

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC. and
TELEFONAKTIEBOLAGET LM ERICSSON,
Petitioner,

v.

INTELLECTUAL VENTURES I LLC,
Patent Owner.

Case IPR2014-01149
Patent 6,023,783

Before JOSIAH C. COCKS, WILLIAM A. CAPP, and
DAVID C. McKONE, *Administrative Patent Judges*.

CAPP, *Administrative Patent Judge*.

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

Ericsson Inc. and Telefonaktiebolaget LM Ericsson, (collectively “Ericsson”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 6–12, 18–22, 25, 26, 43–49, 55–59, 62, and 63 of U.S. Patent No. 6,023,783 (Ex. 1001, the “’783 patent”). We issued a Decision to Institute an *inter partes* review of claims 18–22, 25, 26, 43, 44, 46–49, 55–59, 62, and 63 of the ’783 patent. Paper 8 (“DI”). After institution of trial, Patent Owner Intellectual Ventures I LLC (“Intellectual Ventures”) filed a Patent Owner’s Response (Paper 33, “PO Resp.”) and Ericsson filed a Petitioner’s Reply (Paper 38, “Reply”). We have jurisdiction under 35 U.S.C. § 318(a).

The instant case came before the Board for a regularly scheduled oral hearing on the merits on August 26, 2015, the transcript of which is entered as Paper 65 (“Tr.”). Also before the Board are the following matters:

- Petitioner’s Objection to Patent Owner’s Evidence (Paper 37);
- Patent Owner’s Objection to Petitioner’s Evidence (Paper 42);
- Petitioner’s Motion to Exclude Evidence (Paper 44, 49, 60);
- Patent Owner’s Motion to Exclude Evidence (Papers 45, 51, 58);
- Patent Owner’s Motion to Withdraw Challenged Claims (Paper 52, 62, 64, and 66).

After considering the evidence and arguments of counsel and for the reasons set forth below, we determine that Ericsson has met its burden of showing, by a preponderance of the evidence, that claims 18–22, 43, 44, and 46–49 of the ’783 patent are unpatentable. Ericsson has not met its burden of showing that claims 25, 26, 55–59, 62 and 63 are unpatentable.

Related Proceedings

The '783 patent is the subject of two IPR proceedings. The first such proceeding is the instant proceeding in which Petitioner Ericsson initially challenged claims 18–22, 25, 26, 43, 44, 46–49, 55–59, 62, and 63 of the '783 Patent. The second such IPR Proceeding is *Ericsson Inc. v. Intellectual Ventures II LLC*, IPR2014-00921 (PTAB) in which the Petitioner Ericsson challenges claims 1–5, 23–24, 38–42, and 60–61 of the '783 Patent.

The '783 patent is a patent-in-suit in one or more of the following United States District Court patent infringement actions:

Intellectual Ventures I LLC v. AT&T Mobility LLC, 1-13-cv-01668 (D. Del. 2013).

Intellectual Ventures I LLC v. Leap Wireless Int'l, 1-13-cv-01669 (D. Del. 2013).

Intellectual Ventures I LLC v. Nextel Operations, 1-13-cv-01670 (D. Del. 2013).

Intellectual Ventures I LLC v. T-Mobile USA Inc., 1-13-cv-01671 (D. Del. 2013).

Intellectual Ventures I LLC v. United States Cellular, 1-13-cv-01672 (D. Del. 2013).

I. BACKGROUND

A. The '783 Patent (Ex. 1001)

The '783 patent, entitled *Hybrid Concatenated Codes and Iterative Decoding*, relates to error correcting codes. Ex. 1001, 1:12. The '783 patent describes “Related Art” as being concerned with “[t]urbo codes,” which are “binary error-correcting codes built from the parallel concatenation of two recursive systematic convolutional codes and using a feedback decoder.” *Id.* at 1:14–17. The '783 patent characterizes its disclosed invention as

“encompass[ing] several improved turbo code apparatuses and methods.”
Id. at 1:66–67.

By way of explanation, the '783 patent presents Figure 1, depicted below, which is represented as “Prior Art”:

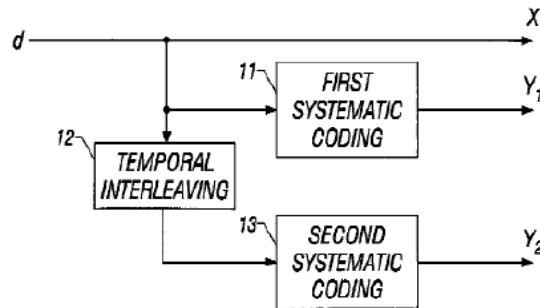


FIG. 1
(Prior Art)

As shown in the above-noted figure:

Each source data element d to be coded is coupled to a first systematic coding module **11** and, through a temporal interleaving module **12**, to a second systematic coding module **13**. The coding modules **11** and **13** may be of any known systematic type, such as convolutional coders, that take into account at least one of the preceding source data elements in order to code the source data element d .

Id. at 1:27–34. The '783 patent further explains that “an important aspect of prior art turbo code encoders is that they transmit a data element X equal to input source data element d .” *Id.* at 1:53–55.

Figure 5 of the '783 patent is reproduced below and depicts an embodiment according to the invention of that patent:

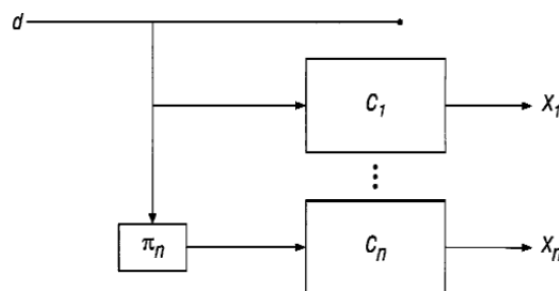


FIG. 5

Figure 5 illustrates a diagram of a turbo encoder that includes similar features to those of the prior art, and describes that “encoded parity elements X_n ,” i.e., encoded data, are transmitted from coding modules C, with at least one interleaver π_n . *Id.* at 13:63–66. According to the ’783 patent, the invention disclosed therein is distinguished from the prior art because the turbo encoder structure of the patent “outputs *only* encoded parity elements X_n from the coding modules C—the original data source elements d are not transmitted or stored.” *Id.* (emphasis added.)

B. The Challenged Claims

Ericsson challenges claims 18–22, 25, 26, 43, 44, 46–49, 55–59, 62, and 63. Claims 18, 25, 43, 55, and 62 are independent claims. Claim 18 is illustrative of the subject matter of the challenged claims and is reproduced below:

18. A system for error-correction coding of a source of original digital data elements, comprising:

- (a) a first encoder, coupled to the source of original digital data elements, for generating a plurality of coded intermediate output elements derived from the original digital data elements;
- (b) at least one interleaver, each coupled to at least one of the plurality of coded intermediate output elements, for modifying the order of the coded intermediate output elements to generate respective interleaved output elements; and
- (c) at least one systematic recursive convolutional encoder, each coupled to at least one interleaver, for generating a set of coded output elements derived from the interleaved output elements from each coupled interleaver.

C. The Asserted Grounds of Unpatentability

We instituted a trial on Ericsson's challenges to claims 18–22, 25, 26, 43, 44, 46–49, 55–59, 62, and 63 of the '783 patent as obvious under 35 U.S.C. § 103 over various combinations of references listed below and as further supported by the Declaration of Mark R. Lanning (Ex. 1003a).

References	Claims challenged
Berrou ¹ and Forney ²	43–46
Berrou, Forney, and Ungerboeck ³	47 and 48
Berrou, Forney, Ungerboeck, and Massey ⁴	49
Deutsch ⁵ and Berrou	18, 19, 55 and 56
Deutsch, Berrou, and Ungerboeck	20, 21, 57 and 58
Deutsch, Berrou, Ungerboeck, and Massey	22 and 59
Divsalar, ⁶ Berrou, Forney, and Ungerboeck	25, 26, 62, and 63

¹ US Patent 5,446,747 to Berrou, issued August 29, 1995. (Ex. 1004).

² G. David Forney, Jr., *Convolutional Codes I: Algebraic Structure*, IT-16 IEEE TRANSACTIONS ON INFORMATION THEORY 720 (Nov. 1970) (Ex. 1005).

³ Gottfried Ungerboeck, *Trellis-Coded Modulation with Redundant Signal Sets Part 1: Introduction*, 25 IEEE COMMUNICATIONS MAGAZINE 5–11 (Feb. 1987) (Ex. 1007).

⁴ James L. Massey, *Coding and Modulation in Digital Communications*, ZÜRICH SEMINAR (1974) (Ex. 1010).

⁵ US Patent No. 4,907,233 to Deutsch, et al., issued March 6, 1990 (Ex. 1006).

⁶ D. Divsalar & F. Pollara, *Turbo Codes for Deep-Space Communications*, TDA PROGRESS REPORT 42-120, 29–39 (Feb. 15, 1995) (Ex. 1009).

II. MOTIONS TO EXCLUDE EVIDENCE

Ericsson and Intellectual Ventures each move to exclude evidence proffered by their respective opponents.

A. Ericsson's Motion to Exclude (Paper 44)

Ericsson moves to exclude paragraphs 60–65, 79, 80, and 93 from the declaration of Intellectual Ventures's expert, Dr. Cimini (Ex. 2009).

Paper 44, 1. The underlying controversy deals with Dr. Cimini's declaration and deposition testimony concerning a printed publication referred to as Robertson CMS (Ex. 1027).⁷

Ericsson filed its Petition on August 4, 2014. Paper 1. We subsequently entered our Decision to Institute on January 28, 2015. Ericsson did not file Robertson CMS as an exhibit in support of its original Petition. On March 2, 2015, Ericsson contacted the Board to request authorization to file a motion for supplemental information. We held a conference call on March 5, 2015, and authorized Ericsson to file such a motion. Paper 13. On March 11, 2015, Ericsson moved the Board to submit supplemental information. Paper 14. The Robertson CMS reference was identified as one of the objects of Ericsson's motion. *Id.* 1, n.1. Intellectual Ventures opposed the motion. Paper 18. We denied Ericsson's motion to file Robertson CMS as supplemental information without prejudice to Ericsson's right to file it in another context, such as rebuttal evidence in support its Petitioner's Reply. Paper 19, 5.

Ericsson represents that it served Intellectual Ventures with a copy of Robertson CMS almost three months before Intellectual Ventures filed its

⁷ P. Robertson and T. Wörz, *Coded Modulation Scheme Employing Turbo Codes*, 31 ELECTRONICS LETTERS 1546–47 (Aug. 31, 1995).

