

No. 24-1822

**In the United States Court of Appeals
for the Federal Circuit**

CONSTELLATION DESIGNS, LLC,
Plaintiff-Appellee

v.

LG ELECTRONICS INC., LG ELECTRONICS USA, INC., LG
ELECTRONICS ALABAMA, INC.,
Defendants-Appellants

On Appeal from the United States District Court for the
Eastern District of Texas
(No. 2:21-cv-448) (The Hon. J. Rodney Gilstrap)

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EXEMPLARY PATENT CLAIMS

U.S. Patent No. 8,842,761 (Appx141)

17. A digital communication system, comprising:
- a receiver configured to receive signals transmitted via a communication channel using a QAM symbol constellation;
- wherein the receiver, comprises:
- a demodulator configured to demodulate the signal received via the communication channel;
 - a demapper configured to estimate likelihoods of symbols in a QAM symbol constellation from the demodulated signal;
 - a decoder that is configured to estimate decoded bits from the likelihoods generated by the demapper using an LDPC code;
 - and
- wherein the QAM symbol constellation is a geometrically spaced symbol constellation optimized for capacity using parallel decode capacity that provides a given capacity at a reduced signal-to-noise ratio compared to a QAM signal constellation that maximizes d_{\min} .

U.S. Patent No. 10,693,700 (Appx197)

1. A communication system, comprising:

a receiver capable of receiving signals via a communication channel having a channel signal-to-noise ratio (SNR), wherein the receiver comprises:

a demodulator capable of demodulating a received signal into a demodulated signal;

a demapper, coupled to the demodulator, capable of determining likelihoods using the demodulated signal and a multidimensional symbol constellation selected from a plurality of multidimensional symbol constellations; and

a decoder, coupled to the demapper, capable of using the likelihoods determined by the demapper to provide a sequence of received bits based upon a low density parity check (LDPC) code;

wherein the plurality of multidimensional symbol constellations comprises a plurality of different non-uniform multidimensional symbol constellations having the same number of constellation points, where the constellation points are non-uniformly spaced in each degree of freedom available to the multidimensional symbol constellations;

wherein the receiver is capable of selecting an LDPC code rate and multidimensional symbol constellation pair from a plurality of predetermined LDPC code rate and multidimensional symbol constellation pairs, where each of the plurality of different nonuniform multidimensional symbol constellations is only included in one of the plurality of predetermined LDPC code rate and multidimensional symbol constellation pairs.

5. The communication system of claim 1, wherein each of the plurality of different non-uniform multidimensional symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than the other symbol constellations in the plurality of multidimensional symbol constellations at the same SNR.

U.S. Patent No. 11,019,509 (Appx260)

21. A communication system, comprising a receiver that receives signals via a communication channel having a channel signal-to-noise ratio (SNR), wherein the receiver uses a symbol constellation to transform the received signals into received bits, and the symbol constellation includes constellation points at a plurality of unique point locations, where:

the plurality of unique point locations are unequally spaced;

the constellation points each have a location and a different label; and

the locations of at least two of the constellation points are the same.

23. The communication system of claim 21, wherein:

the symbol constellation is selected from a plurality of unequally spaced symbol constellations;

the plurality of unequally spaced symbol constellations includes a plurality of unequally spaced symbol constellations of a first type that comprise multiple different sixty-four-point symbol constellations, multiple different two-hundred-fifty-six-point symbol constellations, and multiple different one-thousand-twenty-four-point symbol constellations, where unequally spaced symbol constellations of the first type include at least two constellation points having identical locations and different labels;

the receiver selects an LDPC code rate and the unequally spaced symbol constellation as a pair from a plurality of predetermined LDPC code rate and unequally spaced symbol constellation pairs; and

each of the plurality of unequally spaced symbol constellations is only included in one of the plurality of predetermined LDPC code rate and unequally spaced symbol constellation pairs.

U.S. Patent No. 11,018,922 (Appx447)

24. A communication system, comprising:

a receiver capable of receiving signals via a communication channel having a channel signal-to-noise ratio (SNR), wherein the receiver comprises:

a demodulator capable of demodulating a received signal into a demodulated signal;

a demapper, coupled to the demodulator, capable of determining likelihoods using the demodulated signal and a non-uniform quadrature amplitude modulation 1024-point symbol constellation (NU-QAM 1024); and

a decoder, coupled to the demapper, capable of using likelihoods determined by the demapper to provide a sequence of received bits based upon a Low Density Parity Check (LDPC) code;

wherein the NU-QAM 1024 constellation comprises an in-phase component and a quadrature component, where each component comprises 32 levels of amplitude such that the amplitudes scaled by a scaling factor are within 0.55 from the following set of amplitudes: -38.424, -31.907, -24.169, -26.796, 38.425, 31.908, -20.038, -19.169, -7.759, -7.759, -11.460, -11.460, -4.850, -4.850, -15.014, -15.205, 20.038, 19.170, 15.206, 15.015, 24.170, 26.797, 11.460, 11.460, 1.326, 1.326, 4.849, 4.849, -1.328, -1.328, 7.759, and 7.759.

44. The communication system of claim 27, wherein the plurality of symbol constellations includes multiple different sixty-four-point non-uniform symbol constellations, multiple different two-hundred-fifty-six-point non-uniform symbol constellations, and multiple different one-thousand-twenty-four-point non-uniform symbol constellations.

CERTIFICATE OF INTEREST

1. The full name of every entity represented in the case by the counsel filing the certificate:

Constellation Designs, LLC

2. For each entity, the name of every real party in interest, if that entity is not the real party in interest:

N/A

3. For each entity, that entity's parent corporation(s) and every publicly held corporation that owns ten percent (10%) or more of its stock:

N/A

4. The names of all law firms, partners, and associates that have not entered an appearance in the appeal, and (A) appeared for the entity in the lower tribunal; or (B) are expected to appear for the entity in this court:

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Ward, Smith & Hill, PLLC: Andrea L. Fair

5. An indication as to whether there are any related or prior cases, other than the originating case number(s), that meet the criteria under Federal Circuit Rule 47.5:

N/A

6. All information required by Federal Rule of Appellate Procedure 26.1(b) and (c) that identifies organizational victims in criminal cases and debtors and trustees in bankruptcy cases:

N/A

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35 U.S.C. § 28459

STATEMENT OF RELATED CASES

Constellation Designs, LLC is not aware of any other case that arises from the same action or will directly affect the Court's decision in this case.

INTRODUCTION

As television radio waves travel, they weaken and face interference from various sources—all of which can result in a less clear picture on the screen. For decades, engineers tried to improve the efficiency of over-the-air television broadcasts, with only incremental gains. That changed in 2006, when two researchers working at NASA's Jet Propulsion Lab, Dr. Chris Jones and Dr. Maged Barsoum, devised a new way of transmitting and decoding content through a broadcast signal. Their discovery generated huge efficiency gains—indeed, as much as the previous forty years of research combined. By virtue of Drs. Jones and Barsoum's invention, over-the-air broadcasts can now approach the limit of what is theoretically possible.

A few years after their discovery, a group of television manufacturers and broadcasters, including the defendant LG Electronics, developed a new industry standard: Advanced Television Systems Committee (ATSC) 3.0. They incorporated Drs. Jones and Barsoum's technology because it dramatically improved the efficiency of over-the-air broadcasts. By that time, the inventors had assigned their patents to Constellation Designs, which contacted LG and other manufacturers to negotiate a license. LG protested that it was too early to talk about a license—even as it made money selling

televisions that practiced Constellation's patents. Constellation was left with no choice but to file this suit.

Although LG tries to make the issues in this appeal seem complicated, they are not. The district court rejected LG's patent-eligibility defense from the bench. The jury then found at trial that Constellation's patents were willfully infringed. After the court rejected LG's evidentiary challenge to Constellation's damages expert, the jury awarded Constellation a total of \$1.6 million based on a per-television royalty of \$6.75—an award that actually reflected a conservative valuation of Constellation's transformative technology. LG's attacks on patent eligibility and the evidence supporting infringement and damages are unpersuasive.

First, LG asks this Court to rule that Constellation's patents are ineligible as a matter of law—even though it did not have sufficient faith in its Section 101 challenge to ask the district court for the same ruling. The district court's determination of patent eligibility tracks this Court's precedents, which afford protection to patents like these that reflect concrete and transformative improvement, claim specific steps for achieving their benefits, and describe in detail the longstanding problems they address. LG frames the inventions at a high level of generalization and says they are directed to

“optimizing” performance. That caricature ignores the detailed limitations recited in the claims, and in any event Drs. Jones and Barsoum’s innovative way of optimizing performance would still be patent-eligible.

Second, LG challenges the jury’s infringement finding. Constellation put forward extensive evidence of infringement, including LG’s internal documents, tests performed on LG’s televisions, and expert analysis of LG’s source code. LG nevertheless argues that the verdict cannot stand because Constellation also referred to the ATSC 3.0 standard. But Constellation did not argue that *every* standard-practicing device infringed its patents. Rather, Constellation examined LG’s products directly, and presented evidence that those products implemented the relevant portions of the standard. As the district court recognized, Constellation was free to rely on standards evidence alongside other evidence of infringement.

LG’s real complaint is with the jury’s fact-finding. According to LG, no reasonable jury could find infringement here because it put forward evidence purporting to show that its televisions did not match the industry standard. But the jury also heard substantial evidence undercutting LG’s testimony on that point. LG is not entitled to reweigh the facts on appeal. LG also challenges the infringement verdict for televisions that use a chip

manufactured by a third party, Realtek, because Constellation did not present source code for those chips to the jury. Constellation established infringement for the Realtek chip using other evidence, including test results and internal documents. The jury was entitled to rely on that evidence in finding infringement.

Third and finally, LG attacks the jury's damages award. The jury based its royalty on prior licenses negotiated by Zenith (an LG subsidiary) for its own predecessor ATSC technology. LG argues that those earlier licenses were too dissimilar from the hypothetical negotiation in this case—which is a *Daubert* challenge dressed up as a challenge to the jury verdict. The district court did not abuse its discretion in admitting Constellation's damages model, which established that the prior licenses were both technically and economically comparable to a hypothetical license here. The size of the royalty simply reflects the large improvements made possible by the patented inventions. Here again, the jury's verdict is supported by substantial evidence, and this Court should affirm the judgment below.

STATEMENT OF THE ISSUES

1. Whether the district court correctly determined that Constellation's claims are eligible for patent protection.
2. Whether substantial evidence supports the jury's finding that LG infringed the asserted patents.
3. Whether the district court did not abuse its discretion by admitting testimony from Constellation's damages expert.

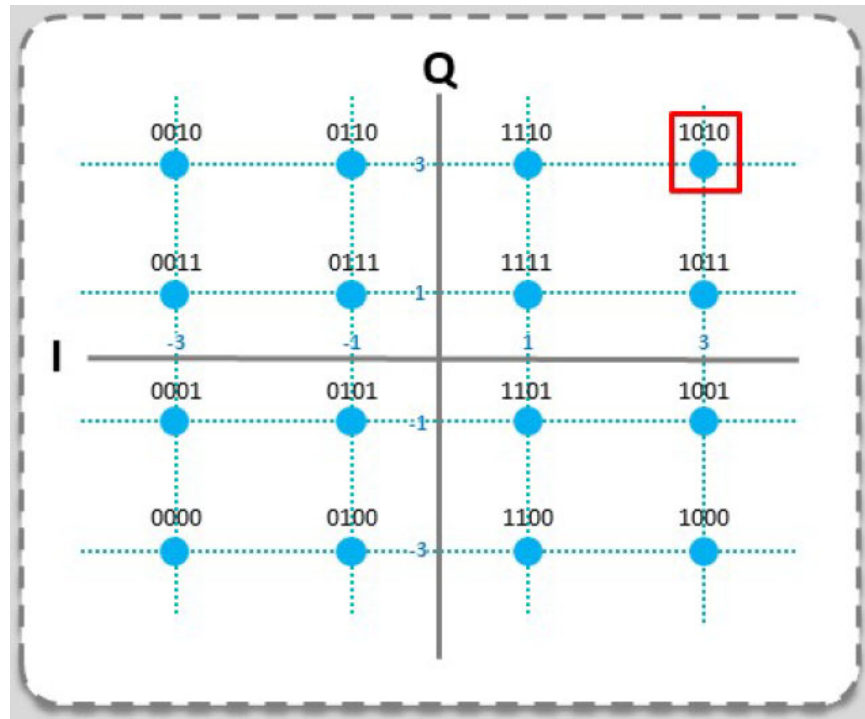
STATEMENT OF THE CASE

A. Factual Background

1. Digital communications technology

Millions of televisions receive and display over-the-air broadcasts. For those broadcasts to reach viewers, the digital information that makes up a television program must first be converted into radio signals. That process happens by transforming "bits" of digital information (a string of 1s and 0s) into specific radio waves. Appx20165. Once that process is complete, antennas and radio towers transmit those signals, which travel along the public airwaves until they reach a television capable of receiving them. The television then converts the signal back into digital bits and displays the program on the screen. Appx20165.

