

**THE UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

**Before The Honorable Mary Joan McNamara
Administrative Law Judge**

In the Matter of

**CERTAIN ELECTRONIC DEVICES,
INCLUDING SMARTPHONES,
COMPUTERS, TABLET COMPUTERS,
AND COMPONENTS THEREOF**

Investigation No. 337-TA-1373

COMPLAINANTS' OPENING CLAIM CONSTRUCTION BRIEF

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<i>TI Grp. Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.</i> , 375 F.3d 1126 (Fed. Cir. 2004).....	2
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JXM-0001	U.S. Patent No. 10,250,877
JXM-0002	U.S. Patent No. 8,674,859
JXM-0003	U.S. Patent No. 9,674,556
JXM-0004	File History for U.S. 10,250,877
JXM-0005	File History for U.S. 8,674,859
JXM-0006	File History for U.S. 9,674,556
CXM-0002	Declaration of Dr. Iain Richardson, dated January 26, 2024
CXM-0003	M. Elad, “Sparse Representations Are Most Likely to Be the Sparsest Possible,” <i>EURASIP Journal on Applied Signal Processing</i> , vol. 2006, article ID 96247, pgs. 1-12 (IDG1373_0018207– 18218)
CXM-0004	D. Donoho and I. Johnstone, “Ideal Spatial Adaption by Wavelet Shrinkage,” <i>Dep’t. of Statistics, Stanford University</i> , April 1993 (IDG1373_0018219– 18248)
CXM-0005	R. Gribonval and M. Nielsen, “Sparse Approximations in Signal and Image Processing – Editorial,” <i>Signal Processing</i> , Elsevier, 2006, special issue on Sparse Approximations in Signal and Image Processing, 86 (3), pp. 415-416
CXM-0006	D. Donoho, “Compressed Sensing,” <i>IEEE Transactions on Information Theory</i> , vol. 52, no. 4, April 2006 (IDG1373_0018253– 18270)
CXM-0007	U.S. Patent Publication No. 2003/0219073 (LENOVO_1373- 00134005–134027)
CXM-0008	Complainants’ Demonstrative

Exhibit No.	Description
SXM-0001	Nelson, Mark, “Arithmetic Coding + Statistical Modeling = Data Compression,” <i>Dr. Dobb’s Journal</i> (Feb. 1991), available at https://marknelson.us/posts/1991/02/01/arithmetic-coding-statistical-modeling-data-compression , accessed Nov. 14, 2023
SXM-0002	Robin, Michael, “Compression basics,” <i>Transition to Digital, broadcastengineering.com</i> , pp. 24-28 (Nov. 2004)
SXM-0003	Widrow, Bernard et al., “Adaptive Noise Cancelling: Principles and Application,” <i>Proceedings of the IEEE</i> , Vol. 63, No. 12, pp. 1692-1716 (Dec. 1975)
SXM-0004	Cheng, Yung-Fu et al., “Analysis of an Adaptive Technique for Modeling Sparse Systems,” <i>IEEE Transactions on Acoustics, Speech, and Singal Processing</i> , Vol. 37, No. 2, pp. 254-264 (Feb. 1989)
SXM-0005	Huang, Ke et al., “Sparse Representation for Signal Classification,” <i>Advances in Neural Information Processing Systems</i> 19 (NIPS 2006), available at https://papers.nips.cc/paper_files/paper/2006/file/c922de9e01cba8a4684f6c3471130e4c-Paper.pdf , accessed Nov. 14, 2023
SXM-0006	Normille, James, “Analysis and Application of Adaptive Noise Reduction Using Sparse Filters,” <i>Sixth MDSP Workshop</i> , Session TE1, pp. 160-161 (1989)
SXM-0007	Dabov, Kostadin et al., “Image Denoising by Sparse 3-D Transform-Domain Collaborative Filtering,” <i>IEEE Transactions on Image Processing</i> , Vol. 16, No. 8, pp. 2080- 2095 (Aug. 2007)
SXM-0008	Ravishankar, Saiprasad et al., “Learning Sparsifying Transforms,” <i>IEEE Transactions on Signal Processing</i> , Vol. 61, No. 5, pp. 1072-1086 (March 1, 2013)
SXM-0009	Xu, Jun et al., “Sparsity-Based Deartifacting Filtering in Video Compression,” <i>ICIP</i> , pp. 3933-3936 (2009)
SXM-0010	Excerpt from Prosecution History of EP Patent Publication No. 2082583
SXM-0011	US Patent Publication No. 2011/0222597
RXM-0001	U.S. Patent 7,932,843 B2
RXM-0002	U.S. Patent 8,351,502 B2

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RXM-0003	U.S. Patent 8,416,857 B2
RXM-0004	U.S. Patent 8,718,149 B2
RXM-0005	U.S. Patent 9,008,171 B2
RXM-0006	U.S. Patent ,9386,316 B2
RXM-0007	File History for EP2449683
RXM-0008	File History for EP4224717
RXM-0009	Osorio, R.R. and Bruguera, J.D., 2008, July. An FPGA architecture for CABAC decoding in manycore systems. In 2008 International Conference on Application-Specific Systems, Architectures and Processors (pp. 293-298). IEEE.
RXM-0010	Venugopal, N., Ramachandran, S. and Adiga, B.S., 2009, June. Design and FPGA implementation of fast variable length coder for video encoder. In 2009 International Conference on Control, Automation, Communication and Energy Conservation (pp. 1-6). IEEE.
RXM-0011	Ahmad, J., Raza, K., Ebrahim, M. and Talha, U., 2009, December. FPGA based implementation of baseline JPEG decoder. In Proceedings of the 7th International Conference on Frontiers of Information Technology (pp. 1-6).
RXM-0012	Desmouliers, C., Oruklu, E. and Saniie, J., 2009, June. FPGA-based design of a high-performance and modular video processing platform. In 2009 IEEE International Conference on Electro/Information Technology (pp. 393-398). IEEE.
RXM-0013	Pescador, F., Maturana, G., Garrido, M.J., Juárez, E. and Sanz, C., 2009. An H. 264 video decoder based on a latest generation DSP. IEEE Transactions on Consumer Electronics, 55(1), pp.205- 212.
RXM-0014	Klepko, R. and Wang, D., 2008, February. A real-time wavelet-based video decoder using SIMD technology. In Real-Time Image Processing 2008 (Vol. 6811, pp. 113-124). SPIE.
RXM-0015	Cho, J. and Sung, W., 2009. Efficient software-based encoding and decoding of BCH codes. IEEE Transactions on Computers, 58(7), pp.878-889.
RXM-0016	Halsteinli, E., 2009. Real- Time JPEG2000 Video Decoding on General- Purpose Computer Hardware (Master's thesis, Institutt for elektronikk og telekommunikasjon).
RXM-0017	Nishihara, K., Hatabu, A. and Moriyoshi, T., 2008, June. Parallelization of H. 264 video decoder for embedded multicore processor. In 2008 IEEE international conference on multimedia and expo (pp. 329-332). IEEE.
RXM-0018	Wei, L., 2008, December. A Soc design for AVS video decoding. In 2008 IEEE Pacific-Asia Workshop on Computational Intelligence and Industrial Application (Vol. 1, pp. 700-703). IEEE.