Patent Owner's Response. Paper 44, 1. Intellectual Ventures filed its Patent Owner's Response on May 29, 2015. Paper 33. Contemporaneous therewith, Intellectual Ventures filed a declaration of its expert, Dr. Cimini. Ex. 2009. Dr. Cimini's declaration makes no mention of the Robertson CMS reference. *Id.* Dr. Cimini gave cross-examination deposition testimony in this case on July 1, 2015. Ex. 1033. He gave cross-examination in a related case on June 30, 2015.⁸ Dr. Cimini testifies that he did not consider Robertson CMS in forming his opinion in either case.⁹

Ericsson contends that Dr. Cimini's declaration testimony should be excluded because Dr. Cimini's failure to consider Robertson CMS renders his declaration testimony unreliable. Paper 44, 9. Essentially, Ericsson contends that, in the absence of considering Robertson CMS, Dr. Cimini's analysis of whether a person of ordinary skill in the art would have combined Berrou, Forney, and Ungerboeck to achieve the invention of claims 10, 11, 47, and 48 of the '783 patent is incomplete and, therefore, deficient. *Id.*

Ericsson further contends that it was deprived of a full and fair opportunity to cross-examine Dr. Cimini regarding the Robertson CMS reference at his deposition. Paper 44, 10.¹⁰ Ericsson accuses Intellectual Ventures's counsel of obstructing a fair cross-examination of Dr. Cimini by repeatedly interjecting speaking objections, thereby coaching Dr. Cimini not

⁸ IPR2014-00921, Exhibit 1031, Cimini Deposition, 196:13–197:12. IPR2014-00921 is a related proceeding to the instant IPR and involves the same parties and the same '783 patent.

⁹ *Id.*

¹⁰ "Patent Owner's counsel's deliberate decision to withhold Robertson CMS from Dr. Cimini." *Id.*

to answer questions about Robertson CMS at his deposition. *Id.* In addition, Ericsson essentially accuses Intellectual Ventures's counsel of deliberately withholding knowledge of Robertson CMS from Dr. Cimini so that Dr. Cimini would be unprepared to answer questions regarding Robertson CMS at his deposition. *Id.*

Intellectual Ventures counters that Ericsson's motion is procedurally improper because Ericsson did not timely serve an objection to Dr. Cimini's declaration. Ordinarily, a party is required to timely serve objections to an opposing party's evidence in order to preserve the right to file a motion to exclude. *See* 37 C.F.R. § 42.64. However, our governing rules allow the Board to waive such requirement. *See* 37 C.F.R. § 42.5.

Intellectual Ventures argues that "Dr. Cimini did not address Robertson CMS [in his declaration] because he had no obligation to opine on a document not discussed in the Petition—thus, not in the record." Paper 49, 2. Intellectual Ventures points out that, despite counsel's awareness of Robertson CMS prior to Dr. Cimini's deposition and declaration testimony, it was not actually evidence of record in this proceeding until it was filed with Petitioner's Reply. *Id.* at 3. Intellectual Ventures also argues that Dr. Cimini "answered every question posed to him" and that Ericsson "had ample opportunity to cross-examine Dr. Cimini." *Id.* at 5, 7.

The complete exclusion of Dr. Cimini's testimony is not warranted or necessary here. Intellectual Ventures argues that the instant dispute concerning Dr. Cimini's testimony should not affect the admissibility of his opinion, but merely the weight the Board accords his opinion. Paper 49, 12. This is the path we choose to follow. By shielding Dr. Cimini from the

Robertson CMS reference so that he did not address it in his declaration and was unprepared to testify about it at this deposition, Intellectual Ventures deprived itself of an opportunity to respond to Ericsson's case.

Accordingly, we DENY Ericsson's motion to exclude 60–65, 79, 80, and 93 of Dr. Cimini's declaration testimony (Ex. 2009), but discount the weight to be given such testimony in light of the foregoing discussion.

B. Intellectual Ventures's Motion to Exclude (Paper 45)

Intellectual Ventures moves to exclude Exhibit 1036 and Exhibit 1037. Paper 45, 1. Intellectual Ventures also moves to exclude the declaration testimony of Scott Bennett (Exhibit 1038) that attempts to lay a foundation for the admission of Exhibits 1036 and 1037. Paper 45. Ericsson opposes the motion. Paper 51.

Exhibit 1036 is entitled "High Gain Coding Schemes for Space Communications" and appears, on its face, to have been published by Signal Processing Research Institute of the University of South Australia in 1995. Ex. 1036.¹¹ Authorship of the document is attributed to Jean Yves Couleaud. *Id.* The document is 192 pages long and contains extensive page sequences of mathematical formulas. *Id.* at 15–18. The document has the appearance of having been professionally published as evidenced by its formatting, typesetting, chapter and subchapter divisions. It has an overall consistent appearance throughout its 192 page length. It cites at least 17 different references with dates ranging from 1974 to September of 1995. Ex. 1036, 77–78.

¹¹ Ericsson has filed two exhibits in this proceeding marked and labeled as Exhibit 1036. For purposes of this decision, we will distinguish between the two exhibits based on their content.

Exhibit 1037 is entitled “Serial Concatenated Systematic Convolution Codes for Space Communications” and appears, on its face, to be a letter submitted to the IEEE Transactions on Communications. Ex. 1037.¹² It bears the date of 6 October 1995 on the face page of the document. *Id.* Authorship of the document is attributed to Jean Yves Couleaud and Steven S. Pietrobon. *Id.* Apart from the title page, Exhibit 1037 contains two and one-half pages of text, a half page of end-note reference citations, and two pages of figures. It cites to four references, dated from 1974 to September of 1995.

Scott Bennett declares that he is a retired academic librarian with 30 years of experience with various university libraries including the University of Illinois, Northwestern University, Johns Hopkins University, and Yale. Ex. 1038. Mr. Bennett declares that Exhibits 1036 and 1037 are documents that are readily available online. Ex. 1038. He declares that Exhibits 1036 and 1037 are complete and accurate copies downloaded from the Turbo Coding Home Page of the Institute for Telecommunication Research at the University of South Australia. *Id.* Attached to Mr. Bennett’s declaration is an email purportedly from Steven Pietrobon containing a statement that the website from which Exhibits 1036 and 1037 were obtained was a personal website managed by Mr. Pietrobon. Ex. 1038, Attachment 5.

Mr. Bennett observes and opines that Exhibits 1036 and 1037 are in a condition that creates no suspicion about their authenticity and that they are in a place where, if authentic, they would likely be. Ex. 1038, 3.

¹² Ericsson has filed two exhibits in this proceeding marked and labeled as Exhibit 1037. For purposes of this decision, we will distinguish between the two exhibits based on their content.

Intellectual Ventures argues that Exhibits 1036 and 1037 should be excluded because Ericsson has failed to establish that they are authentic and, secondly, because they contain hearsay. Paper 45, 7. Essentially, Intellectual Ventures argues that Mr. Bennett is not competent to testify concerning whether Exhibits 1036 and 1037 are authentic. Paper 45, 4. Intellectual Ventures argues that Bennett is not a custodian of Exhibits 1036 and 1037. *Id.* Intellectual Ventures also argues that Mr. Bennett lacks sufficient personal knowledge to authenticate the exhibits. *Id.* at 1.

With respect to the authenticity question, Ericsson posits that Mr. Bennett is an expert and, therefore, qualified to give expert opinion testimony as to the authenticity of Exhibits 1036 and 1037. Paper 51, 3–4. Ericsson argues that, under Federal Rule of Evidence 703, Mr. Bennett may base his opinion on facts or data that need not otherwise be admissible. *Id.* Ericsson also urges us to consider that the documents were almost 20 years old at the time that they were tendered into evidence and, therefore, almost qualify for authenticity treatment under the “ancient documents” provision of Federal Rule of Evidence 901(b)(8).

Rule 901 of the Federal Rules of Evidence provides that the requirement of admissibility is satisfied by evidence sufficient to support a finding that the material in question is what its proponent claims. The burden of proof for authentication is “slight.” *Lexington Ins. Co. v. Western Pennsylvania Hosp.*, 423 F.3d 318, 329 (3d Cir. 2005). Rule 901(b) lists nine non-exclusive examples of authentication techniques. *See United States v. Simpson*, 152 F.3d 1241, 1249–50 (10th Cir. 1998). Rule 901(a) merely prescribes that a proponent produce sufficient evidence of authenticity to support a prima facie case that the item is genuine.

See Rickets v. City of Hartford, 74 F.3d 1397, 1409–11 (2d Cir. 1996).

Conflicting evidence of authenticity goes to weight, not admissibility, as long as some reasonable person could believe that the item is what it is claimed to be. *Id.* at 1411.

In the instant case, Exhibit 1036 is a 192 page document that appears to be internally consistent with no obvious indication of having been fabricated or altered. A professional librarian testifies that the exhibit was obtained from a place where such a document is expected to be found.

Intellectual Ventures presents no affirmative evidence that casts doubt on the authenticity of the exhibit. Given the foundation laid by Ericsson, which is essentially unrebutted by Intellectual Ventures, we think that a reasonable person could believe that Exhibit 1036 is what it is claimed to be.

Exhibit 1037 is a closer case, because it is much shorter than Exhibit 1036 and, therefore, lacks some of the indicia of authenticity that can be discerned from its internal structure and consistency. Nevertheless, given the foundation laid by Ericsson and the lack of opposing evidence from Intellectual Ventures, we think that a reasonable person could believe that Exhibit 1037 is what it is claimed to be.

Next, Intellectual Ventures attacks the document exhibits (1036 and 1037) under the hearsay rule. Paper 45, 1. Intellectual Ventures contends that the dates that appear on the face of the exhibits constitute inadmissible hearsay when offered for the truth of the matter asserted. *Id.* at 7.

Intellectual Ventures similarly contends that Mr. Bennett's testimony concerning the date of preparation of the exhibits is hearsay. *Id.* at 3.

The dates on the face of Exhibits 1036 and 1037 are during 1995. The filing date of the '783 patent is May 15, 1997. Ex. 1001. Mr. Bennett relays

that Mr. Pietrobon, the author and custodian of Exhibit 1037, states that he loaded the exhibit onto IT's Turbo Coding Home Page in October 1995. Ex. 1038, 3, Attachment 6. As corroborating evidence, Mr. Bennett attaches a computer printout that indicates that the underlying computer file for Exhibit 1037 was last modified on September 4, 1996. Ex. 1038, 3, Attachment 7.