“Constellations” are visual representations of the relationship between digital bits and radio waves. Appx135; Appx20168-20169. In the figure below, for example, the bits 1010 map onto a radio wave with an amplitude at 3 on the X-axis and 3 on the Y-axis. Appx6137.

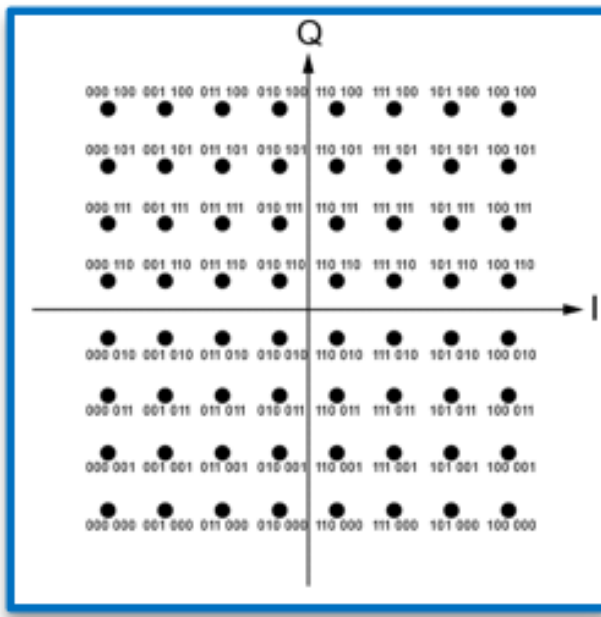


The constellations used on both sides of a communication channel need to match. Appx20171; Appx20219. Otherwise, the transmitter may map the digits into radio waves using one point on the grid, while the receiver would map the waves back into digits using a different point. Appx20171.

The transmission and mapping process for broadcast television presents two technological challenges. First, the portion of the broadcast spectrum devoted to television broadcasts is limited. Appx20167. As a result,

broadcasters have limited bandwidth they can use when transmitting data. Appx20167. Second, broadcast transmission is prone to error. Appx20167-20168. When broadcast signals are transmitted over the air, the radio waves become weaker as they travel (a process called “attenuation”) and pick up “noise” before they reach their final destination. Appx20166. That process distorts the radio signal, making it difficult to map the radio wave back to the correct set of digital bits, which can cause a distorted image for viewers at home.

Because of these challenges, engineers are constantly looking for ways to broadcast data more efficiently and to reduce the “signal-to-noise ratio” required to receive those broadcasts. Appx20166. For many years, engineers believed the best way to do that was through a “uniform” constellation. The assumption was that, if the distance between points was as great as possible, the television’s receiver would be less likely to mistake one point for another. Appx135 (1:29-41); Appx20172. To maximize the distance between two points, engineers constructed constellations where the points are spaced at uniform (and therefore maximum) distances from one another, as in the following figure. Appx6179.

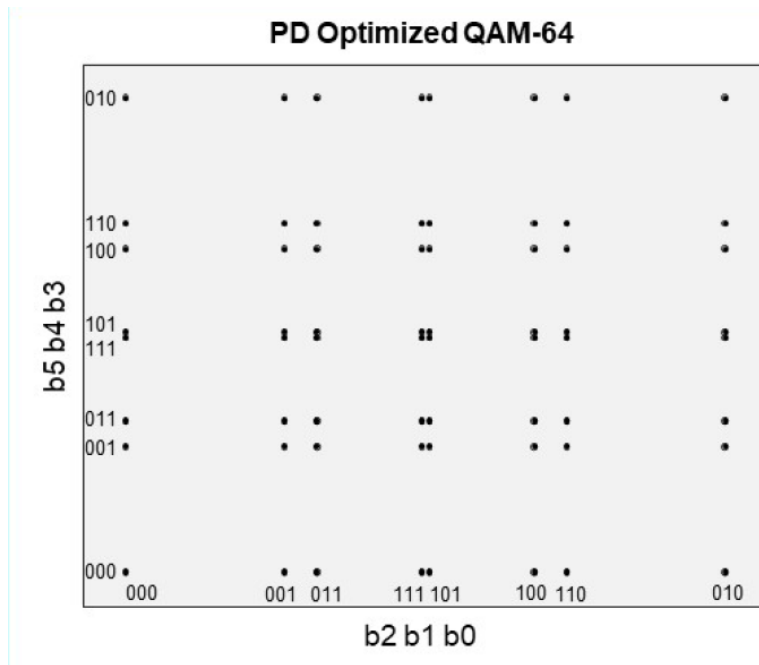


When building constellations, engineers measure their progress against the so-called “Shannon Limit,” which is “the theoretical maximum capacity” for a “digital communications system.” Appx135 (1:42-45); Appx20171. In the 1960s, researchers were able to make appreciable gains toward the Shannon Limit, but as the decades went on their progress slowed. They eventually hit a wall and were unable to make significant gains in performance using conventional methods. Appx20168; Appx20171-20173.

2. Constellation’s inventions

That changed in 2006. At that time, Drs. Chris Jones and Maged Barsoum were working together at NASA’s Jet Propulsion Lab. Appx20165; Appx20175. Like other scientists, they were frustrated by the inability to improve the efficiency of digital communications. Appx20172. Rather than

tinker with systems that used uniform constellations, Drs. Jones and Barsoum tried something different: they developed new, *non*-uniform constellations. Appx20172. These non-uniform constellations did not maximize the distance between each point, but were instead arranged in the way that optimized the information content that could be accurately transmitted through a broadcast signal—even if that meant that some points in the constellation were close to one another. Appx20172; Appx20174; Appx6180.



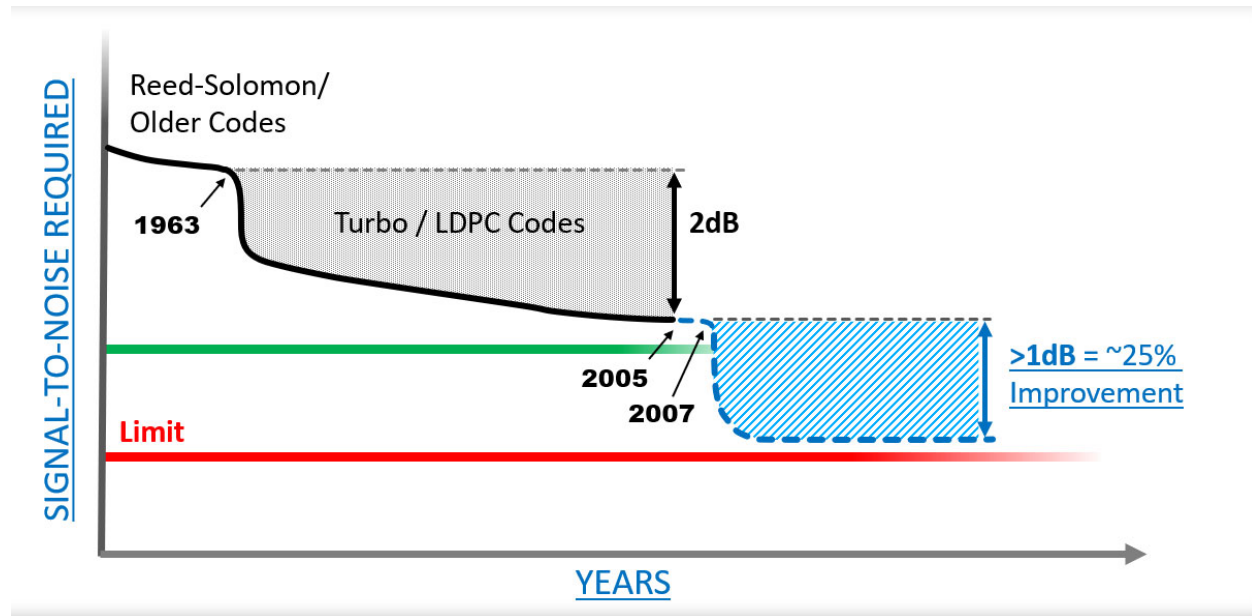
At the time that they began their work, others in the field had experimented with non-uniform constellations. But they broke from the pack by building their non-uniform constellations in a different way. Specifically, they constructed their constellations to improve performance using “a very

specific measure of information,” which is based on something called “parallel decode capacity.” Appx20173-20174; *see* Appx141; Appx20167.

Parallel decode capacity measures the amount of information successfully transmitted through a communications system by comparing the information sent into the “mapper” on one end of a channel with the information coming out of the “demapper” on the other. Appx20174. Put differently, it focuses on the quality of the information coming out of the receiver, rather than the location of the symbols in the constellation. To measure performance using parallel decode capacity, Drs. Jones and Barsoum “wr[ote] . . . software” and “buil[t] an optimizer” to test the results for each constellation. Appx20173-20174; Appx20215.

Their experiments yielded counterintuitive results, including increased performance for constellations with multiple points located very close together and, in some cases, at the very same location. Appx20174-20175. And the gains in performance were massive. Before their breakthrough, researchers in the field had made only incremental gains in four decades from 1963 to 2005, and were still far away from the Shannon Limit (shown in red on the graph below). Appx20171-20172. By constructing non-uniform constellations using parallel decode capacity, Drs. Jones and Barsoum broke through that barrier and

generated efficiency improvements greater than 25 percent (shown in blue)—achieving performance levels very close to the Shannon Limit. Appx6181; *see* Appx20173; Appx20217.



In 2007, Drs. Jones and Barsoum first published and presented their findings. Appx15582; Appx20174. As relevant here, they are the named inventors of U.S. Patents 8,842,761, 10,693,700, 11,019,509, and 11,108,922. Appx141, Appx197, Appx260, Appx447. Each of those patents is directed to digital-communication systems and claims a receiver that can process a radio signal and perform demapping using constellations optimized for parallel decode capacity. Appx20215. To capture the benefits of Drs. Jones and Barsoum's inventions, the patents also claim either non-uniform constellations constructed using parallel decode capacity or recite specific constellations of

particular sizes or with specific points discovered using that process. Appx20215.

3. ATSC 3.0 standard and LG's infringement

Because televisions throughout the United States must receive and decode the same broadcast transmissions, the TV industry relies on standards developed by the Advanced Television Systems Committee (ATSC). ATSC's membership includes television manufacturers like Samsung, Sony, and the defendant here, LG. Appx20216. The first ATSC standard (version 1.0) was published in 1995. Appx20159. But to keep pace with evolving technology, the ATSC began work on a new standard in 2013 called ATSC 3.0. Appx20217. At that time, television manufacturers and other ATSC participants wanted new technologies that would enable the industry "to increase the capacity use on the existing channels" for broadcast television. Appx20217. They quickly honed in on Drs. Jones and Barsoum's inventions, recognizing that their discovery could drastically improve the performance of the standard. Appx20177; Appx20219-20220.