Exhibit No.	Description
RXM-0019	Finchelstein, D.F., 2009. Low-power techniques for video decoding (Doctoral dissertation, Massachusetts Institute of Technology).
RXM-0020	File History for U.S. Pat. App. No. 17/367184
RXM-0021	File History for U.S. Pat. App. No. 15/585462
RXM-0022	File History for U.S. Pat. No. 9,277,243
RXM-0023	File History for European Pat. Pub. No. 2 082 583
RXM-0024	File History for European Pat. Pub. No. 4 224 853
RXM-0025	Dabov, K., 2007, August. Image Denoising by Sparse 3-D Transform-Domain Collaborative Filtering. IEEE Transactions on Image Processing (Vol. 16, pp 2080-95). IEEE.
RXM-0026	Richardson, I., 2010. The H.264 Advanced Video Compression Standard (2nd Ed.), WILEY.
RXM-0027	Wang, G., 2010. Image Denoising Based on Adaptive Sparse Representation. 2010 International Conference on Electronics and Information Engineering (Vol. 2, pp 520-524). IEEE.
RXM-0028	Portilla, J., 2003, November. Image Denoising Using Scale Mixtures of Gaussians in the Wavelet Domain. IEEE Transactions on Image Processing (Vol. 12, No. 11, pp 1338-1351). IEEE.
RXM-0029	Elad, M., 2006, December. Image Denoising Via Sparse and Redundant Representations Over Learned Dictionaries. IEEE Transactions on Image Processing (Vol. 15, No. 12, pp 3736-3745). IEEE.
RXM-0030	Ji, H., 2011. Robust Video Restoration by Joint Sparse and Low Rank Matrix Approximation. Siam J. Imaging Sciences (Vol. 4, No. 4, pp. 1122–1142). SIAM.
RXM-0031	Guleryuz, O., 2006, March. Nonlinear Approximation Based Image Recovery Using Adaptive Sparse Reconstructions and Iterated Denoising— Part I: Theory. IEEE Transactions on Image Processing (Vol. 15, No. 3, pp 539–54). IEEE
RXM-0032	Guleryuz, O., 2006, March. Nonlinear Approximation Based Image Recovery Using Adaptive Sparse Reconstructions and Iterated Denoising— Part II: Adaptive Algorithms. IEEE Transactions on Image Processing (Vol. 15, No. 3, pp 555–571). IEEE.
RXM-0033	Ravishankar, S., 2015, June. Online Sparsifying Transform Learning— Part I: Algorithms. IEEE Journal of Selected Topics in Signal Processing (Vol. 9, No. 4, pp 625-636). IEEE.
RXM-0034	Ravishankar, S., 2013, March. Learning Sparsifying Transforms. IEEE Transactions on Image Processing (Vol. 61, No. 5, pp 1072-86). IEEE.
RXM-0035	U.S. Pat. App. No. 2011/0222597
RXM-0036	Coifman, R.R., Translation- Invariant De-Noising (pp 1- 26).

Exhibit No.	Description
RXM-0037	Wen, B., 2015. Video Denoising by Online 3D Sparsifying Transform Learning. ICIP 2015 (pp 118–22). IEEE.
RXM-0038	Dabov, K. 2007, Sept. Video Denoising by Sparse 3D Transform-Domain Collaborative Filtering. 15th European Signal Processing Conference (EUSIPCO 2007) 15th European Signal Processing Conference (EUSIPCO 2007). (pp 145–49). EURASIP.
RXM-0039	Guo, H., 2016. Video Denoising Via Online Sparse and Low-Rank Matrix Decomposition. IEEE Statistical Signal Processing Workshop (SSP). IEEE.
RXM-0040	Xu, J., 2009. Sparsity- Based Deartifacting Filtering in Video Compression. ICIP 2009 (pp 3933–36). IEEE.

TABLE OF ABBREVIATIONS

Abbreviation	Exhibit
“Complainants” or “InterDigital”	InterDigital, Inc., InterDigital VC Holdings, Inc., InterDigital Patent Holdings, Inc., and InterDigital Madison Patent Holdings SAS
“Respondents” or “Lenovo”	Lenovo PC HK Limited, Lenovo (United States) Inc., and Motorola Mobility LLC
“Staff”	Commission Investigative Staff
“POSITA”	Person of ordinary skill in the art

*All emphasis herein is added unless otherwise noted.

INTRODUCTION

InterDigital respectfully submits this brief in support of their proposed claim constructions. InterDigital proposes that all terms at issue should be provided their plain and ordinary meaning, consistent with decades of controlling law. There has been no disclaimer nor lexicography by any inventor in this investigation.

LEGAL STANDARDS

I. Construing Claim Terms based on Intrinsic and Extrinsic Evidence.

Claim terms are afforded their ordinary and customary meaning within the context of the entire patent in which the terms are used, *i.e.*, the meaning that the term would have to a person of ordinary skill in the art at the time of the invention. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (internal citation omitted). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony Comp. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1580 (Fed. Cir. 1996)). The claim language and the context in which a term is used in the patent specification are also intrinsic evidence. *Id.* at 1312, 1315. Extrinsic evidence, including expert testimony, dictionaries, and treatises, for example, may also inform claim construction. *Phillips*, 415 F.3d at 1318.

