

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TQ DELTA, LLC,

Plaintiff,

v.

ADTRAN, INC.,

Defendant.

Civil Action No. 14-954-RGA

MEMORANDUM OPINION

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ANDREWS, UNITED STATES DISTRICT JUDGE:

Before me is the issue of claim construction of the “allocating” terms in the Family 3 patents: U.S. Patent Nos. 7,836,381 (“the ’381 patent”), 7,844,882 (“the ’882 patent”), and 8,276,048 (“the ’048 patent”).¹ The parties submitted a Joint Claim Construction Brief and Appendix. (D.I. 1482, 1483). I heard oral argument on March 11, 2024. (D.I. 1493).

I. BACKGROUND

Plaintiff filed suit against Defendant alleging infringement of numerous patents. (D.I. 1). I divided the case into separate trials based on the patent families. (D.I. 369). The asserted claims of the Family 3 patents are system and method claims that describe procedures for allocating memory and resources in telecommunications systems. In particular, the claims relate to allocating memory between an interleaver and deinterleaver by first setting aside memory to one component and then to the other. (*See* D.I. 1466 at 6–7).

On August 18, 2023, I denied the parties’ summary judgment and *Daubert* motions except for Defendant’s motion for summary judgment of non-infringement of the Family 3 patents, which I dismissed with leave to renew after additional briefing. (*Id.* at 2). I concluded,

There does not appear to be any factual dispute here, and the meaning of the phrase “allocating . . . to the [de]interleaver to [de]interleave” is likely dispositive. The parties have not provided argument on the construction of this phrase in the briefing on this motion, though Defendant appears to have been aware that claim construction might be necessary. . . . Consequently, I think it is necessary to construe the phrase “allocating . . . to the [de]interleaver to [de]interleave.”

(*Id.* at 8). I now consider the parties’ claim construction arguments for the “allocating” terms.

¹ I have grouped the patents in this case into families. Members of each family share a specification with each other.

II. LEGAL STANDARD

“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (cleaned up). “[T]here is no magic formula or catechism for conducting claim construction.’ Instead, the court is free to attach the appropriate weight to appropriate sources ‘in light of the statutes and policies that inform patent law.’” *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (alteration in original) (quoting *Phillips*, 415 F.3d at 1324). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). Of these sources, “the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315 (cleaned up). “While claim terms are understood in light of the specification, a claim construction must not import limitations from the specification into the claims.” *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1354 (Fed. Cir. 2012) (citing *Phillips*, 415 F.3d at 1323).

“[T]he words of a claim ‘are generally given their ordinary and customary meaning.’ . . . [It is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1312–13 (citations omitted). “[T]he ‘ordinary meaning’ of a claim term is its meaning to [an] ordinary artisan after reading the entire patent.” *Id.* at 1321. “In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily

apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314.

When a court relies solely on the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court’s construction is a determination of law. *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based on consideration of extrinsic evidence, which “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317–19 (quoting *Markman*, 52 F.3d at 980). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id.*

III. CONSTRUCTION OF DISPUTED TERMS

A. Asserted Claims

The asserted claims of the Family 3 patents state:²

5. A non-transitory computer-readable information storage media having stored thereon instructions, that if executed by a processor, cause to be performed a method for allocating shared memory in a transceiver comprising:

transmitting or receiving, by the transceiver, a message during initialization specifying a maximum number of bytes of memory that are available to be allocated to a deinterleaver;

determining, at the transceiver, an amount of memory required by the deinterleaver to deinterleave a first plurality of Reed Solomon (RS) coded data bytes within a shared memory;

allocating, in the transceiver, **a first number of bytes of the shared memory to the deinterleaver to deinterleave** a first plurality of Reed Solomon (RS) coded data bytes for reception at a first data rate, wherein the allocated memory for the deinterleaver does not exceed the maximum number of bytes specified in the message;

allocating, in the transceiver, **a second number of bytes of the shared memory**

² There are certificates of correction for the ’381 and ’882 patents, which impact the asserted claims in those patents. I have included the corrected text.

to an interleaver to interleave a second plurality of RS coded data bytes transmitted at a second data rate; and

deinterleaving the first plurality of RS coded data bytes within the shared memory allocated to the deinterleaver and interleaving the second plurality of RS coded data bytes within the shared memory allocated to the interleaver, wherein the shared memory allocated to the deinterleaver is used at the same time as the shared memory allocated to the interleaver.