In 2017, the ATSC finalized the ATSC 3.0 standard, which included constellations that optimized performance using parallel decode capacity. Appx20205; Appx20219-20220. Its developers touted the increased efficiency

made possible by the new standard—including benefits attributable to the patented inventions. Appx20217. Following the adoption of the standard, the FCC mandated that broadcasters fully comply with that standard when transmitting ATSC 3.0 broadcasts over the public airwaves. Appx20218.

Shortly after learning that its technology would be incorporated into the ATSC 3.0 standard, Constellation reached out to LG and other manufacturers to discuss a license. Appx20266. Rather than be the first manufacturer to take a license and set the market rate, LG refused to engage, ignoring messages from Constellation in 2017 and 2018. Appx20266-20267; Appx17918-17919. When LG finally responded in 2020, it took the position that it was “too early” to discuss a license—even though LG was already producing infringing televisions at that time. Appx20201; *see* Appx17922-17923. To escape taking a license, LG also filed a series of petitions challenging Constellation’s patents before the Patent Trial and Appeal Board. Those petitions went nowhere. Appx1098; *see* Appx6063; Appx6078.

B. Procedural History

Constellation filed this suit in December 2021, alleging that LG had willfully infringed the claims of the ’761, ’700, ’509, and ’922 Patents. Appx1007; Appx20201.

1. Relevant pre-trial proceedings

a. Constellation offered testimony from two experts. Constellation's technical expert, Dr. Mark Jones, testified that LG's televisions infringed each of the asserted patents. On damages, he also examined agreements negotiated by Zenith, a wholly-owned subsidiary of LG. Dr. Jones explained why the technology covered by those licenses, which was incorporated into the earlier version of the ATSC standard, was comparable to Constellation's patented technology. Constellation's damages expert, Dr. Ryan Sullivan, then explained why those licenses arose in comparable economic circumstances to a hypothetical negotiation between Constellation and LG. After accounting for any relevant differences, he concluded that Constellation was entitled to \$6.75 per infringing television. Appx6026-6028; *see* Appx20280.

LG moved to exclude Dr. Sullivan's testimony, arguing that Zenith's licensing agreements were not sufficiently comparable. The district court rejected that argument. As the court explained, "[t]here are almost never completely absolutely 100 percent comparable agreements." Appx20057. Accordingly, it was for the jury to decide whether the differences between the Zenith patents and the hypothetical negotiation were too great. Appx20057

(explaining that those differences “can be fairly explored and addressed on cross-examination”).

b. Before trial, Constellation moved for summary judgment on LG’s patent-eligibility defense, arguing that the claims were patent-eligible based on the claims and disclosures in the specification. Appx1073. LG opposed that motion. LG did not, however, move for judgment in its favor. It argued only that factual disputes precluded summary judgment on both steps of the *Alice* framework. Appx1164-1165.

The district court granted Constellation’s motion. Appx20024-20025. As the court explained, a trial on patent eligibility was not necessary because the patented inventions claim “a practical application to achieve improved, *i.e.*, optimized, channel capacity and more efficient over-the-air data transmission.” Appx20025. The court rejected LG’s contention that the claims were directed to the abstract idea of “optimization.” Appx20022. The court reasoned that “using parallel decode capacity to achieve improved capacity at a reduced signal-to-noise ratio” was a concrete advance eligible for patent protection. Appx20022; Appx20225. The court also rejected LG’s argument that the claims were invalid simply because they employed some

“conventional” components (*e.g.*, decoders) “to bring about a real achievement or improvement.” Appx20021.

2. Trial proceedings

A five-day jury trial began on July 5, 2023. To prove infringement, Constellation offered testimony from both the inventor, Dr. Chris Jones, and a technical expert, Dr. Mark Jones, who conducted tests of LG’s televisions, analyzed LG’s source code and internal testing, examined ATSC documents, and walked the jury through internal LG documents “show[ing] the design and operation of LG’s accused products.” Appx20219-20226; *see* Appx15868-5875 (source code); Appx17331; Appx18039-18044. To support its damages case, Constellation put forward Dr. Sullivan, who opined on the comparable license model that LG had unsuccessfully challenged before trial. Appx20276-20299.

LG offered its own technical expert, Dr. Robert Akl, who opined on both infringement and obviousness. Dr. Akl did not test LG’s televisions. Instead, he testified that LG’s televisions did not infringe because the constellations used by those televisions did not match the constellations claimed by the asserted patents. Appx20361-20363. LG also offered a damages expert, Dr. Brian Napper, who suggested that an appropriate damages award should

be based on the royalties paid for patents included in the ATSC 3.0 patent pool. Appx20394.

After hearing the evidence, the jury returned a verdict finding that LG willfully infringed Constellation's patents and awarding damages equal to \$6.75 per infringing television.

3. Post-trial proceedings

LG filed five motions challenging the jury's verdict, none of which asked the district court to enter a judgment of patent ineligibility based on the trial record. Instead, LG argued that it was entitled to judgment as a matter of law on liability because Constellation had relied on evidence related to the ATSC 3.0 standard alongside other evidence of infringement. Appx54. The court rejected that argument, explaining that "nothing . . . prevents a plaintiff from performing both a standards-based infringement read and a direct comparison of a limitation to an accused product." Appx55. The court further reasoned that there is nothing improper about relying on a standard to prove infringement for some limitations in a claim but not others. Appx56-57.

LG also asked the court to set aside the jury's infringement finding for certain televisions that use a semiconductor chip manufactured by a third party, Realtek, because Constellation's expert did not have the opportunity to

examine Realtek source code. The court rejected that argument, explaining that additional evidence in the record—including tests performed by Dr. Mark Jones and LG, Realtek’s internal documents, and the extensive testimony regarding digital-communications systems—supported the jury’s infringement finding. Appx66-71.

LG separately argued that it was entitled to judgment as a matter of law on damages, reprising the argument from its *Daubert* motion. Appx46-47. The court denied that motion for two separate reasons. First, the court held that LG’s argument was procedurally improper because it challenged “the admissibility of Dr. Sullivan’s testimony under the guise of challenging the sufficiency of the evidence.” Appx48. Second, the court rejected LG’s argument on the merits, holding that “[t]here is substantial evidence in the record [demonstrating] that the licenses are comparable.” Appx49.

SUMMARY OF ARGUMENT

I. The district court correctly held that the asserted claims are patent-eligible under both steps of *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

A. The claims provide a concrete improvement to digital-communications technology, which relies on constructing non-uniform constellations that use parallel decode capacity to increase performance. That approach broke from conventional wisdom and achieved benefits that were not possible using earlier technologies. LG argues that the asserted claims are directed to abstract ideas, such as “optimizing” constellations. But LG’s characterization of the claims finds no support in the claim language or specifications, which provide considerable detail regarding the claimed inventions.

B. Even if the patents are directed to abstract ideas, the innovative way of constructing non-uniform constellations disclosed by the claims is eligible for patent protection. LG’s argument to the contrary rests on the mistaken view that a claim cannot possess an inventive concept any time certain features of the inventions were known in the art. This Court has rejected that argument many times before and should do the same here.

C. If this Court holds that the district court erred in granting summary judgment to Constellation, it should remand for trial. LG did not ask the district court for summary judgment on invalidity below. Instead, it argued that a trial was necessary to resolve factual disputes on both steps of the *Alice* test. LG has not identified a single instance where an appellate court entered judgment in favor of a party that failed to move for summary judgment below. It would be inappropriate to take that drastic step here because patent eligibility was not at issue during the trial.

II. The jury's finding that LG infringed the asserted patents is supported by substantial evidence.

A. Constellation's evidence of infringement at trial included a detailed analysis of LG's documents and source code, live testing of LG's products, an examination of the ATSC standard, and testimony about the features of modern digital-communications systems. That evidence provides ample support for the jury's infringement verdict.

B. LG argues that the infringement verdict must be set aside because Constellation relied on evidence related to the ATSC standard. First, LG contends that Constellation could not rely on standards evidence without proving that the asserted claims as a whole are standard-essential. This

Court's decisions, however, do not prevent a plaintiff from using a standard alongside other evidence of infringement, as Constellation did here. Nor do they prevent a plaintiff from relying on a standard to support its infringement case for some limitations but not others. Second, LG challenges the jury's finding that its televisions practiced the relevant portions of the standard. The jury heard evidence establishing that LG's televisions were capable of receiving ATSC 3.0 signals and incorporated the constellations recited in the standard. The jury's verdict is thus supported by substantial evidence.

C. LG also asks this Court to set aside the verdict with respect to devices running on a Realtek chip because Constellation's expert did not have access to Realtek source code. That argument overlooks the substantial evidence in the record (including testing results and testimony from LG's expert) that supports the jury's infringement finding for each limitation of the asserted claims.

III. The jury's damages award was legally sound and supported by the evidence in the record.

A. This Court has explained that a plaintiff can establish a reasonable royalty by relying on a prior license that is technically and economically comparable to the hypothetical negotiation. Constellation followed that law to

the letter, presenting detailed evidence regarding the similarities and differences between prior licenses negotiated by Zenith (an LG subsidiary) for its own ATSC technology and the hypothetical negotiation in this case. And the jury's damages award reflected a conservative valuation of the patented technology, which offered unparalleled improvements to digital-communications systems.

B. LG does not contest the use of a comparable license to establish damages. Instead, it argues that the licenses relied on by Constellation were too dissimilar from the hypothetical negotiation to support the verdict in this case. As the district court recognized, that argument fails because LG cannot escape the abuse-of-discretion standard for a *Daubert* motion by repackaging the same arguments as a challenge to the jury verdict. And on the merits, LG's arguments rest on factual issues that were squarely addressed by Constellation's experts below.

STANDARD OF REVIEW

“Patent eligibility under § 101 is an issue of law” that is reviewed *de novo* by this Court. *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1312 (Fed. Cir. 2016).

This Court reviews motions for judgment as a matter of law “under the law of the regional circuit.” *Raytheon Co. v. Indigo Sys. Corp.*, 895 F.3d 1333, 1338 (Fed. Cir. 2018). In the Fifth Circuit, “[j]udgment as a matter of law is appropriate only where ‘the facts and inferences point so strongly and overwhelmingly in favor of one party that the court concludes that reasonable jurors could not arrive at a contrary verdict.’” *Id.* (citation omitted).

The district court’s decision to admit expert testimony is reviewed for abuse of discretion. *See i4i Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 852 (Fed. Cir. 2010). “When [an expert’s] methodology is sound, and the evidence relied upon sufficiently related to the case at hand, disputes about the degree of relevance or accuracy (above this minimum threshold) may go to the testimony’s weight, but not its admissibility.” *Id.* (citation omitted).

ARGUMENT

Constellation’s inventions provided a groundbreaking and concrete improvement in the field of digital-communications technology. The record at trial showed that those inventions were infringed by LG’s televisions and that Constellation was entitled to damages of roughly \$6.75 per television to compensate for that infringement. LG’s arguments to the contrary rest on

either a mischaracterization of the patented inventions or a misreading of the record below.

I. CONSTELLATION’S INVENTIONS ARE PATENT-ELIGIBLE.

Claims are eligible for patent protection so long as they are not directed to “laws of nature, natural phenomena, [or] abstract ideas,” or possess “an ‘inventive concept’” that “ensure[s] that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.” *Alice Corp.*, 573 U.S. at 217-218 (quoting *Mayo Collab. Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72-73 (2012)). Constellation’s claims readily satisfy that test. The asserted patents claim communication systems that require non-uniform constellations constructed based on parallel decode capacity or recite specific constellations built using that innovative process. Before the patented inventions, no one in the field had considered building non-uniform constellations based on parallel decode capacity to increase performance. By rejecting the consensus, the inventors discovered a precise way to achieve efficiency gains that were previously unheard of. Simply put, the asserted claims cover exactly the sort of concrete and transformative inventions that the patent laws are meant to protect.