II. Construing Means-Plus-Function Terms.

When analyzing whether pre-AIA 35 U.S.C. § 112, ¶ 6 or AIA § 112(f) applies to a claim limitation, courts first consider whether a claim limitation uses the term “means.” *Williamson v. Citrix Online LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). “While the use of the word ‘means’ gives rise to a presumption” that pre-AIA 35 U.S.C. § 112, ¶ 6 or AIA § 112(f) applies, “the presumption is overcome by the recitation of the structure needed to perform the recited function.”

TI Grp. Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., 375 F.3d 1126, 1135 (Fed. Cir. 2004).

Courts construe means-plus-function terms under a two-part framework: first, the court must determine the particular function of the claim limitation, and second, the court must identify the corresponding structure in the written description that performs the function. *Chicago Bd. Options Exch., Inc. v. Int’l Sec. Exch.*, LLC, 667 F.3d 1361, 1367 (Fed. Cir. 2012).

ARGUMENT

III. The ’877 Patent.

A. Overview.

The ’877 Patent is directed to a device and method for reconstructing a current block of a current image from at least one block of a reconstructed reference image that is at a different size from the size of the current image. JXM-0001 (’877 Patent).

B. Disputed Terms.

1. “circuit configured to” (’877 patent, Claims 7, 8).

Complainants’ Proposed Construction	Respondent’s Proposed Construction	Staff’s Proposed Construction
Plain and ordinary meaning (i.e., requires pre-existing hardware and software programmed to perform the cited functionality)	Plain and ordinary meaning (i.e., requires pre-existing programming of hardware and software to perform the cited functionality)	Plain and ordinary meaning (i.e., requires pre-existing programming of hardware and software to perform the cited functionality))

The parties have substantially narrowed the disputed issues regarding this claim term. The parties agree the phrase “circuit configured to” of claim 1 of the ’877 patent is limiting. They only dispute the correct phrasing of the term’s plain and ordinary meaning. Complainants’ position is that the plain and ordinary meaning is “requires pre-existing hardware and software *programmed to perform the cited functionality.*” Staff and Respondents use slightly different phrasing, taking the position that it means “requires pre-existing *programming of hardware and software to perform the cited functionality.*” The ALJ should adopt Complainants’ proposed construction.

The genesis of the parties’ constructions comes from this Court’s Markman Claim Construction decision in *Certain Computer Network Security Equipment and Systems, Related Software, Components Thereof, and Products Containing Same* (“Network Security Equipment”). Inv. No. 337-TA-1314, Order No. 37 9-19 (U.S.I.T.C. Feb. 2, 2023). In that case, the Court found the term “configured to” had its “plain and ordinary meaning, i.e., requires pre-existing programming of hardware and software to perform the cited functionality without modification.” *Id.* at 10. Respondents and Staff propose importing almost *verbatim* the same construction. But this Investigation involves different claims from a different patent. Here, the term “circuit configured to” should be analyzed in the context of the patent and claim in which it appears—claims 7 and 8 of the ’877 Patent. Complainants’ proposal for the plain and ordinary meaning of “circuit configured to” more closely aligns with how the words appear in the claims of the ’877 Patent. *Id.* at 12 (“Claim construction necessarily focuses on the words as they appear in the claim.”).

Claims 7 and 8 of the ’877 Patent both recite “at least one circuit configured to” perform the cited functionality in the claims. *See* JXM-0001 (’877 Patent), at Claims 7-8. A circuit strictly speaking is not “programming ... to perform the cited functionality.” More correctly, a circuit is “programmed to perform the cited functionality.” Thus, the proper construction for “circuit configured to” in the context of claims 7 and 8 of the ’877 Patent is “requires pre-existing hardware and software programmed to perform the cited functionality.”

In contrast to the “circuit configured to” language in the ’877 Patent, in *Network Security Equipment*, it was “rules” that were being configured. *Network Security Equipment*, at 10-11 (“The disputed term appears three times in claim 22: 1) ‘rules configured to identify a plurality of packets received,’ 2) ‘rules configured to identify a plurality of packets transmitted,’ and 3)

‘rules...configured to cause the system to log packets.’”). As the Court explained, “the rules are necessarily configured/programmed as cited in claim 22 as required by the term as it appears in the context of the claim as a whole.” *Id.* at 17. “Here, taken in the context of claim 22 as a whole, the rules are configured.” *Id.* Those rules constituted *programming*. *Id.* Thus, the Court found in the context of the claims at issue in *Network Security Equipment* that “configured to” had its plain and ordinary meaning in that patent which was “requires pre-existing programming of hardware and software to perform the cited functionality without modification.” As stated above, this case involves a different patent and different claims. In the context of the ’877 Patent, the plain and ordinary meaning of “circuit configured to” should be “requires pre-existing hardware and software programmed to perform the cited functionality.”

The Federal Circuit’s decision in *Nevro Corp. v. Boston Scientific Corp.*, 955 F.3d 35, 41 (Fed. Cir. 2020) is instructive. In *Nevro*, the Federal Circuit construed the term “configured to” to mean “programmed to.” *Id.* And the claim limitation “a signal generator configured to generate” was construed to mean “a signal generator programmed to generate.” *Id.* In other words, the signal generator in *Nevro* was programmed to perform the recited functionality. *Id.* Like the signal generator in *Nevro*, the claimed “at least one circuit” of the ’877 Patent is “programmed to” perform the recited functionality in claims 7 and 8. While the decision in *Network Security Equipment* distinguished *Nevro*, it did so on the basis that the patent and claim language at issue were different. *Network Security Equipment*, Order No. 37 at 18. “A claim construction ‘that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Id.* at 17, citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005). The patent and claim language at issue here are similar to the claim at issue in *Nevro*, and different than the claim language in *Network Security Equipment*. In the

context of claims 7 and 8 of the '877 Patent, the term “circuit configured to” should have its plain and ordinary meaning, “i.e. requires pre-existing hardware and software programmed to perform the cited functionality.”

IV. The '556 Patent.

A. Overview.

The '556 Patent describes, among other things, a method and apparatus for decoding an image region using at least two in-loop filters in succession. In block-based video coding frameworks, visual distortions or artifacts may result from the lossy nature of video compression. The '556 Patent describes a two-pass method to help reduce the amount of coding artifacts by using a succession of filters on coded frames. The invention uses filters that are placed in the coding loop (in-loop) so that the filtered frames are used as referenced frames for motion compensation of subsequent coded frames.