('381 patent at 11:11–12:15 (disputed terms bolded and italicized)).

13. A system that allocates shared memory comprising:

a transceiver that performs:

transmitting or receiving a message during initialization specifying a maximum number of bytes of memory that are available to be allocated to a deinterleaver;

determining an amount of memory required by the deinterleaver to deinterleave a first plurality of Reed Solomon (RS) coded data bytes within a shared memory;

allocating a first number of bytes of the shared memory to the deinterleaver to deinterleave a first plurality of Reed Solomon (RS) coded data bytes for reception at a first data rate, wherein the allocated memory for the deinterleaver does not exceed the maximum number of bytes specified in the message;

allocating a second number of bytes of the shared memory to an interleaver to interleave a second plurality of RS coded data bytes transmitted at a second data rate; and

deinterleaving the first plurality of RS coded data bytes within the shared memory allocated to the deinterleaver and interleaving the second plurality of RS coded data bytes within the shared memory allocated to the interleaver, wherein the shared memory allocated to the deinterleaver is used at the same time as the shared memory allocated to the interleaver.

('882 patent at 12:19–43 (disputed terms bolded and italicized)).

1. A system that allocates shared memory comprising:

a transceiver that is capable of:

transmitting or receiving a message during initialization specifying a maximum number of bytes of memory that are available to be allocated to an interleaver;

determining an amount of memory required by the interleaver to interleave a first plurality of Reed Solomon (RS) coded data bytes within the shared memory;

allocating a first number of bytes of the shared memory to the interleaver to interleave the first plurality of Reed Solomon (RS) coded data bytes for transmission at a first data rate, wherein the allocated memory for the interleaver does not exceed the maximum number of bytes specified in the message;

allocating a second number of bytes of the shared memory to a deinterleaver to deinterleave a second plurality of RS coded data bytes received at a second data rate; and

interleaving the first plurality of RS coded data bytes within the shared memory

allocated to the interleaver and deinterleaving the second plurality of RS coded data bytes within the shared memory allocated to the deinterleaver, wherein the shared memory allocated to the interleaver is used at the same time as the shared memory allocated to the deinterleaver.

(’048 patent at 10:41–65 (disputed terms bolded and italicized)).

B. “Allocating” Terms (’381 patent, claim 5; ’882 patent, claim 13; ’048 patent, claim 1)³

- a. *Plaintiff’s proposed construction*: assigning a number of bytes of memory to the [de]interleaver, where the number of bytes is the amount that is used at any given time to hold active Reed Solomon (RS) coded data bytes for the purpose of both delaying and rearranging the order thereof
- b. *Defendant’s proposed construction*: associating . . . a [first/second] number of bytes in the shared memory with the [de]interleaver to [de]interleave . . .
- c. *Court’s construction*: setting apart or designating a [first/second] number of bytes of memory from the shared memory to the [de]interleaver for the function of [de]interleaving

Plaintiff contends that the specification uses “allocating” and “assigning” in the same way. (D.I. 1482 at 13). Plaintiff argues, “The ‘assigned’ number of bytes of memory is the amount of memory that, at a given time, holds RS coded data bytes for the purpose of ‘alter[ing] the sequence of data bytes of several codewords,’ i.e., rearranging.” (*Id.* (quoting D.I. 1483 at A264 (U.S. Patent No. 6,151,690 at 1:30–39))).⁴ Plaintiff relies on a series of illustrations by Dr. Cooklev to support its position. (*See* D.I. 1482 at 13–20).

In Plaintiff’s view, two categories of memory are not included in the scope of the disputed claim terms. First, Plaintiff contends that RS-coded data bytes may be “stored in memory before they are output or held for the purpose of delaying and rearranging the [] required pattern.” (*Id.* at 20). Plaintiff describes this as memory used for “pre-interleaving

³ For example, one “allocating” term, as more fully set out, is “allocating . . . a first number of bytes of the shared memory to the deinterleaver to deinterleave.”