LG principally argues that the claims are invalid because they are directed to the abstract idea of “optimizing” constellations. As the district court explained, that argument ignores the detailed limitations recited in the claims. LG also contends that the claims lack an inventive concept because certain features of the patented invention were known in the prior art. This Court need not reach that issue to affirm. But even if LG could show that Constellation’s inventions were directed to abstract ideas, the claims would still be patent-eligible because they disclose an innovative way of improving the performance of a digital-communication system through the use of non-uniform constellations that are optimized based on parallel decode capacity. LG also asks this Court to grant summary judgment in its favor on patent eligibility. LG never asked for that relief below, and accordingly this Court should remand if it determines that the district court erred in resolving eligibility at summary judgment.

A. Constellation’s Patent Claims Are Not Directed To Abstract Ideas.

This Court has consistently held that claims are patent-eligible when they recite a “specific improvement” and “solve a technological problem.” *Ancora Tech., Inc. v. HTC America, Inc.*, 908 F.3d 1343, 1347-1348 (Fed. Cir.

2018); *see McRo, Inc. v. Bandai Namco Games Am., Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016). That is precisely what Constellation’s claims do.

1. The claims disclose a concrete improvement in digital-communications technology.

The plain language of the claims discloses specific, concrete improvements in digital-communications technology—namely, techniques for improving the capacity and efficiency of over-the-air communications channels. Each of the asserted claims recites a discrete article: a “receiver,” which is capable of receiving broadcast signals via a communication channel. Appx141; Appx197-198; Appx260; Appx447-449. The claims further require that the system include the components necessary to process the signal (*e.g.*, demappers and decoders). And most importantly, the claims recite a means of improving the capacity of a digital-communications channel by constructing non-uniform constellations to improve performance using parallel decode capacity—with some claims going even further and claiming specific sets of non-uniform constellations:

Patent	Relevant Limitations
'761 (Claims 17, 21, 24, and 28)	Claim 17: “[A] geometrically spaced symbol constellation” (<i>i.e.</i> , non-uniform), “optimized for capacity using parallel decode capacity that provides a given capacity at a reduced signal-to-noise ratio” compared to a uniform constellation.
'700 (Claim 5)	Claim 1: “[A] plurality of different non-uniform constellations” where “each of the plurality of different non-uniform multidimensional symbol constellations is only included in one of the plurality of predetermined LDPC code rate and multidimensional symbol constellation pairs.” Claim 5: The system of Claim 1 with “non-uniform multidimensional symbol constellations” “capable of providing a greater parallel decoding capacity at a specific [signal-to-noise] ratio.”
'509 (Claims 21 and 23)	Claim 21: “[A] symbol constellation” that “includes constellation points” where “the locations of at least two of the constellation points are the same.” Claim 23: A “plurality of unequally spaced constellations” of different sizes (<i>e.g.</i> , 64-symbol, 256-symbol) and a receiver that “selects an LDPC code rate and the unequally spaced symbol constellation.”
'922 (Claims 24 and 44)	Claim 24: “NU-QAM 1024 constellations” with “32 levels of amplitudes” within “0.55” of specific amplitudes.

Appx141, Appx197, Appx260, Appx447-449.*

As that language demonstrates, each of the asserted claims recites a system that uses non-uniform constellations. To improve performance, they require either constellations constructed using parallel decode capacity or recite specific constellations and features discovered by the inventors using that method (*e.g.*, two points in the same location). The claims are accordingly directed to a concrete technique for more efficiently communicating digital

* “LDPC” stands for “low density parity check” and refers to a type of error-correction decoding. Appx20171.

information—rather than to an abstract idea that underlies all digital-communications technology. *See McRO*, 837 F.3d at 1315 (explaining that claims are patentable when they recite “specific format[s]” and specify “desired results”); *see, e.g., Uniloc USA, Inc. v. LG Elec. USA, Inc.*, 957 F.3d 1303, 1307 (Fed. Cir. 2020) (holding claims eligible at step one because they disclosed an invention that “reduce[d]” the “latency” of a communications system); *Sycamore IP Holdings LLC v. AT&T Corp.*, 294 F. Supp. 3d 620, 652-653 (E.D. Tex. 2018) (Bryson, J.) (holding claims eligible at step one because they disclosed “the conversion of data into a form that makes the communication of data more efficient”).

The patents’ specifications also provide detail on the invention recited in the claims. For example, the specifications for the ’761, ’700, and ’509 patents explain how the non-uniform constellations are constructed to reduce the signal-to-noise ratio. Appx135; Appx192; Appx252. Those specifications also disclose constellations that were constructed using the patented invention. Appx128 (Fig. 21). And the specification for the ’922 patent is even more detailed: it discloses *hundreds* of specific non-uniform constellations constructed based on parallel decode capacity, and it defines the precise

ranges where symbols must be located to improve performance. Appx438 (discussing Figures 126-145).

By disclosing an innovative approach to digital communications, the claimed inventions also “achieve[] . . . benefits over conventional” technologies. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337 (Fed. Cir. 2016). The patents’ specifications discuss how “[c]ommunication systems have a theoretical maximum capacity . . . known as the Shannon [L]imit.” Appx135; Appx436. The specifications walk through various prior unsuccessful efforts to approach the Shannon Limit—including attempts to “develop unequally spaced constellation” in an “uncoded system” (rather than a coding method like LDPC coding). Appx135; Appx436. They also explain how the patented inventions finally unlocked significant efficiency gains by “locating points . . . in order to maximize capacity between the input and output of a bit or symbol mapper or demapper respectively.” Appx135; Appx436.

In short, Constellation’s claims have the hallmarks of a patent-eligible invention: they recite (i) a *specific* type of constellation (non-uniform constellations), (ii) constructed using a *specific* measure of efficiency (parallel decode capacity), (iii) that achieves a *specific* benefit (more efficient data transmission). *See, e.g., Enfish, LLC*, 822 F.3d at 1339; *Uniloc USA*, 957 F.3d

at 1307. And because they claim only one concrete approach to constructing constellations, they do not preempt future innovations in digital-communications technology. *See McRo*, 827 F.3d at 1315 (“The concern underlying the exceptions to § 101 is not tangibility, but preemption.”).

2. LG’s arguments lack merit.

In arguing that the claims are unpatentable, LG tries a familiar tack: it first narrows the claims to a single limitation, ignoring the way the claimed elements work together. It then frames that limitation at an extremely high level of generality (“optimization”), ignoring the patent’s specific guidance. This Court has rejected that approach many times and should do the same here. *See, e.g., SRI Int’l, Inc. v. Cisco Sys., Inc.*, 930 F.3d 1295, 1303 (Fed. Cir. 2019) (rejecting argument that claims were “directed to just analyzing data”).

a. LG’s principal argument on appeal (at 21) is that Constellation’s claims are directed to the abstract idea of “optimization,” which is “an unpatentable mathematical operation.” Of course, “describing the claims at such a high level of abstraction and untethered from the language of the claims all but ensures that the exceptions to [Section] 101 swallow the rule.” *Enfish*, 822 F.3d at 1337; *see Diamond v. Diehr*, 450 U.S. 175, 189 n.12 (1981) (explaining that “all inventions can be reduced to underlying principles of

nature”). Constellation is not “broadly and generically claim[ing]” *any* way to “optimize” channel capacity. *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1258 (Fed. Cir. 2014). Instead, its patents claim a concrete way to improve channel capacity by using non-uniform constellations constructed based on parallel decode capacity. For some of the claims, the invention is even more precise, claiming constellations of particular sizes (*e.g.*, “256-point”) or within defined amplitude ranges (*e.g.*, “-38.424”). Appx260; Appx447; *see California Inst. of Tech. v. Broadcom Ltd.*, 25 F.4th 976, 988 (Fed. Cir. 2022) (holding that claims “directed to an efficient, improved method of encoding data” were patent-eligible even though they “employ[ed] a mathematical formula”).

Given that specificity, the asserted claims are readily distinguishable from those this Court has previously held invalid—including in the cases relied on by LG. In *Two-Way Media Ltd. v. Comcast Cable Comm’ns, LLC*, 874 F.3d 1329 (Fed. Cir. 2017), for example, this Court confronted bare-bones claims that simply recited “routing” data packets and “monitoring” the results. As the Court explained, the claims were unpatentable because they described a result but offered no means of achieving it. *Id.* at 1337. Similarly in *Hawk Technology Systems, LLC v. Castle Retail, LLC*, 60 F.4th 1349 (Fed. Cir.

2023), the claims recited “converting information from one format to another,” but never “describe[d] how the alleged goal” was to be “achieved.” *Id.* at 1357. The claims here are very different. They do not merely recite a broad goal like “improved efficiency.” Instead, they outline a “specific solution” for constructing a communication system to bring about the “alleged improvement.” *Hawk Tech.*, 60 F.4th at 1358.

LG resorts (at 20-21) to stray quotes that supposedly demonstrate the abstract nature of the inventions. For starters, this Court frequently resolves the step-one inquiry on the face of the patent, “which defines the breadth of each claim,” *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 766 (Fed. Cir. 2019), not by relying on expert testimony introduced to muddy the waters, *see CardioNet, LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1372 (Fed. Cir. 2020) (“*Alice* step one presents a legal question that can be answered based on the intrinsic evidence.”).

In any event, LG’s arguments do not hold up. LG says (at 21) that Constellation’s expert opined that its patents “covered ‘any method or optimization process.’” Those words came from *LG’s lawyer*, who asked “if a constellation *is optimized for capacity using parallel decode capacity* by any method or by any optimization process, would it meet the claim language[?]”

Appx1198-1199 (emphasis added). Constellation’s expert rejected that characterization, responding that the constellation “would have to meet all of the claim language” in order to infringe. Appx1199.

LG also argues (at 21) that the claims are abstract because they cover any “quantity of signal-to-noise improvement, however small that improvement might be.” The only authority for that proposition is deposition testimony explaining that there may be multiple non-uniform constellations that achieve a similar performance level compared to a uniform constellation. Appx1196-1197. The patented inventions are not abstract simply because two constellations can perform similarly. Moreover, LG has not explained why the “quantity of” the improvement taught by the claims is relevant to step one. What matters is whether Constellation’s innovative way of achieving that improvement is patent-eligible, and the specific limitations recited in the claims demonstrate that it is.

b. LG tries to create daylight between the asserted claims, suggesting that the ’700, ’509, and ’922 Patent claims are invalid because, unlike the ’761 Patent claims, they do not use the word “optimization.” Here again, LG’s caricature ignores the specificity found in the claims. Each of the asserted claims is directed to non-uniform constellations that improve

performance based on a specific approach—even if some of them do not use the magic word “optimization.”

First, LG argues (at 26) that the ’700 and ’509 Patent claims “preempt[] all” means of selecting a code rate and symbol constellations. But rather than claiming “selection” generally, the claims provide important limits on how code rates are selected. The ’700 Patent claims a system that pairs a specific type of constellation (“non-uniform multidimensional symbol constellations”) with a specific type of code rate (a “predetermined LDPC code rate”), to “provid[e] a greater parallel decode capacity at a specific [signal-to-noise] ratio.” Appx198-199. The specification explains why the “achieve[d] gain” for each constellation differs based on the code rate, Appx193, and describes in detail the “process for selecting the points,” which includes “ensur[ing] that the constellation size can support the desired capacity.” Appx194.