In the first pass, a deblocking filter is applied to remove blocking artifacts (e.g., discontinuities at the boundaries of coding blocks). In the second pass, an adaptive sparse denoising filter is applied to reduce quantization noise. The '556 Patent explains that “[a]ll video compression artifacts result from quantization” and these “artifacts can be present in various forms, such as, for example, a blocky artifact, a ringing artifact, an edge distortion, and/or texture corruption.” JXM-0003 ('556 Patent), at 1:12-17. The method and apparatus of the '556 Patent results in enhanced decoded video quality because different types of artifacts and quantization errors are handled by different filters that are successively applied.

B. Disputed Terms.

1. “sparse de-noising filter” (’556 patent, Claims 1, 5).

Complainants’ Proposed Construction	Respondent’s Proposed Construction	Staff’s Proposed Construction
Plain and ordinary meaning (i.e., a filter that reduces noise based on a sparse representation of the signal)	sparse de-noising filter for performing a second pass to reduce noise, which is not a deringing filter Alternatively, a filter which exploits a sparse image model using an over complete set of linear transforms and hard thresh-holding, which is not a deringing filter	A filter that reduces noise based on a sparse representation of the signal

The construction proposed by Complainants and Staff is based firmly in the intrinsic record. The claims support it, the specification and figures support it, and the prosecution history supports it. And although consideration of extrinsic evidence is not necessary in view of the intrinsic evidence, the extrinsic evidence further supports Complainants’ and Staff’s construction. Accordingly, the plain and ordinary meaning of “sparse de-noising filter” in the context of the ’556 Patent should be found to be “a filter that reduces noise based on a sparse representation of the signal.”

Respondents’ construction, on the other hand, seeks to import a negative limitation (“which is not a deringing filter”) that finds no support in the claims, the specification, or the prosecution history. Ringing is a form of noise, and the ordinary meaning of “sparse de-noising filter” encompasses filters that reduce ringing noise. Respondents’ error stems from a misreading of certain statements regarding the prior art in the prosecution history. Read properly, the applicant’s statements are not a “clear and unmistakable disclaimer” that disavows the ordinary scope of the term “sparse de-noising filter.” In fact, the Examiner’s response during prosecution confirms that

there was no disclaimer in the first instance. The statements in the prosecution history do not compel the broad scope of disclaimer argued by Respondents.

Respondents also present an “alternative” construction. This alternative is also incorrect because it would unduly limit the claims to a single exemplary “sparsity based de-noising tool[]” discussed in the ’556 Patent’s background section. Respondents then attempt to improperly bolster their alternative argument using extrinsic evidence, but this is likewise unavailing because limiting the scope of the claims to such an example would run counter to the canons of claim construction.

(i) Complainants’ and Staff’s Proposed Construction Reflects the Ordinary Meaning of the Term and Should be Adopted.

The intrinsic record confirms the “sparse de-noising filter” has a plain and ordinary meaning: a filter that reduces noise based on a sparse representation of the signal. The term has an understood meaning in the field of data compression and decoding and a POSITA would have appreciated that this meaning applied in the context of the intrinsic record, starting with the claims.

“The court may receive extrinsic evidence to educate itself about the invention and the relevant technology,” accordingly, Complainants submit the declaration of Dr. Iain Richardson, who is an expert in this field and explains how a skilled artisan would understand the claimed “sparse de-noising filter” in the context of the intrinsic record. *See Vitronics Corp. v. Conceptronic*, 90 F.3d 1576, 1584 (Fed. Cir. 1996); *see also* CXM-0002 (Richardson Decl.), at ¶¶ 14-15, § VII.A. Dr. Richardson also analyzes the extensive extrinsic evidence relied upon by Respondents and provides his opinions as to why these references, read properly, actually support the ordinary meaning of “sparse de-noising filter” that is understood from the intrinsic record. *See Vitronics*, 90 F.3d at 1584 (“[E]xtrinsic evidence . . . may not be used to vary or contradict the claim language.”); *Pickholtz v. Rainbow Techs., Inc.*, 284 F.3d 1365, 1373 (Fed. Cir. 2002) (“Only

if a disputed claim term remains ambiguous after analysis of the intrinsic evidence should the court rely on extrinsic evidence.”).

However, Respondents’ use of the extrinsic evidence to import limitations into the claims, should be afforded no weight as it runs counter to the intrinsic record. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 983 (Fed. Cir. 1995); *see also Vitronics*, 90 F.3d at 1584 (“[E]xtrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to . . . contradict the import of other parts of the specification.”).

(a) *A POSITA Would Have Understood the Ordinary Meaning of “Sparse De-noising Filter.”*

The plain and ordinary meaning of the term “sparse de-noising filter” is first evident from the context of the claims—the starting point for construing all claim terms. The Federal Circuit has explained that “the claim construction inquiry . . . begins and ends in all cases with the actual words of the claim.” *Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1375 (Fed. Cir. 2017) (citing *Phillips*, 415 F.3d at 1314). Where “the ordinary meaning of claim language [is] readily apparent,” as it is here, “claim construction will involve little more than the application of the widely accepted meaning of commonly understood words.” *Id.*

Although the general public may not be familiar with the term “sparse de-noising filter,” that is not the inquiry here. *Home Diagnostics, Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1358 (Fed. Cir. 2004) (“customary meaning” refers to the “customary meaning in [the] art field”). In this field of art—video encoding and decoding—“sparse de-noising filter” would have been commonly understood by the POSITA and the ordinary meaning should therefore apply. *See Comark Communs., Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (applying clear and well-defined meaning ascertained from the claims because the term “video delay circuit” was not “so

amorphous that one of skill in the art can only reconcile the claim language with the inventor's disclosure by recourse to the specification.”). The ordinary meaning of “sparse de-noising filter,” as understood by the POSITA reading these claims, is addressed below, beginning with the understanding that the filter reduces noise.