With respect to Exhibit 1036, Mr. Bennett, testifies that he made inquiry of Mr. Pietrobon, the custodian of the ITR Turbo Coding Home Page, who relayed to him that Exhibit 1036 was uploaded onto the internet site in September 1995. Ex. 1038, 3. Mr. Bennett obtained the statement from Mr. Pietrobon in writing in the form of an email message.

Id. Attachment 6.

Intellectual Ventures is technically correct that Mr. Bennett lacks personal knowledge of the origin and initial publication dates of Exhibits 1036 and 1037. Intellectual Ventures is also technically correct that the statements of Mr. Pietrobon, both oral and written, relayed by Mr. Bennett in his declaration, are hearsay because they are out of court statements of a declarant (Pietrobon) offered for the truth of the matter asserted, at least so far as the date indicated on the face of the two exhibits.

Nevertheless, we will allow Exhibits 1036 and 1037 into evidence in this proceeding under the residual exception provision of Federal Rule of Evidence 807.¹³ Trial courts are accorded wide discretion in applying the

¹³ The hearsay exception need only apply to evidence of the date of publication of the exhibits. The hearsay rule does not apply to the content of Exhibits 1036 and 1037 as they are not offered for the truth of the matter asserted, but merely as verbal acts of what is stated therein, whether or not true.

residual exception. *Doe v. United States*, 976 F.2d 1071, 1076–77 (7th Cir. 1992), cert. denied 510 U.S. 812 (1993); *United States v. North*, 910 F.2d 843, 909 (D.C. Cir. 1990) cert. denied 500 U.S. 941 (1991). In admitting the exhibits, we take into account the following considerations. Given the timing of its introduction, Intellectual Ventures had a fair opportunity to prepare to contest the use of the evidence. Secondly, there are circumstantial guarantees of trustworthiness, including that dating of the documents is corroborated by machine generated data. *See United States v. Lamons*, 532 F.3d 1251, 1264 (11th Cir. 2008) cert denied 129 S.Ct. 524 (2008) (raw data generated by machines are not “statements” subject to the hearsay rule). Furthermore, at the time of issuing this decision, the documents qualify as ancient documents under Federal Rule of Evidence 803(16) as they are now more than 20 years old. Additionally, the purported dates of authorship are internally consistent with the dates of the references cited therein and are particularly proximate in time to the most recent references cited therein. There is no evidence that the authors of Exhibits 1036 and 1037 have any interest in this litigation and, therefore, they have no motive to falsify the dates of the documents. The investigation into the authenticity of Exhibits 1036 and 1037 by Mr. Bennett, a professional librarian, provides an additional circumstantial guarantee of trustworthiness.

Mr. Bennett’s statements are offered as evidence of a material fact, namely whether the teachings of Exhibits 1036 and 1037 would have been known by a person of ordinary skill in the art at the time of the invention. Mr. Bennett’s statements are more probative on the point for which it is offered than any other evidence that Ericsson could have procured through reasonable efforts, as the authors of Exhibits 1036 and 1037 are located in

Australia and, therefore, it would have been difficult to procure superior evidence, such as compelled testimony, through reasonable efforts. *See* Fed. R. Evid. 807. Finally, we determine that the general purposes of the Federal Rules and interests of justice will be served by admission of Mr. Bennett's testimony into evidence.¹⁴

Thus, based, in part, on the foundation laid by Mr. Bennett's testimony and accompanying exhibits to his declaration, we will admit Exhibits 1036 and 1037 under Federal Rule of Evidence 807, not as applied prior art *per se*, but for the limited purpose of showing the background knowledge of a person of ordinary skill in the art at the time of the invention. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013); *Ariosa Diagnostics v. Verinata Health, Inc.*, Case 2015-1215, slip op. 11–12 (Fed. Cir. Nov. 16, 2015).

In view of the foregoing, we DENY Intellectual Ventures's motion to exclude Exhibits 1036, 1037, and 1038.

III. DISPOSITION OF CLAIMS 55–59

A. Ericsson's Motion To Withdraw Challenge to Claims 55–59

The parties' dispute over the procedural aspects relative to the disposition of claims 55 through 59 has a long and well-documented history in this proceeding. *See* Papers 27, 29, 31, 32, 34, 36, 52, and 62.

After we instituted trial, Ericsson brought a motion to correct its Petition with respect to its challenge to claim 55–59. Paper 27. Ericsson

¹⁴ We do not reach the question of whether Mr. Bennett's testimony is admissible as an expert opinion under Rules 702 and 703. *See United States v. Cormier*, 468 F.3d 63, 73 (1st Cir. 2006) (an expert must do more than merely serve as a conduit for hearsay).

alleged that it desired to correct a “clerical mistake.” *Id.* at 1. Ericsson represented that it first became aware of the situation requiring correction of this so called “clerical mistake” during preparation for Mr. Lanning’s deposition. *Id.*

We denied Ericsson’s motion, among other things, based on our determination that Ericsson’s desired correction was more substantive than clerical in nature. Paper 31, 12–13. We also expressed concerns regarding the timeliness of Ericsson’s request. *Id.* at 13.

Subsequently, Ericsson unilaterally filed a notice to withdraw its challenge to claims 55–59. Paper 32. We noted that Ericsson failed to obtain prior authorization from the Board to file such a notice and directed that the notice be expunged. Paper 34.

Ericsson then requested a teleconference with the Board and sought authorization to file a motion to withdraw its challenge to claims 55–59. Paper 36. We authorized Ericsson to file such a motion and directed Ericsson to explain whether its request implicated our statutory mandate to enter a final written decision. *Id.*; 35 U.S.C. § 318(a). At the time, we were lead to believe, by affirmative representations of Intellectual Ventures’s counsel, that Ericsson’s proposed motion would be unopposed. Paper 36.¹⁵

Ericsson filed its motion to withdraw on August 20, 2015. Paper 52. The challenged claims involved in the motion to withdraw are the same as

¹⁵ Intellectual Ventures’s position on this issue has vacillated from initialing demanding that Ericsson withdraw claims 55–59 from this IPR (Ex. 1036), to requesting the Board that the Petition be terminated as to claims 55–59 (Ex. 1037), to representing that it would not oppose Ericsson’s motion to withdraw (Paper 36), to now opposing the withdrawal of Ericsson’s challenge to these claims (Paper 64).

the claims in Ericsson's motion to correct its petition that we previously denied.¹⁶ Ericsson indicated that the motion was unopposed. *Id.* Subsequently, we were informed by Intellectual Ventures that the scope of relief requested in Ericsson's motion exceeded the scope of relief that Intellectual Ventures had agreed to. The pending motion remained unresolved at the time the parties appeared for oral hearing on August 26, 2015. Tr. 82:12–89:12. At the hearing, counsel for Intellectual Ventures requested permission to submit a brief in opposition to the motion. Tr. 89:1–8. We then entered an order authorizing Intellectual Ventures to file a brief in opposition to the motion. Paper 62, 3. We also authorized Ericsson to file a reply to such opposition. *Id.*

Ericsson contends that the Board has authority to allow the withdrawal of challenged claims following institution of a trial. Paper 52, 3. For this, Ericsson primarily relies on the Board's decision in *GTNX, Inc. v. INTTRA, Inc.*, Case CBM2014-00072, slip op. at 4–5 (PTAB Dec. 10, 2014) (Paper 20). The Board's decision in *GTNX* has no bearing on the instant matter. In *GTNX*, it was undisputed that the Petitioner had filed a declaratory judgment action seeking a declaration of invalidity of the subject patent prior to filing a petition under the Covered Business Method provisions of the America Invents Act. *Id.* at 3. *GTNX* went to an issue of whether the Board had statutory authority to hear the case in the first instance in view of 35 U.S.C. § 325(a)(1). The Board decided that the statutory prohibition of filing a CBM after first filing declaratory judgment

¹⁶ “Petitioners request permission to withdraw claims 55–59 to address the error described previously in Petitioners' Motion to Correct Petition filed on April 30, 2015 (Paper 27), which was denied by the Board on May 19, 2015 (Paper 31).” Paper 52, 1.

action could not be waived and, thus, required termination of the proceeding. *Id.* at 4 (citing *SecureBuy, LLC v. CardinalCommerce Corp.*, Case CBM2014-00035 (PTAB Apr. 25, 2014) (Paper 12) (Precedential)).

In the instant case, we instituted a trial based on our determination that Ericsson had made the requisite showing of a reasonable likelihood of prevailing on its challenge that claims 55–59 are unpatentable. DI 21–23. The prospect that some of the evidence that Ericsson presented, and that we relied on in finding such reasonable likelihood, turned out to be incorrect after being exposed to cross-examination, does not serve to revoke retroactively our statutory authority to institute a trial. Instead, we will proceed to hear all of the evidence presented by both parties and then issue a final written decision with respect to the patentability of any claim challenged by the petitioner. *See* 35 U.S.C. § 318(a). Thus, we reject Ericsson’s argument that we must terminate this IPR proceeding, without prejudice and only in part, just because Ericsson now admits that its evidentiary presentation is deficient.

Next, Ericsson argues that we are compelled to permit Ericsson to withdraw its challenge to claims 55–59, because 35 U.S.C. § 318(a) only directs us to issue a final written decision if an inter partes review is “not dismissed” under this Chapter 31. However, claims 55–59 are not currently dismissed and Ericsson cites no applicable provision under Chapter 31 compelling or even authorizing “dismissal” under the fact situation presented here.

Under 35 U.S.C. § 317, an IPR can be terminated upon the joint request of the petitioner and patent owner in the event of settlement. However, in the instant case, there has been no settlement, there has been no

joint request, and there has been no submission of a written agreement in accordance with 35 U.S.C. § 317(b). Thus, Ericsson cannot avail itself of the settlement provision in chapter 31 to obtain the relief it now seeks.

Under 37 C.F.R. § 42.73, a party may obtain termination of a proceeding by requesting entry of adverse judgment. However, we do not interpret Ericsson's request as a request for entry of adverse judgment. To the contrary, we view Ericsson's motion as an effort to prevent entry of an adverse judgment under circumstances where Ericsson reserves the right to challenge the patentability of claims 55–59, in this or another forum.

Finally, Ericsson relies on our extraordinary and discretionary powers under 37 C.F.R. § 42.5(a) as a basis for grant of the relief sought. In denying Ericsson's previous motion to correct the petition, we considered whether it was an appropriate exercise of our extraordinary powers to allow Ericsson to correct its petition. Paper 31, 14–15. We concluded that it was not. *Id.* Many of the same considerations that informed our decision to deny Ericsson's motion to correct its petition also militate against a grant of relief in the instant situation.