Similarly, the ’509 Patent claims limit the selection to non-uniform constellations with a “plurality of unique point locations [that] are unequally spaced,” where “at least two of the constellation points are the same” location—a feature that makes sense only in light of Constellation’s groundbreaking innovation. Appx260; *see supra*, at p. 10. Given that specificity, the asserted claims are nothing like those addressed in LG’s

authorities. *See In re Rudy*, 956 F.3d 1379, 1381 (Fed. Cir. 2020) (rejecting claims directed at selecting the color of a fishhook based on the color of the water); *Cisco Sys., Inc. v. Uniloc 2017 LLC*, 813 Fed. Appx. 495, 498 (Fed. Cir. 2020) (rejecting claims that did not “specify any particular metric or method” for making a selection).

Second, LG contends (at 26) that the '922 Patent claims only the well-known practice of “representing a signal as a constellation.” That argument is completely untethered from the claim language. Far from claiming constellations writ large, the asserted claim covers only non-uniform constellations discovered by the inventors using their innovative approach, which have specific features recited in the claims. Appx447-449. The claim language is narrow, requiring that the constellations include thirty-two highly specific amplitudes (*e.g.*, “-38.424”). Appx447. And the specification describes the process used to develop each of the claimed constellations, including the specific coding methods that result in the greatest performance improvement. Appx436-437; Appx439.

Finally, LG suggests (at 24) that the district court erred by relying solely on “optimization” to reject LG’s challenge to the patentability of the '509, '700, and '922 Patents. But the court correctly explained that each of the

patented inventions paired non-uniform constellations with “parallel decode capacity to achieve improved capacity.” Appx20022. That is entirely correct. To the extent the court mentioned “optimization” in explaining its decision, that is because LG argued that “the focus of the claims is about obtaining optimized constellations.” Appx20020; *see* App20022 (arguing the claims “preempt[] the concept of optimizing”).

B. Constellation’s Patent Claims Have An Inventive Concept.

Even if LG could show that Constellation’s claims are directed to “optimization,” the summary-judgment record demonstrates that Constellation’s claims disclose a technical application of “optimization” that “transforms the abstract idea into a patent-eligible invention.” *CosmoKey Sols. GmbH & Co. KG v. Duo Sec. LLC*, 15 F.4th 1091, 1097 (Fed. Cir. 2021).

First, the patents themselves explain that, before Constellation’s inventions, “earlier approaches” to digital communications had never attempted to construct non-uniform constellations based on parallel decode capacity. Appx135; Appx191; Appx251; Appx436. They describe in detail the difference between the patented inventions and older technologies, which relied on a “specially designed coding mechanism” rather than “maximiz[ing] capacity between the input and output of a bit or symbol mapper and

demapper respectively.” *Id.* They also describe how the inventions achieved considerable efficiency gains and “nearly eliminated the gap” to the Shannon Limit. *Id.* Accordingly, “the claimed steps were developed by the inventors . . . and yield certain advantages over the described prior art”—exactly what is needed to find an invention patentable at step two. *CosmoKey Sols.*, 15 F.4th at 1098.

Second, additional evidence in the summary-judgment record confirmed that the patented inventions were far from “routine or conventional.” *Id.* at 1098. Constellation submitted an article co-authored by an LG employee, which credited the inventors as the first to develop non-uniform constellations optimized for parallel decode capacity. Appx1097-1098; *see* Appx6097. Constellation identified LG’s statements touting the benefits of the patented technology reflected in the ATSC 3.0 Standard. Appx6105. Constellation also directed the court to decisions from the PTAB denying LG’s attempts to challenge Constellation’s patents through *inter partes* review, including for the ’761 Patent. Appx6063; Appx6078. And to the extent this Court accepts LG’s invitation to look at the trial record, the jury rejected LG’s obviousness challenge to the asserted patents, which largely mirrored its step-two argument from summary judgment. Appx36; Appx1173 (arguing that

Constellation's claims failed step two because they recited elements disclosed by prior art).

Despite that evidence, LG argues (at 27-28) that the claims lack an inventive concept because its expert opined that various features of the patented inventions (such as decoders or demappers) were well known in the art. That is irrelevant. “[A]n inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces.” *Bascom Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016). In other words, LG's expert could be right that decoders were conventional, but LG cannot point to anyone before the named inventors who had tried pairing conventional features of a communication system with non-uniform constellations that were constructed in the manner disclosed by the patented inventions. That “specific, discrete implementation of the abstract idea” of optimization is enough to reject LG's challenge. *Bascom*, 827 F.3d at 1350.

C. LG Cannot Obtain A Judgment Of Ineligibility.

Finally, LG's request (at 30) that this Court “enter[] judgment of ineligibility in favor of LG” is inappropriate. LG never moved for summary judgment on patent eligibility. Instead, it argued at length that “genuine

disputes of material fact precluded summary judgment” on both steps one and two. Appx1164-1187. Accordingly, the district court was never asked to find the claims patent ineligible absent a trial. LG does not cite a single decision entering such a judgment on appeal. Instead, it cites a decision where this Court *declined* to grant the relief LG is seeking and remanded the case. Br. 30 (citing *Litton Indus. Prod., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 164, 167 (Fed. Cir. 1985)).

LG’s only argument for taking an unprecedented step here is a “trial record” where patent eligibility was not at issue and the jury rejected LG’s obviousness evidence. LG cannot rely on a few misleading excerpts of trial testimony on a different issue to carry its burden of proving patent-ineligibility by “clear and convincing evidence”—particularly on *Alice* step two, which involves questions of fact. *See Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018). Accordingly, if the district court erred in granting summary judgment, the proper course is to remand for a new trial—not to resolve the issue on appeal based solely on trial testimony related to obviousness.

II. SUBSTANTIAL EVIDENCE SUPPORTED THE JURY’S INFRINGEMENT FINDING.

Constellation presented the jury with a clear case of infringement. Its technical expert examined LG’s internal documents and source code,

conducted tests demonstrating that those televisions infringed Constellation's patents, and discussed LG's own statements touting its use of the ATSC 3.0 standard. That opinion was buttressed by other witnesses, who explained the features of digital-communication systems incorporated in LG's televisions and confirmed that those televisions are compatible with the ATSC 3.0 standard. Given Constellation's evidence, the jury's infringement finding has ample support in the record.

LG does not dispute much of that evidence. Instead, it argues that the jury should have been barred from hearing *any* evidence about the ATSC 3.0 standard because Constellation did not show that its claims were standard-essential and did not prove that LG's televisions used the constellations found in the standard. But this Court's decisions did not prevent Constellation from relying on standards evidence alongside other evidence of infringement. And the jury was entitled to reject LG's evidence purporting to show that it departed from the standard.

LG also argues that the jury could not have found infringement for LG televisions running on a semiconductor chip manufactured by Realtek because Constellation did not have access to that chip's source code. Other evidence in the record—including testing results and testimony from LG's expert—

confirmed that televisions running on the Realtek chip infringed every limitation of the asserted claims.

A. The Jury Was Presented With Considerable Evidence of Infringement.

An accused product infringes a patent when it “meets all the limitations of the asserted claims.” *E.I. du Pont De Nemours & Co. v. Unifrax I LLC*, 921 F.3d 1060, 1073 (Fed. Cir. 2019). To prove infringement, a plaintiff can rely on both direct and circumstantial evidence. *See Liquid Dynamics Corp. v. Vaughn Co., Inc.*, 449 F.3d 1209, 1219 (Fed. Cir. 2006). Because infringement is a fact-bound inquiry, a jury’s infringement verdict should be upheld unless the “evidence points so strongly and overwhelmingly in favor of one party that the court believes that reasonable jurors could not arrive at any contrary conclusion.” *Versata Software, Inc. v. SAP America, Inc.*, 717 F.3d 1255, 1261 (Fed. Cir. 2013).

Constellation’s evidence pointed overwhelmingly in favor of the jury’s infringement verdict. Constellation’s technical expert, Dr. Mark Jones, conducted a thorough examination of LG’s televisions and demonstrated that they infringed Constellation’s claims.

Internal documents. Dr. Jones analyzed internal documents and testing prepared by LG and Realtek. Those documents demonstrated that the

receivers in LG's televisions included the demodulators, demappers, and decoders required by the claims. Appx20229 (discussing Appx18039-18040; 18048). They also confirmed that LG's televisions use the specific non-uniform constellations claimed by the asserted patents. Appx20216; Appx20218; Appx20220.

Testing. Dr. Jones conducted his own tests, which showed that each of LG's televisions performed demodulation, demapping, and decoding, and "was able to receive and display the information in the ATSC 3.0 signal." Appx20221. As Dr. Jones explained, the ATSC 3.0 signals contained the precise non-uniform constellations claimed by Constellation's patents. Appx20229-20235. To support his own testing, Dr. Jones also evaluated tests performed by LG, which confirmed that LG's televisions were able to receive and display signals generated from non-uniform constellations that infringed Constellation's patents. Appx20222.

Source code. Dr. Jones also examined the source code for LG's chips. Appx20222-20225. As Dr. Jones explained, that code included the very same constellations that were found in the ATSC 3.0 standard and claimed by Constellation's patents. Appx20223-20224. Without any need to examine the Realtek source code, he explained that the performance of those chips

matched the performance of televisions running on LG’s own chips—confirming that they necessarily practiced the patented inventions. Appx20222 (discussing the “performance” of LG’s “B17+ chip” and “the Realtek chip” and finding “that the performance is commensurate”).

Technical background and the ATSC standard. Dr. Jones also explained the basic characteristics of digital communications and the ATSC 3.0 standard. He examined ATSC 3.0 documents showing the specific constellations used by the standard and the features that a receiver must have to process ATSC 3.0 signals. Appx20219-20220 (discussing Appx15630; Appx15962). That analysis was reinforced by the inventor and LG’s technical expert, both of whom testified about features of receivers used in modern communications systems. Appx20168-20170; Appx20355-20359.

After presenting that extensive evidence, Dr. Jones went limitation-by-limitation through the claims, explaining why each one was infringed by LG’s televisions. Appx20228-20234. Dr. Jones’s testing and testimony went far beyond the substantial evidence required to uphold the jury’s verdict.

B. The Jury Was Entitled To Hear Evidence Regarding The ATSC 3.0 Standard.

Despite that evidence of infringement, LG argues that the jury’s verdict must be set aside because, as part of its infringement case, Constellation relied

on facts about how the ATSC 3.0 standard functions. First, LG appears to contend (at 37) that a jury cannot consider any evidence related to an industry standard unless the “asserted claim covers every possible implementation of the standard.” LG identifies no support in case law or common sense for that rigid rule. Second, LG argues that Constellation’s use of the ATSC 3.0 standard is not supported by the facts. That backup argument misunderstands the evidence presented to the jury, which demonstrated that LG’s televisions practiced the patented inventions.

1. LG’s argument hinges on this Court’s decision in *Fujitsu Ltd. v. Netgear Inc.*, 620 F.3d 1321 (Fed. Cir. 2010). In the typical patent case, the plaintiff establishes infringement by comparing the asserted claims directly to the accused products. In *Fujitsu*, the plaintiff sought to carve out an exception to that rule by proving (i) the defendant’s products practiced two industry standards for wireless communications, and (ii) any implementation of the standards would necessarily infringe its patents. *Id.* at 1327. According to the plaintiff, there was no need to “show evidence of infringement for each accused product” because *any* product that “compl[ied] with the standard” would “necessarily infring[e] the asserted claims.” *Id.* at 1325.

This Court blessed that exception, holding that “if an accused product operates in accordance with a standard, then comparing the claims to that standard is the same as comparing the claims to the accused product.” 620 F.3d at 1325. At the same time, the Court explained that two conditions are necessary “to prove infringement by showing standard compliance”: (i) the standard “provide[s] the level of specificity required to establish that practicing that standard would always result in infringement,” and (ii) “the relevant section of the standard is” mandatory. *Id.* at 1327-1328. That test makes sense: when a plaintiff seeks to prove infringement based solely on a standard, the only way to ensure that the accused products practice the invention is to show that *every* product that complies with the standard *must* infringe the patent claims. Otherwise the plaintiff cannot rely on *Fujitsu’s* narrow exception, and must instead put forth evidence “compar[ing] the claims [directly] to the accused products.” *Id.* at 1328.