The Sparse De-noising Filter Reduces Noise:

The claims require a “sparse de-noising filter for performing a second pass to reduce noise.” JXM-0003 ('556 Patent), Claims 1, 5. In this context, it is evident the “sparse de-noising filter” is a “filter that reduces noise” to satisfy the further limitation “for performing a second pass that reduces noise.” *See Apple Inc. v. MPH Techs. Oy*, Nos. 2021-1355, 2021-1356, 2022 U.S. App. LEXIS 25173, at *13 (Fed. Cir. Sep. 8, 2022) (“Proper claim construction...demands interpretation of the entire claim in context, not a single element in isolation.”) (quoting *Hockerson-Halberstadt, Inc. v. Converse Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999)). This claim context confirms that the Complainants' and Staff's proposed construction of the “sparse de-noising filter” correctly begins with the explanatory phrase “*a filter that reduces noise*,” before further stating, “based on a sparse representation of the signal.”

The Filter Reduces Noise Based on a Sparse Representation of the Signal:

The context of the claims demonstrates to the POSITA that the “sparse de-noising filter” reduces noise “based on a sparse representation of the signal.” The claimed apparatus is configured to decode an image region (Claim 5) and the claimed method comprises decoding an image region (Claim 1). JXM-0003 ('556 Patent), Claims 1, 5. Both claims then recite at least two filters for successively performing in-loop filtering to reduce at least a first and a second type of coding artifact, where the second pass is performed by the adaptive sparse de-noising filter. *Id.* The POSITA would have understood from this language that the filters, which reduce coding artifacts

in the decoded image region, are based on the signal because the coding artifacts are presented in the signal. CXM-0002 (Richardson Decl.), at ¶¶ 88-89; *see also id.*, at ¶¶ 65-84. The dependent claims recite that “an initial input signal corresponding to the image region” is input to the “two in-loop filters.” *See* JXM-0003 (’556 Patent), Claims 4, 8 (which depend from claims 1 and 5, respectively). The claim language as a whole, therefore, confirms that the filter “reduces noise based on . . . the signal.”

The claimed filter is a “*sparse* de-noising filter.” Here, “sparse” enjoys its widely understood meaning—a few items of interest stand out. Just like tall trees in a sparsely populated forest, or a story that is sparse on details, the trees and details stand out. The concept of sparse filtering was understood at the time of the ’556 Patent and would have been readily apparent to a POSITA in reading the claims. Indeed, an example of a sparse de-noising filter is cited in the background section of the patent, demonstrating the POSITA’s familiarity. *See* JXM-0003 (’556 Patent), at 2:4-21 (describing Guleryuz JXM-0006 (’556 File History), at IDG1373_0010698-701)); CXM-0002 (Richardson Decl.), at ¶¶ 89, 102-109.

“A relevant artisan is not deemed to read a term in a vacuum, but instead is deemed to read the claim term . . . in the context of the particular claim in which the disputed term appears, and in the context of the entire patent, including the specification.” *Evolusion Concepts, Inc. v. HOC Events, Inc.*, 22 F.4th 1361, 1365 (Fed. Cir. 2022). Here, the ’556 Patent provides guidance, explaining that, in connection with one embodiment, “[t]he adaptive sparse de-noising filtering is directed to recovering the original signal from an independent and identically distributed (i.i.d.) noisy environment.” JXM-0003 (’556 Patent), at 14:19-24; CXM-0002 (Richardson Decl.), at ¶ 102. The Examiner in a related case goes further: “By definition sparse filtering works based on sparsity in the image feature distribution” and, therefore, “[a] filter . . . using sparse features

distribution of an image is indeed a sparse filter.” RXM-0021 (’462 File History), at LENOVO_1373-00159438; CXM-0002 (Richardson Decl.), at ¶ 101. In all instance, the goal is to discriminate the original signal from the noise; *see also id.*, at ¶¶ 80-84.

The POSITA in this field would have understood that a “sparse de-noising filter,” specifically, recovers the original signal from the noise based on a “sparse representation” of the signal because the sparse representation allows the signal to be differentiated from the noise. CXM-0002 (Richardson Decl.), at ¶¶ 88-92. Indeed, “[t]he customary meaning of a claim term is not determined in a vacuum and should be harmonized, to the extent possible, with the intrinsic record, *as understood within the technological field of the invention.*” *Lexion Med., LLC v. Northgate Techs., Inc.*, 641 F.3d 1352, 1356 (Fed. Cir. 2011) (emphasis added). Here, the POSITA as of 2006 would have understood that “[s]parse approximation techniques have been at the core of an evolving and very active area of research since the 1990s.” CXM-0002 (Richardson Decl.), at ¶ 91 (quoting CXM-005 (Gribonval), 2006), at 1). These techniques were used in de-noising. CXM-0002 (Richardson Decl.), at ¶¶ 93-98 (citing RXM-0025 (Dabov 2007), at 1 (“Plenty of de-noising methods exist” that are based on representations of “the true (noise-free) signal in order to separate it properly from the random noise,” including where “the signal is sparsely represented”).

De-noising is performed in video decoding because the true signal of the image is corrupted by noise (*i.e.*, coding artifacts) during when the image is compressed. CXM-0002 (Richardson Decl.), at ¶¶ 75-76, 88, 132; JXM-0003 (’556 Patent), at 1:12-17. Artifacts that get introduced are not sparse; instead, they become prevalent throughout the signal. But, using some mathematical manipulation, such as using a “transform,” the true signal can be described in a sparse representation. *Id.*; *see also id.*, at ¶¶ 90, 93-99, 114-116. This allows the true signal to stand out from the noise. *See* SXM-0008 (Rivshankar 2013), at 1 (“It is well known that natural signals and

images have an essentially sparse representation”); CXM-0002 (Richardson Decl.), at ¶ 124. In essence, the “sparse de-noising filter” uses a sparse representation of the signal to find the true signal, the image region that was encoded, amongst the noise so that it can filter out the noise. CXM-0002 (Richardson Decl.), at ¶¶ 102-116; *see also id.*, at ¶¶ 99-100, 122; RXM-0030 (Ji 2011), at 1 (“The goal of video restoration is then to recover the original from the obtained degraded video data”); RXM-0027 (Wang 2010), at 1 (“The goal of de-noising is to remove the noise while retaining the important features as much as possible”); RXM-0039 (Gu 2016) at LENOVO 1373-00161772 (using a “sparse layer” separated from a “rank layer” to remove noise); RXM-0031 (Guleryuz 2006), at LENOVO_1373-00161660 (using a single transform to de-noise based on a sparse representation of the signal).

