIED.

FURTHER ORDERED that claims 1 and 2 are unpatentable as anticipated by Divsalar;

FURTHER ORDERED that, that, because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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PETITIONER:

Eliot D. Williams
eliot.williams@bakerbotts.com

G. Hopkins Guy III
hop.guy@bakerbotts.com

Baker Botts, LLP

PATENT OWNER:

Michael T. Rosato
mrosato@wsgr.com

Matthew A. Argenti
margenti@wsgr.com

Wilson Sonsini Goodrich & Rosati