By its terms, *Fujitsu* creates a rule for situations where a plaintiff tries to establish infringement through “standards compliance *alone*,” 620 F.3d at 1327 (emphasis added)—not where a plaintiff relies on a standard alongside direct evidence about the accused products, *see id.* at 1328. Every subsequent decision discussing *Fujitsu* has understood it that way. *See INVT SPE LLC*

v. *ITC*, 46 F.4th 1361, 1377 (Fed. Cir. 2022) (*Fujitsu* applies where a plaintiff seeks to “establish infringement *simply by arguing* that the product practices the standard.”) (emphasis added); *Godo Kaisha IP Bridge 1 v. TCL Commc’n Tech. Holdings Ltd.*, 967 F.3d 1380, 1384 (Fed. Cir. 2020) (*Fujitsu* describes when “*it [is] enough* to prove infringement by showing standard compliance.”) (emphasis added).

That is not what Constellation did. Rather than prove infringement solely by showing that LG’s televisions complied with the ATSC 3.0 standard, Constellation put forward considerable evidence about the actual functionality of those products—evidence that included source-code analysis, real-world tests, and a review of LG’s own documents. *See supra*, at pp. 41-43. Nothing in *Fujitsu*, *INVT*, or any other case supports LG’s rule that a standard can be relevant *only* in cases where a plaintiff is relying entirely on that standard to prove infringement. Indeed, this Court has previously rejected that rigid all-or-nothing approach. *See Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1365 (Fed. Cir. 2012) (looking to industry standard as evidence even though relevant limitation was not required by the standard). Accordingly, Constellation was entitled to present both standards-related evidence and other evidence about LG’s products when proving infringement.

2. LG nonetheless asks this Court (at 38-41) to extend *Fujitsu* to preclude introducing *any* standard-related evidence unless the plaintiff shows that the “asserted claims” as a whole “are standard essential.” According to LG (at 37), that rule requires reversal here because Constellation relied on the ATSC 3.0 standard alone to prove infringement for certain limitations in the claims. Both the premise and the conclusion are wrong. Constellation did not rely solely on standard-essentiality for any part of its infringement case. And even if it had, there is nothing wrong with relying on the standard to prove infringement for some limitations but not others.

a. First, LG’s premise is mistaken. As explained above (at 42-43), Constellation showed that LG’s televisions infringed each element of the asserted claims. For instance, to prove that LG’s televisions included the claimed demodulators, demappers, and decoders, Constellation pointed to LG’s internal documents and tests. To prove that those televisions used infringing constellations, Constellation tested those televisions directly and examined LG’s source code. Accordingly, Constellation did not rely on a “mix-and-match approach” to prove infringement.

In arguing otherwise, LG focuses on the constellations, claiming that Dr. Mark Jones “only compared the constellation point values in the claims to

those in A/322, *not* to those in LG’s chips.” Br. 33 (bold omitted); *see* Br. 52 (claiming that “Jones relied on the constellations in A/322”). That is a red herring. In explaining his opinions, Dr. Jones established that the constellations claimed by the patented inventions matched the constellations in the ATSC 3.0 Standard. Appx20229; *see* Appx20177. He then explained that the infringing televisions were able to receive and display signals that relied on those very constellations and examined source code that included those constellations as well. Appx20220-20224. In other words, he “compare[d] the claims to the accused products.” *INVT*, 46 F.4th at 1377. Given that testimony directly tying LG’s televisions to the patent claims, Constellation did not need to establish standard-essentiality for any limitation. Appx59 (“[N]othing . . . precludes a party from relying on a standard in combination with direct comparison for a particular limitation.”).

b. Even if that analysis did implicate this Court’s decisions involving standard-essential patents, there is no reason in law or logic to preclude a plaintiff from using standards evidence only for certain limitations. A plaintiff must prove infringement limitation-by-limitation, *see E.I. du Pont*, 921 F.3d at 1073, and it is common for infringement evidence to speak to some limitations but not others. Accordingly, if a plaintiff can show that any accused

product that practices a standard necessarily infringes a particular limitation of a patent claim, the jury should be allowed to rely on that evidence to determine if that limitation has been infringed. As the district court explained, “[i]t would be a waste of judicial resources to separately analyze a limitation for each individual product that practices a standard when it can be shown that all products practice that limitation because they practice a standard.” Appx57.

LG has not identified any contrary authority. It cherry-picks stray quotes from a recent decision that applied *Fujitsu* at the level of an entire claim, without discussing specific limitations. *See* Br. 39-40 (citing *INVT*, 46 F.4th 1361). But this Court in *INVT* discussed the entire claim only because the plaintiff there argued that the claims as a whole were standard-essential. That is not what Constellation argued here, so the district court correctly recognized that *INVT* has no application when a plaintiff “attempt[s] to use the standard on a limitation basis in combination with direct evidence for other limitations.” Appx58-59.

LG ultimately falls back on policy, arguing (at 41) that a limitation-by-limitation approach to standards evidence would give patent owners free rein to “cite a portion of a standard as circumstantial evidence for a limitation even

if the standard has no nexus to the claims.” Yet a standard with “no nexus to the claims” is not circumstantial evidence of anything. When a plaintiff can show that standards-related evidence was relevant to infringement, there is no reason the jury should not be able to consider it—just like the jury can consider any other type of relevant evidence.

3. LG also challenges the factual record, arguing (at 42-47) that Constellation failed to show that LG actually implements the portions of the standard that were relevant to its infringement case. Its arguments either misstate the record or misunderstand the law.

First, LG argues (at 44) that no reasonable jury could find that its televisions practice the ATSC 3.0 standard because “LG presented substantial evidence at trial that it can, and does, deviate from [the standard’s] constellations.” Specifically, LG points to testimony from its own employee stating that he “intentionally developed and incorporated constellation values *different* from those in A/322,” as well as testimony from its expert opining that the constellations in the LG products were different from those claimed by Constellation’s patents. Br. 35-36 (citing Appx20350; Appx20362-20363).

Dr. Mark Jones refuted that testimony. He explained that LG’s expert failed to distinguish between constellations expressed in decimals and

constellations expressed in binary code (*i.e.*, 1s and 0s). Appx20224. He also told the jury why, once that error was corrected, the constellations found in the source code were a precise match for the constellations described in the ATSC 3.0 standard and claimed by Constellation's patents. Appx20224 (explaining that "the representation" "in 10-digit binary is the same"); Appx20251; *see* Appx20352 (testimony of LG employee); Appx20379-20380 (testimony of LG expert). That analysis was confirmed by LG's corporate witness, Richard Lewis, who testified that the part of the standard "with the constellations" was "incorporated into [LG's] chipsets." Appx20317. Remarkably, LG never mentions that testimony in the portion of its brief asking this Court to reweigh the evidence. *See* Br. 44-47.

Second, LG faults Constellation (at 42-43) for not proving that its claims were standard-essential. As explained above, Constellation did not need to make that showing. What Constellation did need to establish was that the portions of the standard it relied on were relevant to infringement. That requirement was satisfied by Dr. Jones's testimony that the specific constellations found in the standard were claimed by Constellation's patents and used in LG's televisions. Appx62 (collecting evidence); *see supra*, at pp. 42-43. LG appears to challenge that evidence (at 43, 46) on the ground that

the claims are directed to receivers while the standard discusses transmitters. But multiple witnesses explained that receivers have to align with transmitters to receive broadcast signals. Appx20170-20171; Appx20216. LG has not explained why it was unreasonable for the jury to agree.

C. A Reasonable Jury Could Find That Televisions Running On The Realtek Chip Infringed The Asserted Patents.

LG's other infringement challenge is even narrower. According to LG (at 47), the jury could not find that televisions with Realtek chips infringed various limitations of the asserted claims because Constellation's expert did not have access to Realtek source code. That argument is meritless. There is no hard-and-fast rule that a plaintiff must examine source code to establish infringement. Here, Constellation's evidence established that the Realtek chips have demappers and decoders, rely on likelihoods to perform decoding, and use the constellations claimed by Constellation's patents. LG's challenges to that evidence on appeal simply repeat the factual assertions that the jury considered and rejected at trial.

1. Substantial evidence showed that the Realtek products have a demapper and decoder.

a. The jury's finding that the Realtek chips have the demappers and decoders required by the claims has ample support in the record. Appx66-68.

First, multiple witnesses at trial (including LG's expert) testified that demappers and decoders are critical features for modern digital-communications systems, and would therefore be present in any television that receives broadcast signals. Appx20170-20171 (Chris Jones); Appx20356 (Akl) (explaining that "the typical components on the receiver side"); Appx20358. To support that point, Dr. Mark Jones pointed to portions of the ATSC 3.0 standard and explained that the "standard required a decoder and demapper." Appx68; *see* Appx20219-20222; Appx15962 (portion of the standard discussing "de-mapping for non-uniform constellations").

Second, Dr. Mark Jones performed tests on LG's televisions. Those tests demonstrated that, like LG's other televisions, the televisions running on the Realtek chip were capable of receiving and displaying ATSC 3.0 signals. Appx20221 (discussing "test results" for Realtek's K8HP chip). Dr. Jones also described LG's own tests of the Realtek chip, which aligned with his findings. Appx20222.

Third, Dr. Jones looked to Realtek's own document describing the features of its chip and explained why it necessarily demonstrated a demapper and decoder. Appx20229 (citing Appx18048) (demapper); Appx20229 (decoder).

b. LG does not address the testimony explaining that modern communications systems need a demapper and decoder to process broadcast signals, nor does it explain how its televisions could possibly receive ATSC 3.0 signals without those structures. Instead, LG argues (at 48-50) that the jury should have rejected Dr. Jones's interpretation of a Realtek internal document because it does not use the word "demapper" and "decoder." *See* Appx20359 (Akl). But Dr. Jones explained why the particular document supported his conclusion. Appx20229 (explaining that the "blocks" in the Realtek document show that device "supports demapping" and that the signal that feeds into the demapper "is the demodulated signal coming from the demodulator"); Appx18045. That is a jury question, and the jury was entitled to credit Dr. Jones's interpretation over LG's. Appx68.

LG also claims (at 50) that Dr. Jones never testified that the testing results showed that the Realtek chips included demappers and decoders. But Dr. Jones referred to both "testing I've done and testing LG has done" when explaining why he believes that "LG's accused ATSC 3.0 TV's really perform the demodulation, demapping, and decoding" required by the claims. Appx20221. He repeatedly referred to his testing results when walking

through each element of the asserted claims. Appx20227-20234. That is alone enough to sustain the jury's verdict.

2. Substantial evidence showed that the Realtek products use the “likelihoods” required for soft decoding.

The evidence at trial also demonstrated that the Realtek chips use the “likelihoods” (sometimes called “log likelihood ratios”) required by the claims. Appx68-70.

First, the jury heard that likelihoods are an essential component of modern digital-communications systems. Appx20170-20171; Appx20219; Appx20358. As the inventor explained, older technologies relied on a process called “hard decoding,” whereby the receiver would simply pick the point on the constellation that was closest to the received radio signal. Appx20171. By contrast, newer technologies use “soft decoding,” which adds to that process by using likelihoods to determine the probability of an error while converting the radio wave back into digital bits. Appx20170. Soft decoding performs far better than hard decoding. Appx20171. Both parties' experts opined that modern systems use soft decoding (and therefore rely on likelihoods) as a matter of course. Appx20219; Appx20358.

Second, Dr. Jones explained that both Realtek's documents and the ATSC recommendations showed that the Realtek chip supported demapping

using likelihoods. Appx20228-20229; Appx20221 (explaining that all of LG’s televisions can receive ATSC signals). He also explained that LG’s tests showed that the performance for the Realtek chips matched those of its own chips—performance that would be impossible using hard decoding. Appx20222; Appx20171.