Thus, the term “sparse de-noising filter” has a well-understood meaning in the art and nothing in the claims requires a departure from that understanding. *See Hill-Rom Servs. v. Stryker Corp.*, 755 F.3d 1367, 1374-75 (Fed. Cir. 2014) (construing “datalink” to have its ordinary meaning, not limited to a specific type of link, in view of disclosure in the patent background of known prior art and expert testimony that the POSITA would understand the term did not refer to a specific type of link); CXM-0002 (Richardson Decl.), at ¶¶ 90, 109, 114 (confirming the many examples of different sparse de-noising filters because there are many known approaches to arrive at a sparse representation of the signal—which persons of ordinary skill in the art would have understood at the time of the ’556 Patent). Nothing in the text of Claims 1 or 5 (or the dependent claims) limits the sparse de-noising filter to one specific embodiment or one specific approach to sparse de-noising filtering. *See Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1236 (Fed. Cir. 2023) (holding “no persuasive basis to limit the claims to any particular cellular networks,” in part because “the claim language itself is not so limited.”). The patentee did not choose to claim

one specific approach to create a sparse representation, and the claims do not recite a specific sparse representation that the filter must be based on. Rather, the claims recite a “sparse de-noising filter,” allowing the POSITA to implement the full scope of sparse de-noising filters, and the claims should encompass the full scope of that term. *See Duncan Parking Techs., Inc. v. IPS Grp., Inc.*, 914 F.3d 1347, 1364 (Fed. Cir. 2019) (“A patentee is normally entitled to the full scope of its claim language”).

(b) *There is No Basis to Depart from the Ordinary Meaning of “Sparse De-noising Filter.”*

Consulting the specification and prosecution history confirms that (1) the ordinary meaning applies and should not be limited and (2) the ordinary meaning encompasses de-ringing filters. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (“[C]laims must be read in view of the specification, of which they are a part.”).

The Specification Confirms the Ordinary Meaning Applies:

There is no lexicography or disclaimer in the specification that would compel a departure from the plain and ordinary meaning of the term. *Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1236 (Fed. Cir. 2023) (“[W]e agree with the Board that ‘connection rejection message’ should be given its plain and ordinary meaning . . . the intrinsic evidence provides no persuasive basis to limit the claims”). The Federal Circuit has repeatedly explained that “[t]he words of a claim 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.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during

prosecution.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012); *GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014). Neither exception applies.

There is no lexicography that would limit the scope of the “sparse de-noising filter.” “To act as its own lexicographer, a patentee must ‘clearly set forth a definition of the disputed claim term’ other than its plain and ordinary meaning” and must “‘clearly express an intent’ to redefine the term.” *Thorner v. Sony Computer Entertainment America LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)) (first quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); and then quoting *Helmsderfer v. Bobrick Washroom Equipment, Inc.*, 527 F.3d 1379, 1381 (Fed. Cir. 2008)). There is no definition set forth in the specification or anywhere else in the intrinsic record; to the contrary, the intrinsic record confirms the patentee intended the claims to encompass the full scope of the ordinary meaning of the term.

The background of the ’556 Patent first introduces an example of a specific prior art sparse de-noising filter from a technical paper by Guleryuz before more broadly referring to “sparsity based de-noising tools.” JXM-0003 (’556 Patent), at 2:4-62. The Guleryuz filter is provided as an example of a sparse de-noising filter, not as a definition of it. CXM-0002 (Richardson Decl.), at ¶¶ 105-110, 130. Indeed, the patent does not use limiting language to define all “sparse de-noising filters” to only the filter described in the Guleryuz paper. Dr. Richardson explains that persons having skill in the art would not read this disclosure as limiting, but rather to confirm the ordinary meaning that sparse de-noising filters are filters based on a sparse representation of the signal. *Id.*; *see also id.*, at ¶¶ 88-90.

The Guleryuz paper referenced in the background uses terminology to describe its sparse de-noising filter that supports the position of Staff and Complainants. Namely, Guleryuz explains

that “[b]y utilizing recent advances in sparse signal decompositions,” the author presents a nonlinear, loop filter that reduces quantization noise with a formulation “based on sparse decompositions.” (JXM-0006 (’556 File History), at IDG1373_0010698 (Guleryuz)). The POSITA would have understood Guleryuz’s sparse image model based on sparse decompositions to be the sparse representation of the signal. CXM-0002 (Richardson Decl.), at ¶¶ 107-108. Thus, sparse de-noising filters reduce noise based on a sparse representation of the signal.

Consistent with this understanding, the ’556 Patent discusses drawbacks of “sparsity based de-noising tools,” of which Guleryuz is an example. JXM-0003 (’556 Patent), at 2:22-47. These tools, the patent explains, were often designed for noise that appears in a particular form “while quantization noise has significantly different properties.” JXM-0003 (’556 Patent), at 2:22-30; CXM-0002 (Richardson Decl.), at ¶¶ 104, 111-113. The ’556 Patent explains that “a possible consequence” of trying to solve this problem is that the filter “might result into over-smoothed reconstructed pictures, or a blocky artifact(s) may still be present despite the filtering procedure.” JXM-0003 (’556 Patent), at 2:37-41. The ’556 Patent explains that this occurs because “the signal as well as the blocky artifact added to the signal *would probably have sparse representation at the filtering stage* if the same transform is used for compression and de-noising.” JXM-0003 (’556 Patent), at 2:37-41; CXM-0002 (Richardson Decl.), at ¶¶ 112-113. In other words, in this example of a drawback, both the signal *and* the noise “have sparse representation” and the sparse de-noising filter cannot discern between the signal and the noise based on the sparse representation of the signal. Once again, this confirms the ordinary meaning of the term “sparse de-noising filter” because, as Dr. Richardson explains, “[i]f the ‘sparse de-noising filter’ was not based on a sparse representation of the signal, this would not present the stated drawback.” CXM-0002 (Richardson Decl.), at ¶ 113.