In its motion to correct the petition as with the instant motion to withdraw, Ericsson represents that it first became aware of the error in Lanning's declaration during preparation for his April 15, 2015, deposition. Paper 27, 1; Paper 52, 2. However, Intellectual Ventures brought the deficiency in the Petition with respect to claim 55 to Ericsson's attention in its Preliminary Response. Paper 6, 38–39. Intellectual Ventures's Preliminary Response was filed on November 13, 2014. Paper 6. Nevertheless, Ericsson claims to have been unaware of the problems with Mr. Lanning's analysis of claim 55 until just before Mr. Lanning gave his

deposition on March 3, 2015, almost four months later. Similarly, in our Decision to Institute, we noted that Intellectual Ventures had argued that a Reed-Solomon encoder cannot output systematic convolutional encoded intermediate output elements. DI 21. We gave little weight to that attorney argument at the institution stage, because it was as yet unsupported by evidence. *Id.* Nevertheless, our Decision to Institute should have apprised Ericsson of the problem with its challenge to claim 55. Our Decision to Institute was entered on January 28, 2015, yet Ericsson claims to have been unaware of the problem until March 3, 2015, five weeks later. Ericsson did not move to correct its petition until April 30, 2015, almost six months after Intellectual Ventures filed its Preliminary Response. Paper 27.

Two days after the Lanning deposition, on March 5, 2015, we held a conference call at the request of Ericsson to entertain a request to file a motion to submit supplemental information. Paper 13. We granted the request and Ericsson filed its motion to submit supplement information on March 11, 2015. Paper 14. In its motion, Ericsson requested, among other things, authorization to file the Robertson CMS reference as supplemental information. *Id.* Even though this teleconference took place after Mr. Lanning's deposition where he had conceded the error in his claim 55 analysis, Ericsson made no mention of a need to correct its Petition or Mr. Lanning's supporting declaration testimony with respect to claim 55.

For purposes of the instant proceeding, we do not reach the issue of whether our authority under the extraordinary powers granted by 37 C.F.R. § 42.5 extends to allowing a petitioner to withdraw challenged claims from an IPR after determining that it is unlikely that it will prevail on the merits. For purposes in this decision, it is sufficient to note that, even if we had such

discretion, we would choose not to exercise it under the facts and circumstances presented here. We find that Ericsson failed to exercise diligence in discovering the problem with its Petition and, after discovery, was dilatory in bringing the matter to our attention. In view thereof, we are not inclined to exercise our discretion favorably toward Ericsson.

Turning now to the facts and circumstances of the instant case, we think that Ericsson's lack of diligence in discovering and then seeking to correct the acknowledged defect in its Petition has allowed the case to progress to the point where entry of a final judgment and its attendant consequence of estoppel is appropriate. It is our opinion that a petitioner, having sought and obtained the institution of an IPR, upon a subsequent determination that it will likely suffer defeat, should not be able to withdraw its challenge to some or all of the claims, over a patent owner's opposition, in order to avoid the estoppel provisions of 35 U.S.C. § 315(e). The prospect that Ericsson's mistake may have been innocent and inadvertent does not alter the outcome here. The advancement of almost any litigation position that is ultimately unsuccessful can be characterized, in some manner, as an inadvertent mistake. Ericsson could have asserted its revised ground of unpatentability in a second IPR Petition and then sought consolidation of the two proceedings so that its revised, corrected position, if meritorious, could have prevailed before entry of adverse judgment and estoppel. However, it chose not to do so.

In view of the foregoing, we DENY Ericsson's motion to withdraw its challenge to claims 55–59.

B. Disposition of Claims 55–59 on the Merits.

Intellectual Ventures argues that the Reed-Solomon encoder relied on by Ericsson and its expert, Mr. Lanning, does not meet the first element of claim 55. PO Resp. 52. Intellectual Ventures points to cross-examination testimony from the deposition of Mr. Lanning where Ericsson’s expert essentially repudiated his declaration testimony underlying Ericsson’s challenge to claim 55–59. PO Resp. 52–53.

Ericsson concedes that the mistake in its Petition with respect to claims 55–59 is a “fatal flaw” and, consequently, it wants to remove those claims from the proceeding. Tr. 74:3–8,

a copy/paste error that originated in Mr. Lanning’s Declaration resulted in a deficient analysis of independent claims 55 and its dependent claims 56–59 . . . [a]t this point in the trial, both Patent Owner and Petitioner agree that the Petition is defective with respect to claim 55–59.

Paper 52, 5–6.

In view of the foregoing, we find that Ericsson has failed to carry its burden of proof with respect to the unpatentability of independent claim 55 and claims 56–59 that depend therefrom.

IV. CLAIM INTERPRETATION

Claims of unexpired patents are construed by applying the broadest reasonable interpretation in light of the specification. *See* 37 C.F.R. § 42.100(b); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1256 (Fed. Cir. 2007). Within this framework, terms generally are given their ordinary and customary meaning, as understood by a person of ordinary skill in the art, in the context of the entire patent disclosure. 504 F.3d at 1257.¹⁷

¹⁷ Citing *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

1. “*systematic convolutional encoder*” (Claims 18, 25, 43, 55, and 62)^{18,19,20,21}

Ericsson’s proposed construction of “systematic encoder”: an encoder is systematic when it outputs encoded data and the original data.

Pet. 8.

Intellectual Ventures’s proposed construction of “systematic convolutional encoder”: an encoder that generates parity bits based on the preceding data elements.

Prelim. Resp. 10.

In our Decision to Institute, we construed “systematic convolutional encoder” on a preliminary basis, as an encoder that may output both encoded data and also original data (or its equivalent). In the Decision to Institute, we criticized Ericsson’s proposed construction because it focused on what it means for a coding system to be systematic to the exclusion of how the adjective “convolutional” also modifies the word “encoder.” DI 8–9. Similarly, we criticized Intellectual Ventures’s proposed construction because it focused on what it means for a coding system to be “convolutional,” to the exclusion of what it means to be “systematic.” *Id.* at 9. In the Decision to Institute, we admonished the parties to give

¹⁸ Claim 18 claims a “systematic *recursive* convolutional encoder.” Ex. 1001, 25:49.

¹⁹ Claim 43 is a method claim that claims “systematic convolutional encoded output elements.” Ex. 1001, 29:57.

²⁰ Claim 55 is a method claim that claims “systematic convolutional encoded intermediate output elements.” Ex. 1001, 30:61–62.

²¹ Claim 62 is a method claim that claims “systematic convolutional encoded output elements.” Ex. 1001, 31:60–61.

attention to our points of criticism in their respective Patent Owner's Response and Petitioner's Reply. *Id.*

We instituted a trial on less than all challenged claims. DI. In particular, we did not institute a trial on claim 6. DI 14. In its Patent Owner's Response, Intellectual Ventures indicated that the Board need not construe this term to resolve the instituted grounds. PO Resp. 13. In its Petitioner's Reply, Ericsson simply states that it agrees with the Board's claim construction in the Decision to Institute. Reply 6.

The parties' respective positions, as developed in Intellectual Ventures's Patent Owner's Response and Ericsson's Reply do not rely on competing constructions of this term. Accordingly, we do not modify the construction of this term as set forth in our Decision to Institute.

2. “*coded output elements*” - “*encoded output elements*” (Claims 18, 19, 20, 22, 25, 43, 46, 47, 49, 55, 56, 59, and 62)²²

Ericsson's proposed construction: any data that is derived from data received and processed by a coder/encoder.

Pet. 8.

Intellectual Ventures's proposed construction: parity check elements output by a systematic convolutional encoder.

Prelim. Resp. 18.

In our Decision to Institute, we adopted Ericsson's proposed meaning of “coded output elements” as “any data that is derived from data received and processed by a coder or encoder.” DI 10. In its Patent Owner's Response, Intellectual Ventures indicates that construction of this term is not

²² Although some of the claims refer to “encoded output elements,” it is clear from the record that the terms “coded” and “encoded” are regarded as equivalent.

necessary to resolve the instituted grounds. PO Resp. 13. In its Reply, Ericsson expresses agreement with our construction in the Decision to Institute. Reply 6. Under the circumstances, we do not modify our construction of this term for purposes of this final decision.

Apart from the foregoing, neither party expressed a need for further claim construction. PO Resp. 12-13, Reply 6. We do not discern a need to construe any additional terms.

V. OBVIOUSNESS OVER COMBINATIONS BASED ON BERROU

Ericsson asserts that claims 43, 44, and 46–49 would have been obvious over Berrou in combination with one or more secondary references.

A patent is invalid for obviousness:

if the differences between the subject matter sought to be patented 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.

35 U.S.C. § 103. Obviousness is a question of law based on underlying factual findings: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the art; and (4) objective indicia of nonobviousness. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). Courts must consider all four Graham factors prior to reaching a conclusion regarding obviousness.

See Eurand, Inc. v. Mylan Pharms., Inc. (In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.), 676 F.3d 1063, 1076–77 (Fed. Cir. 2012). As the party challenging the patentability of the claims at issue, Ericsson bears the burden of proving obviousness by a preponderance of the evidence. *See* 35 U.S.C. § 316(e).

A. Scope and Content of the Prior Art

1. Berrou (Ex. 1004)

Claude Berrou is regarded as the inventor of modern turbo codes. Ex. 1001, 1:15–22. Berrou discloses a coding method where two distinct codes are used in parallel. Ex. 1004, 7:47–49. Each source data element d to be coded is directed towards a first coding module 11 and also toward a temporal interleaving module 12, which then feeds a second coding module 13. *Id.* at 7:50–53. There are then two coded data elements Y_1 and Y_2 coming from distinct coders 11 and 13. *Id.* at 7:54–56.

An essential feature of Berrou's invention is that the coded data elements Y_1 and Y_2 take account of the same source data elements d . *Id.* at 7:66–68. However, these are considered according to different sequences, through the use of interleaving techniques. *Id.* at 8:1–9. A data element X , that is equal to the source data element d , is transmitted systematically. *Id.* at 8:12–14. According to Berrou, this feature is necessary for decoding modules used in the invention. *Id.* at 8:14–15.

2. Forney (Ex. 1005)

Forney, published in 1970, discloses the fundamentals of convolutional coding. Ex. 1005, 1. It discloses a systematic convolutional encoder coupled to a plurality of input data lines. *Id.*, Fig. 7.

3. Ungerboeck (Ex. 1007)

Ungerboeck discloses Trellis-Coded Modulation as a combined coding and modulation technique for digital transmission over band-limited channels. Ex. 1007, 5. Ungerboeck also demonstrates that multilevel (amplitude and/or phase) modulation systems were known in the prior art. *Id.* at 6.