LG nonetheless asks (at 51-52) this Court to set aside the verdict because the jury heard that receivers can “operate without likelihoods by using hard decoding.” The only testimony cited by LG is a statement from the inventor describing “hard decoding” in general. Appx20171. LG does not point to any evidence that would undermine the testimony showing that *LG’s televisions* use soft decoding. As the district court recognized, the evidence demonstrated that “all accused TVs are compatible with ATSC 3.0” and that “ATSC 3.0 televisions use likelihoods in the demappers and decoders.” Appx69 (citing Appx20219 (Jones); Appx20359 (Akl)); Appx20222. Here again, the jury was not required to adopt LG’s view of the record.

LG also suggests (at 51) that it was necessary for Dr. Jones to present source code or identify some Realtek document that used the word “likelihood.” Dr. Jones explained why documents in the record showed that the Realtek chip performed the decoding consistent with the ATSC 3.0

standard. Appx20229 (describing the “BICM decoder” in the “ATSC 3.0 Demodulator”) (discussing Appx18048). Even without that evidence, the testing results and testimony about modern digital-communications systems supported the jury’s finding.

3. Substantial evidence showed that the Realtek products use the patented constellations.

Finally, record evidence supported the jury’s finding that the Realtek chips use constellations claimed by the asserted patents. Appx70-71. When performing his testing, Dr. Jones explained that LG’s televisions could receive and display an ATSC 3.0 signal only if they used the same constellations listed in the standard (which are covered by Constellation’s claims). Appx20222; *see* Appx20220 (discussing the constellations listed in the standard). LG’s own expert and corporate witness confirmed that its televisions were “compatible with ATSC 3.0.” Appx20359; Appx20317. Moreover, additional exhibits in the trial record provided detail on the constellations used by the accused products, including the constellations running on the Realtek chips. Appx20222 (explaining that “[a]ll of the non-uniform constellations [were] tested” by LG).

In challenging that evidence, LG recycles the fact-bound criticisms found elsewhere in its brief. First, LG argues that the jury could not rely on the testing results because its own employee testified that LG’s televisions use

constellations different from the ATSC 3.0 standard. Br. 52-53 (citing Appx20350). As explained above (at 51), the jury heard persuasive evidence cutting against that self-serving assertion. Second, LG argues (at 53) that the receivers in the televisions running on Realtek chips could use different constellations than those sent by the transmitter. But multiple witnesses explained that the receiver needs to use the same constellations as the transmitter to process signals. Appx20171; Appx20216. LG may not like the jury's decision to credit Constellation's evidence, but that does not provide a basis to overturn the verdict.

III. SUBSTANTIAL EVIDENCE SUPPORTED THE JURY'S DAMAGES AWARD.

After finding that LG infringed the asserted patents, the jury awarded Constellation \$6.75 per infringing television. That damages award was fully supported by the testimony of Constellation's experts, who established that LG's subsidiary had sought a similar per-unit royalty for similar patents negotiated under similar circumstances. It also captured the contributions of the patented inventions, which reflected a seismic shift in the efficiency of digital-communications systems and achieved benefits that even LG's witnesses and amici have heralded as "revolutionary." Appx20316; *see* Pearl

Amicus Br. 1 (explaining that ATSC 3.0 “provides enhanced video and audio capabilities” and “offers an impressive 500% increase in capacity”).

LG does not identify any legal error in the district court’s decision to admit Dr. Sullivan’s testimony or the jury’s verdict based on it. Instead, it asks the Court to overturn the verdict because Constellation’s damages model differed from the models presented in other cases and allegedly failed to capture the value of the patented technology. As the district court recognized, LG cannot avoid the demanding abuse-of-discretion standard for a *Daubert* challenge by repackaging its arguments as a post-trial motion. And on the merits, each of LG’s fact-bound arguments was already considered and rejected by the district court and the jury. Appx49-50.

A. Constellation’s Damages Model Was Legally Sound.

When a plaintiff proves infringement, the Patent Act requires the court to award “a reasonable royalty.” 35 U.S.C. § 284. One way to demonstrate a reasonable royalty for patented technology is by relying on a prior license that is “sufficiently comparable.” *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1329 (Fed. Cir. 2009). “Assessing the comparability of licenses requires a consideration of whether the license at issue involves comparable technology, is economically comparable, and arises under comparable circumstances as

the hypothetical negotiation.” *Bio-Rad Labs, Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1372-1373 (Fed. Cir. 2020). When a plaintiff relies on a “sufficiently comparable license,” the value of the patented technology is already “built-in” and “further apportionment may not necessarily be required” to isolate the value of the patented technology. *Omega Patents, LLC v. CalAmp Corp.*, 13 F.4th 1361, 1376-1377 (Fed. Cir. 2021).

It is for the jury to decide whether a prior license is sufficiently comparable. See *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1227 (Fed. Cir. 2014) (“[T]he fact that a license is not perfectly analogous generally goes to the weight of the evidence, not its admissibility.”). A jury’s damages award “must be upheld unless the amount is grossly excessive or monstrous, clearly not supported by the evidence, or based only on speculation or guesswork.” *Amgen Inc. v. Hospira, Inc.*, 944 F.3d 1327, 1341 (Fed. Cir. 2019) (citations omitted).

Constellation followed that law to the letter. To calculate a reasonable royalty for LG’s infringement, Constellation relied on licenses negotiated by Zenith, a wholly-owned subsidiary of LG engaged in patent licensing. Appx20275-20276. Constellation offered extensive evidence showing that those licenses were technically and economically comparable to the license

that would arise from its hypothetical negotiation with LG. It also explained why the differences between the prior license and the hypothetical negotiation did or did not support an adjustment to the damages award. As the district court explained, that testimony provided “substantial evidence” for the jury’s finding “that the licenses are comparable.” Appx49.

Technical comparability. Dr. Mark Jones testified at length regarding the technical similarities between the Zenith patents and Constellation’s patents. Appx20236-20239. First, he explained that, like the asserted patents here, the Zenith patents recited similar features—such as demappers, demodulators, and decoders—and specific decoding methods to efficiently process incoming signals. Appx20237-20238. He also explained that the Zenith patents described specific uniform constellations that “map symbols” for transmission across a communication channel. Appx20238; *see* Appx16578 (license covering the E-VSB essential patent claims).

Second, Dr. Jones testified that the Zenith patents were put to similar use by television manufacturers. As he explained, Zenith’s patented technology was incorporated into “the physical layer for [the] ATSC 1.0” standard—the immediate predecessor to ATSC 3.0. Appx20237. That use was highly comparable to Constellation’s patents, which cover similar

technology incorporated in the “physical layer” of ATSC 3.0. Appx20237. To support that point, Dr. Jones analyzed a Zenith presentation establishing the connection between its patents and the ATSC standard. Appx20237; Appx17655. LG’s corporate witness, who personally negotiated the Zenith licenses, confirmed that Zenith’s patents were limited to the “physical layer” of ATSC 1.0 (called “A/53”) and established the technical similarity between the physical layers of each standard. Appx20333 (agreeing that “A/53 is to ATSC 1 . . . like A/322 is to ATSC 3”). He also testified that the very same presentation relied on by Dr. Jones was used in Zenith’s licensing negotiations. Appx20326.

Third, Dr. Jones evaluated the technological benefits of the licensed technology. He explained to the jury that Zenith’s patents claimed an innovative “VSB receiver” that (like Constellation’s patents) improved the efficiency of digital communications by “deriv[ing] estimated data from the” signals sent to the receiver. Appx20238-20239. Dr. Jones’s testimony was reinforced by Constellation’s lead negotiator, William Marino, who testified that he considered the Zenith licenses throughout his negotiations with LG because Zenith’s patents solved a similar technological problem. Appx20199.

Economic comparability. After Dr. Jones established technological comparability, Dr. Sullivan demonstrated that Zenith's licenses arose in economic circumstances very similar to the hypothetical negotiation. Appx20276.

First, Dr. Sullivan explained that the licensor and licensee for the Zenith patents were similarly situated to the parties here. Like Constellation, Zenith was solely in the business of licensing its intellectual property and was not producing its own products at the time it licensed its VSB technology. Appx20276. Accordingly, Zenith did not have any incentive to alter its royalties based on its need to license patents from others. Moreover, at the time that it negotiated the \$5 per-unit royalty, Zenith had “under[taken] some very strong licensing efforts” and had not yet decided to enter a patent pool, which would have reduced the per-unit royalty for Zenith's technology. Appx20279. On the other side of the ledger, the licensees for Zenith's patents were companies like LG that manufactured ATSC-compliant televisions; one of those licensees was *LG itself*. Appx20276.

Second, Dr. Sullivan explained that the licenses had a comparable scope to the license that would arise from a hypothetical negotiation. The Zenith licenses extended through the life of the patents and were non-exclusive.

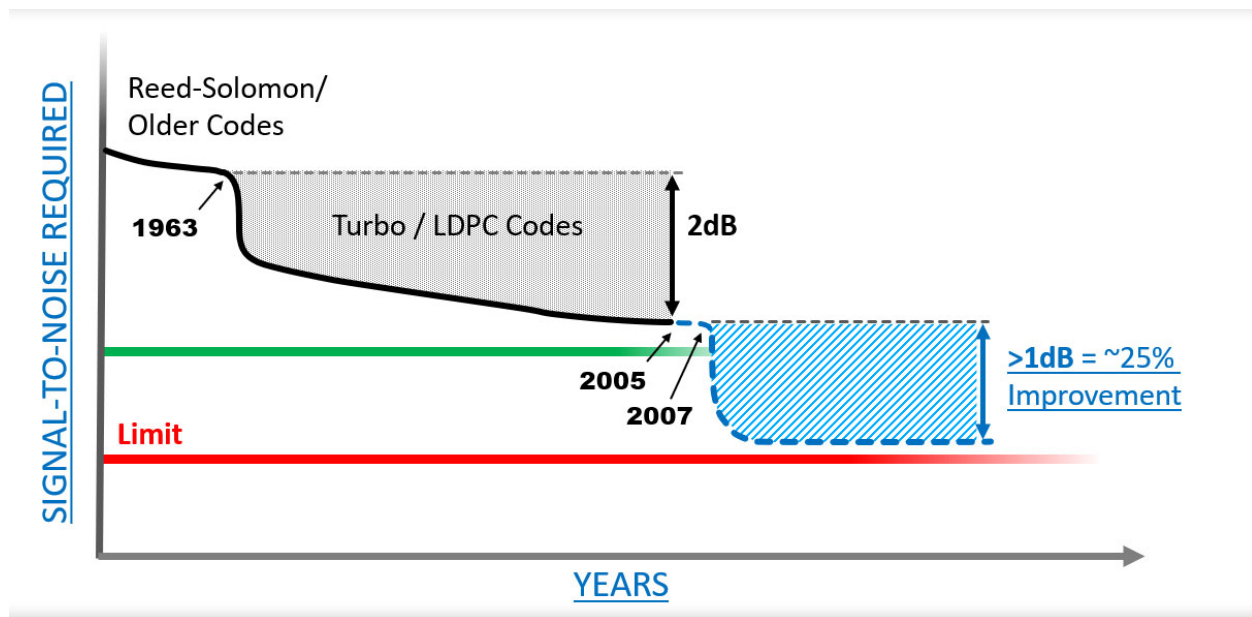
Appx20276-20277. They were structured as a running royalty, which was tied to the number of televisions sold, thereby accounting for any uncertainty about consumer demand for ATSC televisions. Appx20276-20277; *see* Appx20201. They applied only to sales with a nexus to the United States. Appx20294; Appx20299. And they covered only the technology necessary to receive ATSC 1.0 broadcast signals, rather than other technology or features of the licensed televisions. Appx20280. All of those characteristics line up with the hypothetical negotiation in this case.