The detailed description sets forth multiple embodiments which include a “sparse de-noising filter” but which do not limit the “sparse de-noising filter” to one specific implementation. *See, e.g.*, JXM-0003 (’556 Patent), at 9:23-28, 9:44-48, 10:17-23, 10:62-11:1, 11:16-19, 11:56-67, 13:22-55, 13:61-65, 14:18-21, 17:11-18, 17:30-36. The Federal Circuit regularly rejects limitations that are, as here, not disclosed as mandatory. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1346 (Fed. Cir. 2015) (en banc) (reversing district court construction requiring “a pictorial map” where “the specification discloses examples and embodiments where the virtual classroom is depicted as a ‘map’” but “nowhere does the specification limit the graphical display to those examples and embodiments.”); *Arthrex, Inc. v. Smith & Nephew, Inc.*, 935 F.3d 1319, 1330 (Fed. Cir. 2019) (rejecting limitation requiring a “helical thread” be rotated into bone because “[n]owhere does the specification mandate that threaded anchors must be rotated into bone.”). None of these disclosures in the ’556 Patent compel departure from the ordinary meaning. *See, e.g., Vehicle IP, LLC v. AT & T Mobility, LLC*, 594 F. App’x 636, 641–42 (Fed. Cir. 2014) (non-precedential) (reversing district court’s construction of “expected time of arrival” to be limited to “clock time” and exclude “remaining travel time”—explaining that “the specification does not contain an express definition of the term, and nowhere in the specification do the inventors disclaim remaining travel time” even though “some of the disclosed embodiments in the written description focus on clock-time.”); *TecSec, Inc. v. Adobe Sys. Inc.*, 658 F. App’x 570, 577–78 (Fed. Cir. 2016) (non-precedential) (reversing district court’s construction of “selecting a label for the object” as requiring the “choosing [of] a pre-existing label” where “the specification does not in any way indicate or suggest that one cannot select a label that does not yet exist.”); *Hitachi Metals, Ltd. v. All. Of Rare-Earth Permanent Magnet Indus.*, 699 F. App’x 929, 937–38 (Fed. Cir. 2017) (non-precedential) (rejecting construction of “rapid cooling method” that would exclude

cooling above a rate of 10⁶ degrees/second where “nowhere does the specification cap the range at 10⁶ degrees per second.”).

For instance, in connection with one embodiment the patent explains that “[t]he adaptive sparse de-noising filtering is directed to recovering the original signal from an independent and identically distributed (i.i.d.) noisy environment.” JXM-0003 (’556 Patent), at 14:19-24. In another embodiment, an adaptive sparse de-noising filter is described as involving steps including an overcomplete transform set, a threshold, and an adaptive weighting method. JXM-0003 (’556 Patent), at 13:22-55. A different embodiment applies an adaptive sparse de-noising filter “which can further reduce quantization noise over video frames composed of locally uniform regions.” JXM-0003 (’556 Patent), at 13:22-55. In yet another embodiment, broader language is used that does not require using an “overcomplete” set of transforms for the sparse de-noising filter. *See* JXM-0003 (’556 Patent) at 11:59-61 (“[i]n an embodiment . . . [t]he transform for the sparse de-noising step can be adaptively selected from a set of possible transforms.”)); *see* CXM-0002 (Richardson Decl.), at ¶¶ 102, 104, 120-123.

Accordingly, the patent does not compel a specific definition or departure from the ordinary meaning, rather, the disclosure of different embodiments confirms to persons having ordinary skill in the art that the ordinary meaning of “sparse de-noising filter” should apply. CXM-0002 (Richardson Decl.), at ¶¶ 90-93, 151; *see Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1376 (Fed. Cir. 2019) (rejecting construction that would require a limitation when the specification disclosed such a limitation “only as a possible embodiment” and “[n]owhere does the specification state or imply that [the limitation] is a mandatory part of the” claim term). Even if Respondents were to argue that these various embodiments all take the same form, which would be a mischaracterization of the disclosures, the examples are “not sufficient to redefine” the meaning

of “sparse de-noising filter.” See *Ancora Techs v. Apple, Inc.*, 744 F.3d 732, 735 (Fed. Cir. 2014) (quoting *IGT v. Bally Gaming Int’l, Inc.*, 659 F.3d 1109, 1118 (Fed. Cir. 2011)) (ruling that the specification’s description for a “preferred embodiment,” which was consistent with descriptions of other disclosed embodiments, was not limiting).

The Ordinary Meaning Encompasses Deringing Filters:

The ’556 Patent confirms that the ordinary meaning of “sparse de-noising filter” encompasses deringing filters. Respondents argue that the claimed sparse de-noising filter excludes deringing filters, but it is unclear whether this argument is based on supposed ordinary meaning, lexicography, or disavowal. Respondents’ misguided lexicography and disavowal arguments will be addressed below (*see* § IV.B.1(ii), *infra*), but any argument that the ordinary meaning excludes deringing filters can be dispensed with first.

Ringing and noise enjoy a relationship of genus and species. CXM-0002 (Richardson Decl.), at ¶¶ 138-140. Ringing noise is a form of noise, but not all noise is ringing noise. In fact, there are many forms of quantization noise, including ringing noise, mosquito noise, blocking artifacts, tiling artifacts, magnitude offsets, and others. CXM-0002 (Richardson Decl.), at ¶¶ 76, 135-136. Persons having ordinary skill in the art would have understood that de-artifacting and de-noising constitutes the reduction of noise regardless of the specific form the noise takes. CXM-0002 (Richardson Decl.), at ¶¶ 135-140. The ’556 Patent confirms: “[a]ll video compression artifacts result from quantization” and these “artifacts can be present in various forms such as, for example, a blocky artifact, a *ringing artifact*, an edge distortion, and/or texture corruption.” JXM-0003 (’556 Patent), at 1:12-17 (emphasis added). Indeed, the patent title itself is directed to “in-loop de-artifact filtering” and the patentee explicitly lists “ringing artifact” (*i.e.*, ringing noise) as an example of a type of artifact that the in-loop de-artifact filters remove. JXM-0003 (’556 Patent),

at Title, 1:12-17; *see also id.*, at 10:62-11:1 (describing the “exemplary succession of de-artifact filters” shown in Figure 5, including “[a]n adaptive sparse de-noising filter”). Furthermore, in an embodiment the ’556 Patent states “at least one of the at least two filters includes a deblocking filter, a de-ringing filter, a de-noising filter, a signal estimation filter, a linear filter, and a non-linear filter.” JXM-0003 (’556 Patent), at 16:43-47.