4. *Massey (Ex. 1010)*

Among other things, Massey discloses the fundamentals of taking an information source, encoding it, modulating it, transmitting it over a waveform channel, demodulating it, and then finally decoding it. Ex. 1010, see Fig. 1.

*B. Differences Between The Prior Art
and the Claimed Invention*

1. *Claims 43 and 44 over Berrou and Forney*

Claim 43 is an independent claim. Claim 44 depends from claim 43 and adds a limitation directed to outputting the original data elements. Intellectual Ventures does not argue for the separate patentability of claim 44 apart from arguments asserted in connection with claim 43. PO Resp. 13–21.

Ericsson alleges that claims 43 and 44 are unpatentable over Berrou and Forney and supports its contentions with claim charts and testimony from Mr. Lanning. Pet. 9–26. Ericsson contends that Berrou discloses all of the elements of claim 43 except a plurality of sources of original digital data. *Id.* Ericsson concedes that the turbo coder of Berrou differs from the claimed coder in that the claim 43 encoder codes a plurality of sources of original data. Pet. 12–13. Ericsson relies on Forney as disclosing the encoding of a plurality of sources of original data. Pet. 13.

Intellectual Ventures does not dispute that Forney codes a plurality of original input sources. PO Resp. 13–21. Intellectual Ventures argues that, in Ericsson’s illustration of the proposed combination, the second original data source, d_2 , is shown as being input into interleavers and coding elements, but not also being transmitted directly (i.e., without being interleaved or coded). *Id.* Intellectual Ventures also argues that Forney fails to disclose

feedback, which Intellectual Ventures contends is an essential feature of Berrou's turbo coding system. *Id.* at 18–19. Intellectual Ventures presents testimony from Dr. Cimini in support of its position. *Id.* at 14, 17.

With respect to Intellectual Ventures's criticism of Mr. Lanning's illustration of the proposed combination, we find that Mr. Lanning satisfactorily explained and corrected this oversight during his deposition. Ex. 2013, 82:12–17. Correcting the oversight on the illustration does not materially change Ericsson's ground of unpatentability or Mr. Lanning's original testimony that claim 43 is obvious over the combination of Berrou and Forney.

We find that the combination of Berrou and Forney discloses all of the limitations of claims 43 and 44.

2. *Claims 46 over Berrou and Forney*

Claim 46 depends from claim 43 and includes the additional steps of:

- (a) receiving signals representative of at least some of the first set of series systematic convolutional encoded output elements and of at least some of each next set of series systematic convolutional encoded output elements; and
- (b) generating the original digital data elements from such received signals.

Ex. 1001, claim 46. The claim charts in Ericsson's Petition identify passages in both Berrou and Forney that disclose these limitations. Pet. 23–24.

Intellectual Ventures essentially argues that, notwithstanding the teachings of Berrou and Forney independently, the combination of Berrou and Forney does not disclose these limitations, because the two references cannot be combined to arrive at the claimed invention. PO Resp. 22–24.

We find that the combination of Berrou and Forney disclose all of the limitations of claim 46. We separately address the combinability of the references below.

3. Claims 47 and 48 over Berrou, Forney, and Ungerboeck

Claims 47 and 48 depend from claim 43 and add limitations directed to multilevel modulation and trellis code modulation respectively. Ex. 1001, 30:9–15. Ericsson relies on Ungerboeck as disclosing the claimed modulation features. Pet. 27–29.

Intellectual Ventures attacks the combinability of Berrou with Forney and also attacks the combinability of Ungerboeck with Berrou and Forney. PO Resp. 24–25. Intellectual Ventures argues that the trellis code modulation of Ungerboeck does not apply to turbo codes. *Id.* at 25.

We find that the combination of Berrou, Forney, and Ungerboeck disclose all of the limitations of claims 47 and 48. We separately address the combinability of the references below.

4. Claim 49 over Berrou, Forney, Ungerboeck, and Massey

Claim 49 depends from claim 47 and adds limitations directed to demodulating and decoding received signals. Ex. 1001, 30:16–24. Ericsson relies on Massey as disclosing these claimed features. Pet. 29–31.

Intellectual Ventures argues that the decoder of Massey cannot decode data generated by the multiple-input encoder of Berrou, Forney, and Ungerboeck because the new encoder requires the design of a corresponding new decoder. PO Resp. 31. We understand this argument as going to whether the references could be combined successfully to achieve the claimed invention.

We find that the combination of Berrou, Forney, Ungerboeck, and Massey disclose all of the limitations of claim 49. We separately address the combinability of the references below.

C. Person of Ordinary Skill in the Art

Ericsson's Petition is replete with allegation as to what would have been obvious to "one skilled in the art" or what such a person would have been capable of or motivated to do Pet. 4, 10, 14, 16, 21, 22, 26, 27, 28, 31, 36, 39, 40, 42, 50, 53, 54, 57, 58, and 59. However, Ericsson's Petition does not provide an evidentiary based description of a person of ordinary skill in the art.

Ericsson's expert, Mr. Lanning, opines that a person of ordinary skill in the art would have at least a Bachelors or Masters level college degree in Electrical Engineering, Computer Science, Computer Engineering or equivalent training and experience. Ex. 1003 ¶ 38. Mr. Lanning further opines that such a person also would have had at least three to five years of academic or industrial experience in the field of communication systems. *Id.* According to Mr. Lanning, such a person would have been familiar with turbo codes and the functionality provided by turbo encoders, decoders, interleavers, multiplexers and demultiplexers, and modulators. *Id.* Ericsson's rebuttal expert, Dr. Xiong, includes a paragraph on ordinary skill in his declaration that replicates Dr. Lanning's testimony *verbatim*. Compare Ex. 1034 ¶ 22, Ex. 1003 ¶ 38.

Intellectual Ventures's Patent Owner's Response makes repeated references as to the capabilities, or lack thereof, of a person of ordinary skill in the art. PO Resp. 29, 33, 34, 35, 36, 40, 42, 45, 48, and 57. Intellectual Ventures accuses Ericsson's expert, Mr. Lanning, of possessing a skill level

that is below that of “ordinary” skill in the art. PO Resp. 55, 57, and 59. However, Intellectual Ventures does not provide an evidentiary based description of a person of ordinary skill in the art.

Intellectual Ventures’s expert, Dr. Cimini opines that one of ordinary skill in the art would have had a Master’s degree in Electrical Engineering, Computer Science, or an equivalent field as well as at least 3–5 years of academic or industry experience in communications systems, or comparable industry experience. Ex. 2009 ¶ 23. He further testifies, based on his experience working with undergraduate and graduate students, that someone with only a Bachelor’s Degree would not have the mathematical foundation to evaluate design choices for error correction algorithms. *Id.* ¶ 24. Dr. Cimini opines that an individual with only a Bachelor’s Degree would have been unable to parse the mathematics underlying Forney or Ungerboeck. *Id.* He further observes that the authors of Divsalar, Ungerboeck, Forney, Massey, and Pollara all have doctorate degrees in electrical engineering. *Id.* He further observes that the applied references in this IPR, with the exception of Deutsch, are research papers. *Id.*

Neither party presents a detailed evidentiary showing under the factors recited in *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983).²³ Notwithstanding the scant evidence on skill

²³ Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *See id.* These factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art.

level presented by the parties, the level of skill in the art often can be determined from a review of the prior art. *See Litton Indus. Products, Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163–64 (Fed. Cir. 1985).

Based on our review of the prior art, the applicable field of endeavor is wireless communications and, more particularly, using coding techniques to increase the efficiency and reliability of wireless communications. Such a person would have been familiar with turbo codes (Ex. 1004), systematic, convolutional encoders (Ex. 1005), transmission of signals obtained from a plurality of original input sources (Ex. 1005), as well as modulation and demodulation techniques including trellis coded modulation (Ex 1007). Such a person would have been familiar with techniques to combine turbo coding with trellis code modulation. Ex. 1027. We also find that a person of ordinary skill in the art would have been able to design and develop a decoder for the receiving end of a wireless transmission that is capable of decoding the encoding that was imparted to a signal at the transmission end of a wireless communication. Ex. 1014. Finally, we find that a person of ordinary skill in the art would have been able to understand and apply the mathematics taught in the applied references.

D. Secondary Considerations of Non-Obviousness

Evidence of secondary considerations of non-obviousness, when present, must always be considered en route to a determination of obviousness. *See Cyclobenzaprine*, 676 F.3d at 1075–76. However, the absence of secondary considerations is a neutral factor. *See Custom Acc., Inc., v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 960 (Fed. Cir. 1986).

See Daiichi Sankyo Co., Ltd. v. Apotex, Inc., 501 F.3d 1254, 1256 (Fed. Cir. 2007).

Neither party introduced evidence on secondary considerations of non-obviousness. Consequently, we will focus our attention on the first three *Graham* factors.

E. Whether the Prior Art Could Have Been Combined and/or Modified to Achieve the Claimed Invention

The Supreme Court instructs courts to take an expansive and flexible approach in determining whether a patented invention was obvious at the time it was made. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415 (2007). The existence of a reason for a person of ordinary skill in the art to modify a prior art reference is a question of fact. *See In re Constr. Equip. Co.*, 665 F.3d 1254, 1255 (Fed. Cir. 2011). In an obviousness analysis, some kind of reason must be shown as to why a person of ordinary skill would have thought of combining or modifying the prior art to achieve the patented invention. *See Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008). A reason to combine or modify the prior art may be found explicitly or implicitly in market forces; design incentives; the “interrelated teachings of multiple patents”; “any need or problem known in the field of endeavor at the time of invention and addressed by the patent”; and the background knowledge, creativity, and common sense of the person of ordinary skill. *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1328–29 (Fed. Cir. 2009) (quoting *KSR*, 550 U.S. at 418–21).

1. Claims 43, 44, and 46 over Berrou and Forney

Intellectual Ventures argues that the proposed combination would have been inoperable for its intended purpose, turbo coding. PO Resp. 14. Dr. Cimini testifies that modifying Berrou with Forney would render Berrou unsatisfactory for its intended purpose. Ex. 2009, ¶ 47. Intellectual

Ventures criticizes a figure used by Ericsson to illustrate the proposed modification of Berrou by Forney. *Id.* at 15.