Dr. Sullivan's analysis was buttressed by Mr. Marino, who testified that he tried to negotiate a running-royalty arrangement so that Constellation would bear the risk associated with the adoption of the ATSC 3.0 standard—just as Zenith did when structuring its licenses for ATSC 1.0 technology. Appx20201; *see* Appx20276-20277.

Relevant differences. After explaining the similarities between the Zenith licenses and the hypothetical negotiation, Constellation's experts also identified and accounted for any relevant differences.

On the technical side, Dr. Mark Jones explained that Constellation's inventions were more valuable than Zenith's patented technology. He testified that, at the time the ATSC 1.0 standard was developed, Zenith's technology

was one of two potential options for the “physical layer” of the standard. Appx20238-20239 (discussing the option to use “a QAM-based solution rather than a VSB-based solution”). Returning to the figure below, the record evidence showed that Zenith’s technology, which was incorporated into the first ATSC standard in 1995, did not mark a fundamental shift in digital communications.



By contrast, multiple witnesses (including LG’s) established the transformative nature of the patented inventions, explaining that they unlocked efficiency gains comparable to those achieved over the prior forty years of research combined. Appx20217; Appx20316; *see supra*, at pp. 10-11. Dr. Mark Jones also explained that Constellation’s technology was the only viable option to achieve the benefits touted by ATSC 3.0 and was responsible

for one-third of the efficiency gains attributable to the standard. Appx20238-20239. As Dr. Sullivan explained, that technological difference would have “cause[d] the royalty, if anything, to be higher for the Constellation Designs patents.” Appx20277.

Dr. Sullivan also walked through relevant economic differences. He accounted for the fact that Zenith’s licenses covered more patents than those asserted in this case and explained why that did not require an adjustment to the license amount. Appx20280. He considered evidence about the value of patents licensed through patent pools for the ATSC 1.0 and ATSC 3.0 standards, finding that those license rates supported his proposed royalty. Appx20278-20279. Finally, Dr. Sullivan noted the differences in the price of consumer televisions over time, explaining that the prices of new television models had kept pace with inflation and that Zenith had baked inflation adjustments into many of its earlier licenses. Appx20278. To account for that change, Dr. Sullivan applied an inflationary adjustment to the royalty charged by Zenith, arriving at a royalty of \$6.75 per infringing television. Appx20280.

As the district court recognized, Constellation’s experts engaged in the thorough analysis required by this Court’s decisions. Appx49. They explained exactly why the prior licenses were an appropriate starting point for the

royalty here. And for each relevant difference—including the unprecedented improvements reflected in the patented technology—they either adopted a conservative approach or explained the basis for adjusting the per-unit royalty.

B. LG’s Attacks On The Damages Award Lack Merit.

LG does not dispute that Constellation could rely on a comparable license to prove infringement, nor does it dispute that the question of whether the Zenith licenses were sufficiently comparable was for the jury to decide. LG nevertheless asks (at 54) this Court to set aside the damages award on the ground that the Zenith licenses “cover[ed] different patents, different technologies, and different product types.” LG’s argument is both procedurally improper and substantively incorrect.

1. At the outset, LG has not properly raised a challenge to the damages award. This Court has made clear that challenges to the “admissibility of . . . expert testimony,” including “whether [a] damages model is properly tied to the facts of the case,” “should [be] resolved . . . under the framework of *Daubert*.” *Versata Software*, 717 at 1264; *cf. Enplas Display Device Corp. v. Seoul Semiconductor Co. Ltd.*, 909 F.3d 398, 411 n.2 (Fed. Cir.

2018) (noting that the appellant did not argue that “the district court should not have admitted [the] expert testimony on damages”).

LG’s appeal presents a straightforward attack on the admissibility of Dr. Sullivan’s testimony. The arguments in its brief mirror the exact arguments LG lost before trial, including that Dr. Sullivan relied on licenses that were not sufficiently comparable, failed to apportion the value of the asserted patents, and improperly adjusted the royalty for inflation. *Compare* Br. 62-68 with Appx6006-6018; Appx6046-6050. Rather than developing separate challenges to the district court’s pre-trial order and the jury’s damages verdict, LG simply asks this Court to reverse them both for the exact same reasons. Br. 54 (presenting its argument in the “alternative[]”). Accordingly, LG must show that the court abused its discretion to prevail in this appeal.

LG has not done that. For starters, it does not include (at 2) a *Daubert* challenge among its issues on appeal. In its argument, LG asserts (at 54) that the district court erred as a matter of law “by allowing Constellation’s damages expert to stretch the built-in apportionment doctrine past its breaking point,” but it never articulates a specific legal error in the Court’s *Daubert* order. LG’s damages argument (at 57-59) includes only a handful of references to the pre-trial record and does not cite the pre-trial briefing at all.

Simply put, LG does not explain why the court abused its discretion by allowing Dr. Sullivan’s testimony. Vague assertions of legal error are not enough. *See SmartGene, Inc. v. Advanced Biological Lab, SA*, 555 Fed. Appx. 950, 954 (Fed. Cir. 2014).

2. In any event, none of LG’s four fact-bound disagreements with the jury’s verdict warrants reversing the judgment below.

a. First, LG argues (at 65) that Constellation’s experts “relied on vague points of comparison” to show that the Zenith patents were comparable to the asserted patents. That argument grossly mischaracterizes the record.

For technical comparability, Dr. Mark Jones did not simply “run[] keyword searches” or “refer to generic, decades-old equipment.” Br. 65-66. Rather, he described the technological similarities between the Zenith patents and asserted patents here, analyzed the unique contribution of each set of patents to digital-communications technology, and explained how those patents were implemented by television manufacturers to improve digital communications. That is precisely the sort of comparability analysis required by this Court’s decisions. *See Vectura Ltd. v. Glaxosmithkline LLC*, 981 F.3d 1030, 1041 (Fed. Cir. 2020); *Bio-Rad Labs*, 967 F.3d at 1374; *cf. LaserDynamics, Inc. v. Quanta Comp., Inc.*, 694 F.3d 51, 80 (Fed. Cir.

2012) (reversing decision to admit testimony where expert relied on a survey not “limited to any particular industry” and licenses that involved different technology). If LG believed those similarities were “vague and loose,” it had its chance to highlight those concerns to the jury. Br. 66. Yet LG did not ask Dr. Mark Jones a single question about the specific Zenith patents at trial. Appx20248-20249; see *ActiveVideo*, 694 F.3d at 1333 (explaining that “[t]he degree of comparability” is a “factual issue[] best addressed by cross examination”).

As for economic comparability, LG argues (at 66) that Dr. Sullivan was wrong to rely on features that could “possibly implicat[e] hundreds of licenses or more,” such as the “per-unit rate” structure. Those are obviously relevant features of the hypothetical negotiation, and it is easy to imagine LG’s protests if he had omitted them. What is more, LG’s argument ignores the many case-specific economic factors that Dr. Sullivan presented to the jury, including his testimony explaining that Zenith was not manufacturing its own products at the time it negotiated the relevant licenses, Appx20276, or that Constellation’s lead negotiator examined the Zenith licenses before approaching LG, Appx20199.

b. Second, LG argues (at 63-65) that Constellation “should have done more” to account for “the differences between the hypothetical negotiation and the Zenith licenses,” including purported differences in the “parties, timing, accused products, and geographic scope.” It is unclear what more LG thinks Constellation should have done. Constellation’s experts walked through each of the supposed differences identified by LG. Appx20238 (technical differences between Zenith’s VSB technology and Constellation’s optimized constellations); Appx 20276-20279 (characteristics of the licensors and licensees); Appx20294, Appx20299 (geographic scope of the licenses); Appx20299 (differences in the licensed products). Dr. Sullivan also defended his decision not to adjust the damages award for many of these differences, explaining that they would have made the reasonable royalty in this case *higher* than the per-unit royalty for the Zenith patents. LG cites no decision suggesting that Dr. Sullivan’s decision to calculate a conservative royalty is a valid ground for excluding his testimony or challenging the verdict.

c. Third, LG faults Dr. Sullivan (at 62-63) for not presenting separate damages for each specific patent or claim asserted in this case. Here again, Dr. Sullivan explained the basis for his conclusion that each of the asserted patents would warrant the same rate. He noted the “substantial technological

overlap among the four patents,” and that each one provided a “similar” technological “contribution.” Appx20280. He also explained that the Zenith licenses all had the same royalty rate, regardless of the number of patents covered by the license. Appx20280. He informed the jury that it was “very common in the industry” not to assign a value to each patent covered by a single license. Appx20280.

That analysis was consistent with this Court’s decisions, which required Constellation to “account[] for” differences between the prior licenses and the hypothetical negotiation, not to reflexively apply numerical adjustments. *Omega Patents, LLC*, 13 F.4th at 1380-1381 (faulting the plaintiff’s expert for merely stating that the licenses covered multiple patents). It would be nonsensical to require Dr. Sullivan to adjust the royalty for the number of patents when the evidence showed that Zenith did not make those adjustments when licensing its patents on the open market.

d. Fourth, LG suggests (at 59) that there was some flaw in Dr. Sullivan’s analysis because he “never mentioned the word ‘apportionment’” to the jury. This Court’s review is concerned with substance, not buzzwords. Dr. Sullivan explained to the jury that his model “isolate[d] the contributions of the Constellation Designs patents and its . . . contribution

separate and apart from other features, factors, and functionalities of the televisions.” Appx20280. The jury instructions did the same. Appx26. The jury therefore understood that his damages analysis was tied solely to the value of the patented technology, not other components of LG’s televisions.

3. In a final gambit to lower the damages award, LG argues (at 67-69) that it was improper for Dr. Sullivan to adjust for inflation. LG does not cite any authority suggesting such an adjustment is improper. To the contrary, that rule would conflict with decisions (relied on by LG) requiring plaintiffs to account for meaningful differences between a prior license and a hypothetical negotiation.

LG argues (at 68) that the inflation adjustment lacks “real-world support” because television prices have not moved with the price of other goods. Dr. Sullivan expressly addressed that point, telling the jury that the prices of new televisions (including LG’s) kept pace with inflation, even as prices for older models declined substantially. Appx20278. LG also suggests that it was wrong for Dr. Sullivan to rely on Zenith’s practice of incorporating inflation adjustments into its licenses because the licenses with the \$5 per-unit royalty did not include those adjustments. But here again, Dr. Sullivan addressed that issue, explaining that Zenith dropped the inflation adjustments

only after it contributed its patents to a pool. Appx20278-20279. Substantial evidence supports the jury's inflation finding.

4. This Court recently granted rehearing en banc in *Google LLC v. EcoFactor*, No. 23-1101, which presents the question of whether the district court erred by admitting expert evidence that relied on prior licenses to establish damages. The outcome of that case will have no bearing on this one for two independent reasons. First, LG has not preserved a *Daubert* challenge here. *See supra*, at pp. 67-69. Second, the issues in *Google*—namely, (i) the expert's reliance on lump-sum licenses to calculate a running royalty and (ii) reliance on supposedly comparable licenses that did not include any technically comparable patents, *see Ecofactor, Inc. v. Google LLC*, 104 F.4th 243, 259-260 (Fed. Cir. 2024) (Prost, J., dissenting)—are not present in this case. Dr. Sullivan did not rely on a lump-sum license, and Dr. Jones established technical comparability for each of the licenses on which Constellation relied.

CONCLUSION

For the foregoing reasons, the Court should affirm the judgment below.

Respectfully submitted,

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**CERTIFICATE OF COMPLIANCE WITH
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This brief complies with the type-volume limitations of the Federal Rules of Appellate Procedure and the Rules of this Court. According to the word processing system used to prepare it, the brief contains 13,976 words.

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CERTIFICATE OF SERVICE

On October 30, 2024, a copy of the foregoing brief was filed electronically through the CM/ECF system and thereby served on all parties.

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