⁴ To be clear, Plaintiff relies significantly on a patent that has no family or other relationship at all to the patents-in-suit.

storage (or RS codeword buffering)” and contends that such memory is not allocated to the interleaver for interleaving. (*Id.* at 20–21). Second, Plaintiff contends that RS-coded data bytes may be stored in memory after being output from the interleaver memory. (*Id.* at 21). These RS-coded data bytes, Plaintiff contends, are then no longer active in the interleaving process. Plaintiff argues that the memory that they occupy is therefore not allocated to the interleaver for interleaving. (*Id.*).

Defendant argues that its position reflects the plain and ordinary meaning of “allocating.” (*Id.* at 24). Defendant cites to a dictionary, which defines “allocate” as “to apportion for a specific purpose or to particular persons or things” or “to set apart or earmark.” (*Id.* (quoting D.I. 1483 at A892)). Defendant contends that the term applied in the computer context means “to reserve a resource, such as sufficient memory, for use by a program.” (*Id.* at 24–25 (quoting D.I. 1483 at A894–96)). Although the specification “says little about ‘allocating’ at all,” Defendant contends that the specification’s use of the term “associated” “reinforces that allocating involves setting aside (i.e. associating) an identifiable portion of memory.” (*Id.* at 25–26).

Plaintiff responds that the specification does not use “associating” and “allocating” interchangeably. (*Id.* at 22). Plaintiff contends that “although a portion of shared memory [] may be ‘associated’ with one or more interleavers, the number of bytes of this associated portion allocated to the (de)interleaver to (de)interleave is strictly based on the size of the RS codeword block and the interleaver depth.” (*Id.*). Defendant, meanwhile, argues that Plaintiff’s construction “improperly limit[s] the ‘allocating’ element and ‘allocated memory’ to the theoretical minimum amount of memory used in a memory-optimal, triangular implementation of a convolution[al] interleaver.” (*Id.* at 27).

I agree with Defendant to the extent that “set apart” and “designate” reflect the plain and ordinary meaning of “allocate.” (D.I. 1483 at A892). I do not think the specification supports adding additional limitations to this term. *See Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (claim terms are “generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art when read in the context of the specification and prosecution history.” (citing *Phillips*, 415 F.3d at 1313)). Thus, each of the “allocating” steps describes allocating, or setting apart, a number of bytes of the shared memory to the [de]interleaver for the function of [de]interleaving. Plaintiff’s contention that the “allocating” terms refer to shared memory that is in use at any given time is inconsistent with the claim language. I agree with Defendant that “allocating” is different than use.

The proper construction of the “allocating” steps requires looking at the claim language in its entirety. *See Sound View Innovations, LLC v. Hulu, LLC*, 33 F.4th 1326, 1333 (Fed. Cir. 2022) (“Proper claim construction ‘demands interpretation of the entire claim in context, not a single element in isolation.’” (quoting *Pause Tech., LLC v. TiVo, Inc.*, 419 F.3d 1326, 1331 (Fed. Cir. 2005))); *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003) (“While certain terms may be at the center of the claim construction debate, the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of those terms.”).

In the “determining” step, the claim states, “determining an amount of memory required by the interleaver to interleave a first plurality of Reed Solomon (RS) coded data bytes within the shared memory.” (’048 patent at 10:46–48). This limitation provides the required amount—or, the minimum—of memory that is allocated. On the other hand, the “transmitting or receiving” step—describing “a message during initialization specifying a maximum number of bytes of

memory that are available to be allocated to an interleaver”—provides the maximum amount of memory that may be allocated. (*See id.* at 10:43–45). Read together, these parallel steps provide a range of memory that may be allocated. In other words, the amount of memory allocated to the [de]interleaver to [de]interleave must be at or above the minimum described in the “determining” step but no higher than the maximum specified in the “transmitting or receiving” step.

IV. CONCLUSION

Within five days the parties shall submit a proposed order consistent with this Memorandum Opinion.