With respect to whether a person of ordinary skill in the art could have modified Berrou to accept two input lines, Ericsson presents rebuttal testimony from Dr. Xiong, who testifies that it was known to input a second data line in Berrou's recursive encoder through an adder or exclusive OR gate. Reply 10, Ex. 1034 ¶¶ 25–26. Ericsson also points to Ungerboeck as evidence that it was known how to add two inputs into a recursive convolutional coder. Reply 9, Ex. 1007, Fig. 3a.

We think that Ericsson states the better position here. Berrou and Forney, together, disclose all of the elements of claim 43. Intellectual Ventures's attack on Ericsson's proposed combination is essentially an attack on the two references individually. However, it is well settled that non-obviousness cannot be established by attacking references individually where the basis for obviousness is the combined teachings of the references. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Dr. Cimini characterizes Berrou as disclosing a specific type of feedback that is an "essential characteristic of the invention." Ex. 2009 ¶ 47. This essential characteristic, according to Dr. Cimini, is a "specific type of feedback that 'makes it possible to obtain performance characteristics greater than those of classic coders.'" *Id.* Dr. Cimini opines that Ericsson's proposed combination of Berrou and Forney destroys this essential characteristic, because "Forney's encoder does not contain any feedback, let alone the specific type of feedback that forms the essence of Berrou. *Id.*

We find Dr. Xiong's rebuttal testimony persuasive on this point. Ex. 1034 ¶¶ 23–29. In an obviousness analysis, “we do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art.” *In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007). Accordingly, we find that a person of ordinary skill in the art would have been able to modify Berrou and Forney so that Berrou's turbo encoder could process a plurality of inputs. *Id.* In particular, we find that it was within the capability of a person of ordinary skill to modify Berrou with an adder (exclusive OR gate).

Ericsson's reason for combining and modifying Berrou and Forney is to yield higher coding efficiency. Pet. 13. This strikes us as an adequate rationale for making the proposed combination.

In view of the foregoing we conclude that a person of ordinary skill in the art would have been able to combine and modify Berrou and Forney to achieve the invention of claims 43, 44, and 46 and would have had ample reason to do so.

2. Claims 47 and 48 over Berrou, Forney, and Ungerboeck

In challenging the combinability of Ungerboeck with Berrou and Forney, Intellectual Ventures argues that Ungerboeck does not teach how to apply trellis code modulation to turbo codes. PO Resp. 25. In reply, Ericsson points out that claim 47 merely requires multilevel modulation, not trellis code modulation. Reply 12.

However, claim 48, which depends from claim 47, does require that the multilevel modulation is trellis code modulation. Intellectual Ventures reiterates that the Petition fails to show how someone of skill in the art would have accomplished the proposed combination so that modified

Berrou/Forney would have incorporated trellis code modulation. PO Resp. 27–28. Intellectual Ventures’s position relies heavily on declaration testimony from Dr. Cimini. *Id.*

Ericsson’s Reply counters that Robertson CMS is specifically directed at combining the techniques of turbo coding with trellis code modulation. Reply 14–16. While Robertson CMS is not admitted as applied art, we will consider it as background knowledge of the person of ordinary skill in the art. *See Randall Mfg.*, 733 F.3d at 1362. We find Robertson CMS to be persuasive evidence that a person of ordinary skill in the art would have been able to combine the teachings of Berrou and Ungerboeck. This evidence is essentially unchallenged by Intellectual Ventures.

Ericsson posits that a person of ordinary skill in the art would have had reason to combine Berrou with Ungerboeck to increase the efficiency of transmitting coded data. Pet. 28. This is a sufficient reason to make the proposed combination.

We conclude that a person of ordinary skill in the art would have been able to combine and modify Berrou, Forney, and Ungerboeck to achieve the invention of claims 47 and 48 and would have had ample reason to do so.

3. *Claim 49 over Berrou, Forney, Ungerboeck, and Massey*

Claim 49 depends from claim 47 and adds two additional steps to the claimed method:

- (a) demodulating the output multilevel modulated signal into a data signal representative of at least some of the first set of series systematic convolutional encoded output elements and of at least some of each next set of series systematic convolutional encoded output elements; and
- (b) generating the original digital data elements from the data signal.

Ex. 1001, claim 49. Ericsson relies on Massey as disclosing these limitations. Pet. 29–31. Essentially, Ericsson contends that a skilled artisan would have been motivated to develop a demodulator/decoder that is capable of demodulating/decoding a signal that has been encoded using known or obvious technology. *Id.* at 31. According to Ericsson, such would have merely entailed combining known elements according to known methods to yield a predictable result. *Id.*

Intellectual Ventures argues that Ericsson’s position is conclusory and unsupported by details, facts and supporting evidence. PO Resp. 31.

In Reply, Ericsson points to Robertson CMS as evidence that a person of ordinary skill in the art had the motivation and understood how to demodulate and decode a turbo-trellis code modulated signal. Reply 16. We agree and conclude that a person of ordinary skill in the art would have been able to combine and modify Berrou, Forney, Ungerboeck, and Massey to achieve the invention of claim 49 and would have had ample reason to do.

F. Ultimate Conclusion of Obviousness

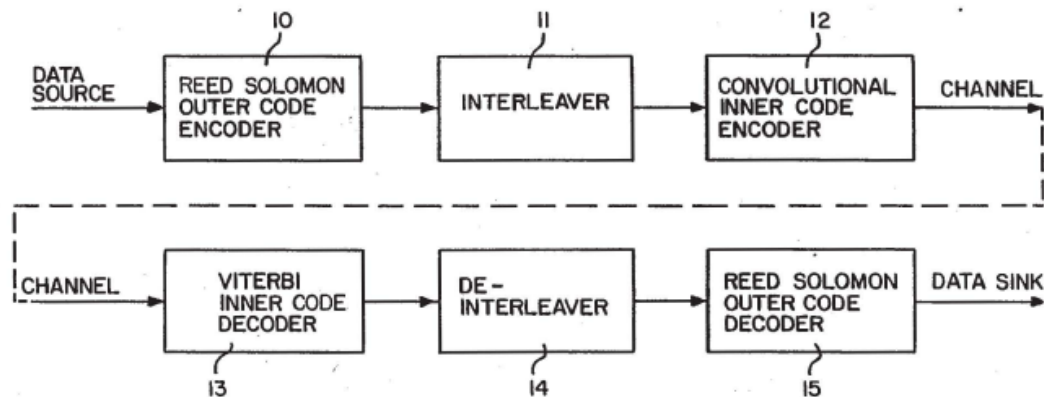
After considering all of the underlying factual considerations, the ultimate conclusion of obviousness is a question of law. *See Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1359 (Fed. Cir. 2007). After considering Ericsson’s obviousness presentation under the *Graham* factors and Ericsson’s evidence on how or why a person of ordinary skill in the art would have modified or combined the prior art to achieve the claimed invention, together with Intellectual Ventures’s counterarguments, we conclude that Ericsson has established, by a preponderance of the evidence, that claims 43, 44, and 46–49 of the ’783 Patent are unpatentable as obvious over the proposed combinations of references based on Berrou.

VI. OBVIOUSNESS OVER COMBINATIONS BASED ON DEUTSCH

A. Scope and Content of the Prior Art - Claims 18–22

1. Deutsch (Ex. 1006)

Deutsch is directed to a concatenated Reed-Solomon convolutional coding system. Ex. 1006, 3:3–5. Deutsch describes a prior art block diagram of a concatenated coding system with interleaving. *Id.* at 4:12–14. Figure 1 of Deutsch is shown below.



Deutsch - Fig. 1

Figure 1 shows a block diagram of a concatenated coding system with interleaving. *Id.* at 4:12–13. A transmitter of a data source features a Reed-Solomon outer code encoder 10, interleaver 11, and a convolutional inner code encoder 12. *Id.* at 4:14–16. At the receiver, the system features an inner code decoder 13, de-interleaver 14, and Reed-Solomon outer code decoder 15. *Id.* at 16–17. The inner code decoder 13 at the receiver constitutes a Viterbi (maximum likelihood) decoder. *Id.* at 4:18–19. The outer code encoder 10 and decoder 15 use a high rate block code. *Id.* at 4:19–21.

2. *Claim 18*

Claim 18 is an independent claim. Ex. 1001. The claim differs from independent claim 43 discussed above primarily in that it requires generation of a plurality of coded intermediate output elements with at least one interleaver coupled to at least one of a plurality of coded intermediate output elements. Ex. 1001, 25:38–53. Ericsson relies on Deutsch as satisfying the limitations directed to coded intermediate output elements being generated prior to interleaving. Pet. 32. Ericsson relies on Berrou as disclosing the recursive feature in element (c) of claim 18. Pet. 33.

Intellectual Ventures does not dispute that Deutsch and Berrou collectively disclose all of the elements of claim 18. PO Resp. 32–36. Rather, Intellectual Ventures challenges whether the two references can be combined. *Id.*

We find that the proposed combination discloses all of the elements of claim 18. We discuss the combinability of the references separately below.

3. *Claim 19*

Claim 19 depends from claim 18 and adds limitations directed to a decoder and for generating original data elements from received signals. Ericsson relies on Berrou as disclosing these limitations. Pet. 37 (citing Ex. 1004, 10:39–44, Fig. 3).

Intellectual Ventures argues that Berrou’s decoder would be incapable of generating the original data elements from the received signals generated by Ericsson’s proposed coder. PO Resp. 36–37. Intellectual Ventures contends that a conventional turbo coder would be incapable of decoding the Reed-Solomon encoding of Ericsson’s proposed combination. *Id.*

Deutsch’s Figure 1 embodiment discloses a system with a Reed-Solomon

outer code encoder and a Reed-Solomon outer code decoder. Ex. 1006. Intellectual Ventures does not explain satisfactorily why, if Deutsch's system can function with a Reed-Solomon outer encoder and outer decoder, modifying Deutsch's inner encoder and decoder with Berrou's turbo coding and decoding would not produce an operable combination.

We interpret Intellectual Ventures's contentions as primarily directed to the combinability of Deutsch and Berrou. Subject to modifications that may be required to achieve an operable combination, we find that the proposed combination discloses all of the elements of claim 19. We discuss the combinability of the references separately below.

4. Claims 20 and 21

Claims 20 and 21 depend, directly or indirectly, from claim 18 and add limitations directed to multilevel modulation and trellis coded modulation respectively. Ex. 1001, 25:58–63. Ericsson relies on Ungerboeck for these limitations. Pet. 39–40.

In opposing the ground of invalidity over claims 20 and 21, Intellectual Ventures essentially relies on the same arguments that we previously considered with respect to claims 18 above. PO Resp. 37–38. Intellectual Ventures also argues that Ericsson's arguments lack evidentiary support. *Id.* Intellectual Ventures also argues that the proposed combination fails to disclose the trellis code modulation limitation of claim 21.

As previously discussed above with respect to claim 47, we find that Ungerboeck discloses trellis code modulation which is a form of multilevel modulation. Ex. 1007.

5. *Claim 22*

Claim 22 depends from claim 20 and adds limitations directed to demodulating and decoding data signals. Ex. 1001. Ericsson relies on Massey for these limitations. Pet. 41–42. In opposing the Petition, Intellectual Ventures relies on the same arguments that were raised previously with respect to claims 18. PO Resp. 38.

As previously discussed above with respect to claim 49, we find that Massey discloses demodulating and decoding data signals. Ex. 1010. We find that the combination of Deutsch, Berrou, Ungerboeck, and Massey disclose all of the limitations of claim 22. We separately address the combinability of the references below.

B. Whether the Prior Art Could Have Been Combined and/or Modified to Achieve the Claimed Invention

1. *Claim 18 over Deutsch and Berrou*

Intellectual Ventures argues that Berrou teaches away from the proposed combination with Deutsch. PO Resp. 32. Intellectual Ventures argues that a person of ordinary skill in the art would have immediately recognized that the line of development flowing from Berrou’s disclosure is unlikely to produce the invention of claim 18. *Id.* at 33. Intellectual Ventures supports its position with a 1996 publication by Benedetto. *Id.*, Ex. 2005. According to Intellectual Ventures, the Benedetto paper teaches that it was known that recursive convolutional encoders often perform worse than non-recursive convolutional encoders. PO Resp. 35–36. Thus, according to Intellectual Ventures, a person of ordinary skill in the art would have been discouraged from combining Berrou with Deutsch. *Id.* at 36.

In Reply, Ericsson contends that Intellectual Ventures has misread Benedetto. Reply 17. Ericsson cites a number of passages of Benedetto that

it insists encourages, rather than discourages, the combining of Deutsch and Berrou. *Id.* at 18–20. Ericsson presents persuasive testimony from Dr. Xiong that a person of ordinary skill in the art would have been encouraged to combine Deutsch and Berrou after reading Benedetto. Ex. 1034 ¶¶ 50–58.

A reference does not teach away if it merely expresses a general preference for an alternative invention but does not “criticize, discredit, or otherwise discourage” investigation into the invention claimed. *Galderma Labs, LP v. Tolmar, Inc.*, 737 F.3d 731, 738–39 (Fed. Cir. 2013). Intellectual Ventures does not direct our attention to any language in Deutsch that criticizes or discredits either Berrou or a combination of Deutsch and Berrou. Neither are we persuaded that any particular passage in Deutsch would discourage investigation into incorporating intermediate output elements in Berrou’s turbo coder. Finally, even assuming that a person of ordinary skill in the art would read Deutsch in view of Benedetto, we are not persuaded that a person of ordinary skill in the art would have been discouraged from combining Deutsch and Berrou.

2. Claim 19 over Deutsch and Berrou

Intellectual Ventures argues that Ericsson and Mr. Lanning fundamentally misunderstand the disclosures of Deutsch and Berrou. PO Resp. 36. Intellectual Ventures focuses its attention on the fact that Deutsch’s system includes a Reed-Solomon encoder. *Id.* Intellectual Ventures contends that Berrou’s conventional turbo decoder cannot generate original data elements from the received signals generated by Ericsson’s proposed encoder. *Id.* at 37. Intellectual Ventures relies on testimony from Dr. Cimini who testifies that a decoder designed for one type of encoder

(turbo code) cannot decode signals from another type of encoder (Reed Solomon). *Id.* citing Ex. 2009 ¶ 78.

In connection with its Reply, Ericsson presents testimony from Dr. Xiong, who begins with the assumption that the combination of Berrou and Deutsch would use a recursive convolutional code as the inner code and preferably also use a recursive convolutional code as the outer code. Ex. 1034 ¶ 59. He further testifies that someone skilled in the art would have been able to include a decoder for a different outer code. *Id.*

Dr. Xiong explains that a serial concatenated decoder is very similar to the Berrou decoder with only minor modifications. Ex. 1034 ¶ 60. According to Dr. Xiong, the inner decoder is identical to the first and second decoder in Berrou Fig. 4. *Id.* Dr. Xiong testifies that the outer decoder requires some modifications related to how its inputs and outputs are connected. *Id.*

Dr. Xiong explains that there are two approaches to modifying Berrou's decoder and that both approaches lead to a valid decoder. *Id.* According to Dr. Xiong, only the order between the inner and outer decoding is changed. *Id.* Dr. Xiong elaborates further details in paragraphs 61–64 of his declaration. Dr. Xiong testifies that Exhibits 1036 and 1037 disclose one of his two proposed approaches. Ex. 1034 ¶¶ 63–64.²⁴ In this second approach, Dr. Xiong explains that the first decoder is the outer decoder and the second decoder is the inner decoder. *Id.* at ¶ 63. He states that this can be done because the inner code is systematic. *Id.*

²⁴ Exhibits 1036 and 1037 are not applied art, nevertheless, we have considered them as background knowledge of a person of ordinary skill in the art. *See Randall Mfg.*, 733 F.3d at 1362.

In view of Dr. Xiong's testimony, we are persuaded that Deutsch's use of a Reed-Solomon encoder would not have posed an insurmountable problem to a person of ordinary skill in the art seeking to combine the teachings of Deutsch and Berrou to achieve the claimed invention. *See Icon Health*, 496 F.3d at 1382 ("we do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art").

3. Claims 20 and 21 over Deutsch, Berrou, and Ungerboeck

The principal issue with respect to claims 20 and 21 is whether Ungerboeck can be combined with modified Deutsch/Berrou to satisfy the multilevel modulation and trellis code modulation limitations of claims 20 and 21 respectively.

The issues here are substantially similar to the issues that we have considered with respect to whether Ungerboeck could be successfully combined with Berrou and Forney in connection with claims 47 and 48. We agree with Ericsson that a successful combination could have been achieved in connection with the Deutsch combination for essentially the same reasons. Once again, we find the Robertson CMS reference to be convincing evidence on the question of whether it was known to combine turbo coding and trellis code modulation at the time of the invention. Ex. 1027.

4. Claim 22

The issue with respect to claim 22 is whether Massey can be combined with modified Deutsch/Berrou and Ungerboeck to satisfy the demodulator and decoder limitations of claim 22.

As previously discussed with respect to claim 49, we agree with Ericsson that a skilled artisan would have been motivated to develop a demodulator/decoder that is capable of demodulating/decoding a signal that

has been encoded using known or obvious technology and that such would have merely entailed combining known elements according to known methods to yield a predictable result. Pet. 42.

C. Ultimate Conclusion of Obviousness

After considering Ericsson's obviousness presentation under the *Graham* factors and Ericsson's evidence on how and why a person of ordinary skill in the art would have modified or combined the prior art to achieve the claimed invention, together with Intellectual Ventures's counterarguments, we conclude that Ericsson's has established, by a preponderance of the evidence, that claims 18–22 of the '783 patent are unpatentable as obvious over the proposed combinations of references based on Deutsch.

VII. OBVIOUSNESS OVER COMBINATIONS BASED ON DIVSALAR

A. Scope and Content of the Prior Art - Claims 25, 26, 62, and 63

1. Divsalar (Exhibit 1009)

Divsalar acknowledges Berrou as a remarkable step forward in high-gain, low-complexity coding. Ex. 1009, 29. Divsalar discloses that parallel concatenation of convolutional codes was known. *Id.*

Divsalar discloses a procedure to accomplish “trellis termination.” *Id.* at 30. To perform trellis termination, Divsalar uses a switch that is switched from a first position (A) to a second position (B) that results in flushing the encoders with zeroes. *Id.* at Fig. 2. Figure 2 of Divsalar is shown below.

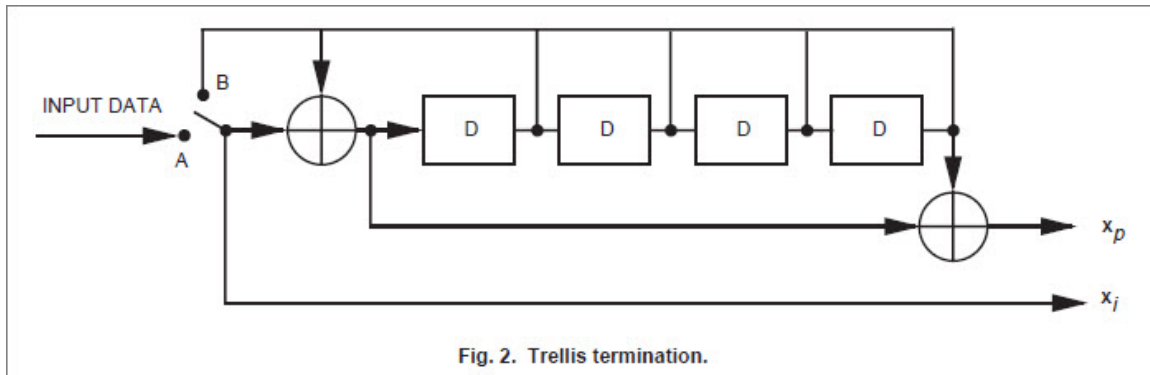


Figure 2 of Divsalar shows input data being introduced into the encoder on the left hand side of the figure. Input data enters the encoder when the switch is set to position A. When the switch is set to position B, the input data is disconnected from the encoder. Divsalar moves the switch to position B to flush the encoders with zeros in order to accomplish trellis termination. *Id.*

*B. Differences Between The Prior Art
and the Claimed Invention*

1. Claims 25 and 62 over Divsalar, Berrou, Forney, and Ungerboeck

Claims 25 and 62 are independent claims and differ in scope from claim 43 primarily in that they require selection of subsets of data elements and generation of coded output elements derived from such subsets.

Ex. 1001. Ericsson relies on a combination of Berrou, Forney, and Ungerboeck for the overlapping subject matter of claims 43 and claims 25 and 62. Ericsson relies on Divsalar as disclosing switching relating to the “subset” limitations. Pet. 43–44.

In order to illustrate the proposed combination, Ericsson introduced a demonstrative figure through Mr. Lanning that purportedly combines features of the switch and encoding features of Divsalar Figure 1 with Figure 7 of Forney that illustrates coding a plurality of input sources. The

resulting figure, which appears in paragraph 214 of Lanning's declaration, is reproduced below.

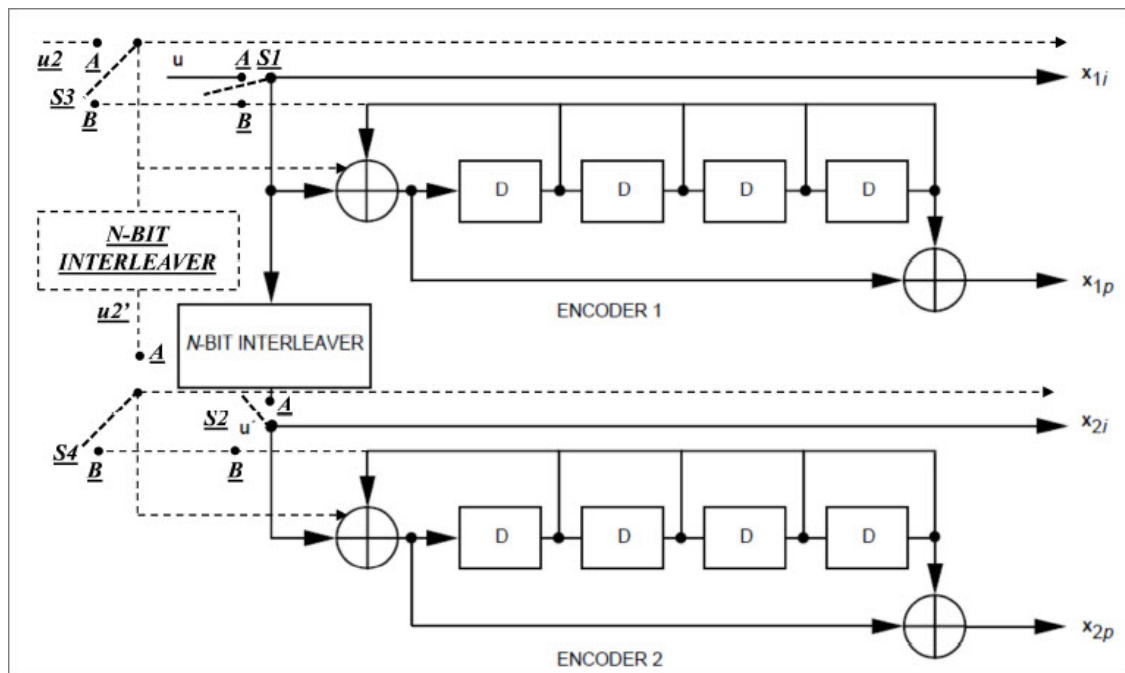


Illustration from Paragraph 214 of Lanning Declaration

Mr. Lanning's illustration from paragraph 214 shows four switches, labeled S1, S2, S3, and S4. Each switch has a position A and a position B. When the respective switches are set to position A, they are connected to an input data source. When they are set to B, they are disconnected from an input data source.

According to Mr. Lanning's declaration testimony, combining Divsalar and Forney allows trellis termination of multiple data sources. Ex. 1003 ¶ 214. Mr. Lanning characterizes this proposed embodiment as substantially similar to the Figure 21 embodiment of the '783 patent, except for the lack of a multi-level modulator. *Id.* Lanning testifies that switching was a well-known means of selecting subsets of data from a plurality of parallel data lines. *Id.* ¶ 215. Lanning directs our attention to Figure 2 of Berrou as disclosing a switch 15 that can be switched between the output of

first systematic coding element 11 (Y_1) and the output of second systematic coding element 13 (Y_2) to produce output Y . Mr. Lanning testifies that a person of ordinary skill in the art would have understood that a similar switch, when placed at the input of a convolutional encoder, would select a subset of input data from a plurality of input data sources. Ex. 1003 ¶ 215. Mr. Lanning opines that “it would have been obvious to one of ordinary skill in the art that the switch configuration realized by combining Divsalar TCDSC and Forney can be used not only for trellis termination, but also for systematically selecting a subset of input data into each convolutional encoder.” *Id.*

Mr. Lanning further testifies that each of the four switches has only two possible positions (A or B). *Id.* ¶ 216. He testifies that there would be a finite number of possible switch configurations, each leading to an identified, predictable result of selecting a different subset of the original data elements. *Id.* He concludes that it would have been obvious for one of ordinary skill in the art to try the finite number of switch configurations with a reasonable expectation of success because each switch configuration determines a subset of input (original or interleaved) data to be selected. *Id.*

Intellectual Ventures points out that Ericsson’s applied references fail to disclose an embodiment that switches between input sources to select a subset of input data. PO Resp. 46. Intellectual Ventures argues that Divsalar merely teaches setting the switches to position A for encoding to position B for trellis termination. *Id.*

We find that the combination of Divsalar, Berrou, Forney, and Ungerboeck does not disclose selecting a subset of input data as claimed in claims 25 and 62.

2. Claims 26 and 63 over Divsalar, Berrou, Forney, and Ungerboeck

Claims 26 and 63 depend from claims 25 and 26 respectively and add limitations specifying that the multilevel modulator generates a trellis code modulation. Ericsson relies on Ungerboeck as disclosing the modulation limitation. Pet. 59–60.

Intellectual Ventures argues that the proposed combination fails to disclose the modulation limitation. PO Resp. 52. For reasons previously discussed, we find that Ungerboeck discloses trellis code modulation.

C. Whether the Prior Art Could Have Been Combined and/or Modified to Achieve the Claimed Invention

Intellectual Ventures's argues persuasively that the proposed combination of Divsalar, Berrou, Forney, and Ungerboeck does not disclose the claimed invention. PO Resp. 40–51. Stated succinctly, Intellectual Ventures points out, correctly, that the two position (A, B) switches in Divsalar are for trellis code termination, not selection of subsets of data input. *Id.* We find Mr. Cimini's declaration testimony on this point to be more credible than Mr. Lanning's testimony and Ericsson's attorney argument. See Ex. 2009 ¶¶ 82–92.

On cross-examination, Mr. Lanning confirmed Intellectual Ventures's interpretation of his paragraph 214 illustration. PO Resp. 47. Mr. Lanning testified that his intent in generating his paragraph 214 illustration was to show that the encoding system is always receiving both inputs, not switching between inputs to select subsets. *Id.* citing Ex. 2013, 60:6–23 (Lanning).

Q. So there's only two possible switch configurations for the encoder on 132; is that correct?

A. That's – that's what I intended, yes.

Ex. 2013, 64:20–24 (Lanning). Mr. Lanning’s testimony is consistent with Divsalar’s teaching of using switching for trellis termination not data input subset selection.

Later, following a break in Mr. Lanning’s deposition in which Lanning had a conversation with Ericsson’s attorney, Mr. Rogers, Lanning testified on re-direct examination. Ex. 2013, 149:5–23. When questioned by Mr. Rogers on re-direct, Lanning testified that setting all switches simultaneously to either the A position or the B position was “typical,” and that setting one switch to the A position while another switch was in the B position was “atypical.” *Id.* Mr. Rogers then concluded his redirect examination and passed the witness back to Ms. Gordon, for re-cross. *Id.* at 149:24.

On re-cross, Ms. Gordon sought to inquire into the subject matter of the conversation that took place between Mr. Lanning and Mr. Rogers during the break between cross-examination and Mr. Rogers’s re-direct examination. *Id.* at 150–156. Mr. Lanning refused to answer such questions on the grounds of privilege and in accordance with instructions from Mr. Rogers to refuse to answer such questions. *Id.*

In light of the record before us, we are not persuaded by Ericsson’s evidentiary presentation that a person of ordinary skill in the art would have modified Divsalar, Berrou, and Forney so that the A, B switches would have operated to select subsets of data inputs. Mr. Lanning testifies that there would be a finite number of possible switch configurations, each leading to an identified, predictable result of selecting a different subset of the original data elements. *Id.* ¶ 216. Ericsson argues that it is unreasonable to suggest

that one skilled in the art would not have considered each possible configuration. Reply 25.

We are not persuaded by Ericsson's argument. Ericsson's theory here is the "obvious to try" theory that arose from *KSR*, where the Supreme Court stated:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

KSR, 550 U.S. at 421. Ericsson's proposed combination, however, does not fit within the Supreme Court's rationale expressed above. Here, Divsalar teaches the use of switching in order to perform trellis termination, not data input selection. Ex. 1009, 30, Fig 2. Ericsson and Mr. Lanning do not explain adequately how Divsalar can be modified so that its switches can successfully accomplish both trellis termination and selecting a data input subset without one function interfering with the other. Neither do Ericsson and Mr. Lanning adequately explain how Divsalar can be modified so that its switches can be used to select a data input subset, while obviating the need to also perform trellis termination. Absent such an explanation and a showing that such could have been accomplished with the exercise of only ordinary skill, Ericsson has not demonstrated that the prior art could have been combined or modified to achieve the claimed invention with a reasonable expectation of success.

D. Ultimate Conclusion of Obviousness

Precedent recognizes the pitfalls of judicial hindsight exercised at the time of litigation, the Court cautioning in *KSR* that “[a] factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421, 127 S.Ct. 1727. “Good ideas may well appear ‘obvious’ after they have been disclosed.” *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 956 (Fed. Cir. 1997).

In the instant case, Ericsson’s attempt to transform the A, B switches of Divsalar from being used to perform trellis termination into being used to select data input subsets smacks of hindsight reasoning. After considering the evidence and arguments of both parties, we conclude that Ericsson has failed to carry its burden of demonstrating, by a preponderance of the evidence, that claims 25, 26, 62, and 63 are unpatentable.

VIII. ORDER

In view of the foregoing, it is ORDERED as follows:

1. Claims 43, 44, and 46 have been shown to be unpatentable as obvious over Berrou and Forney;
2. Claims 47 and 48 have been shown to be unpatentable as obvious over Berrou, Forney, and Ungerboeck;
3. Claim 49 has been shown to be unpatentable as obvious over Berrou, Forney, Ungerboeck, and Massey;
4. Claims 18 and 19 have been shown to be unpatentable as obvious over Deutsch and Berrou;

5. Claim 20 and 21 have been shown to be unpatentable as obvious over Deutsch, Berrou, and Ungerboeck;

6. Claim 22 has been shown to be unpatentable as obvious over Deutsch, Berrou, Ungerboeck, and Massey;

7. Ericsson's motion to withdraw its challenge to claims 55–59 is DENIED;

8. Claims 55–59 have NOT been shown to be unpatentable; and

9. Claims 25, 26, 62 and 63 have NOT been shown to be unpatentable as obvious over Divsalar, Berrou, Forney, and Ungerboeck.

This is a Final Written Decision under 35 U.S.C. § 318(a). 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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Patent 6,023,783

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