These are not listed as exclusive alternatives, for instance, the patent describes a deblocking filter as a form of de-noising filter despite both appearing in the list above. *See* JXM-0003 (’556 Patent), at 1:58-63 (“[A] special purpose ***de-noising filter*** . . . [f]or example, ***the in-loop deblocking filter*** used in the MPEG-4 AVC Standard is a special purpose filter”); *see also* CXM-0002 (Richardson Decl.), at ¶ 138. At bottom, the term “de-noising filters” refers to a category of filters that encompass other known filters, such as de-ringing filters, linear filters, non-linear filters, deblocking filters and others. In keeping with this, the claimed “sparse de-noising filter” does not exclude de-ringing filters.

Respondents’ alternative construction, which seeks to limit the scope of the claims to the specific sparse de-noising filter described by Guleryuz, dooms any argument that the ordinary meaning excludes de-ringing filters. Crucially, the patent declares that the Guleryuz sparse de-noising filter “can address all types of quantization noise.” JXM-0003 (’556 Patent), at 2:13-14. Quantization noise includes ringing noise. JXM-0003 (’556 Patent), at 1:12-17; CXM-0002 (Richardson Decl.), at ¶¶ 105, 134. Therefore, Guleryuz’s sparse de-noising filter is a de-ringing filter. Respondents cannot simultaneously argue that the claims should narrowly be construed to the Guleryuz filter, which removes ringing noise, while also arguing the plain meaning of the term excludes de-ringing filtering. Likewise, in an embodiment, the patent discloses “an adaptive sparse de-noising filter, which can further reduce quantization noise,” which the person having ordinary

skill in the art would have understood would include ringing noise. JXM-0003 ('556 Patent), at 10:17-23. Accordingly, the claims recite “an adaptive sparse de-noising filter for performing a second pass to reduce noise.” JXM-0003 ('556 Patent), at Claims 1, 5. The intrinsic record makes clear that claims are directed to the full scope of de-noising filters, including de-ringing filters, to perform a second pass to reduce noise.

Extrinsic evidence offered by Respondents that is inconsistent with the intrinsic record should be disregarded. *See Vitronics*, 90 F.3d at 1584 (“[E]xtrinsic evidence . . . may not be used to . . . contradict the import of other parts of the specification.”). The literature makes clear that POSITA understood the concept of sparse de-noising filtering and its many different approaches, and reliance on disparate extrinsic references to try to narrowly limit the term to a single implementation of a sparse de-noising tool would be improper. Indeed, across the evidence offered by Respondents different authors describe the shared concept of sparse de-noising filtering in different ways. (CXM-0002 (Richardson Decl.), ¶¶ 93-100 (citing CXM-0003 (Elad 2006); CXM-0006 (Donoho 2006); CXM-0005 (Gribonval, 2006); RXM-0025 (Dabov 2007); RXM-0030 (Ji 2011) at LENOVO_1373-00161633 to 00161634); RXM-0039 (Gu 2016) at LENOVO 1373-00161772)).

The term “sparse de-noising filter” was not specifically addressed during prosecution of the application that led to the '556 Patent. As a result, the '556 Patent file history supports the ordinary meaning of the term because it cannot provide the “clear and unmistakable” disclaimer that would be required to depart from that meaning. However, as noted above, the Examiner of a related application clearly demonstrated the exact same understanding of the ordinary meaning of “sparse de-noising filter” as Complainants and Staff. CXM-0002 (Richardson Decl.), at ¶¶ 101, 128, 142(citing RXM-0021 ('462 File History), at LENOVO_1373-00159438) (“By definition

sparse filtering works based on sparsity in the image feature distribution”)). The prosecution history therefore overall supports the ordinary meaning discussed above.

Without admitting that it constitutes intrinsic evidence, statements made to the EPO confirm applicants' understanding, in line with POSITA, that term “sparse de-noising filter” is not limited to any one specific embodiment.¹ There, the application proposed amendments to recite a specific embodiment of a “sparse de-noising filter.” SXM-0010 (Oct. 8, 2021 Communication to EPO), at 3. This confirms that POSITA would have understood that the term is broader. If “sparse de-noising filter” equaled that one embodiment, as Respondents contend, the applicant would have simply said so, instead of amending the claims to include that language. CXM-0002 (Richardson Decl.), at ¶ 129 (citing SXM-0010 (Oct. 8, 2021 Communication to EPO), at 3). Instead, however, the applicant argued the term was not limited to that one embodiment. *Id.* (citing RXM-0023 (EP ’583 File History), at LENOVO_1373-00160639 (“As argued by the applicant, a ‘sparse’ filter could be interpreted as a filter representable by a coefficient matrix having most of the coefficients set to zero.”)). Thus, applicants’ remarks all suggest that applicants understood that the term “sparse de-noising filter” had an understood scope not limited to only a “sparse image model.” *See K-Fee Sys.*, Case No. 22-2042, 2023 U.S. App. LEXIS 34136 at *13 (Fed. Cir. Dec. 26, 2023) (“K-fee’s remarks all suggest that K-fee understood the relationship between barcodes and bit codes to be more complex than simply that bit codes cannot be barcodes.”).

¹ Respondents would be misguided to argue disclaimer from RXM-0023 (EP ’583 File history) or RXM-0024 (EP ’853 File History), as disclaimer cannot be premised on statements made when defending a related but distinct patent against a different legal standard before a foreign patent office. *AIA Eng’g Ltd. v. Magotteaux Int’l S/A*, 657 F.3d 1264, 1279 (Fed. Cir. 2011) ((quoting *TI Grp. Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1136 (Fed. Cir. 2004)).

As discussed below, Respondents advocate for a negative limitation that stems from a misreading of the prosecution history of related patents, but those statements do not require departure from the ordinary meaning either. *See* § IV.B.1(ii)(a), *infra*.

(ii) Respondents’ Negative Limitation Should be Rejected

Respondents impermissibly restrict the claimed sparse de-noising filter to a filter “which is not a deringing filter.” This is inconsistent with the ’556 Patent, which makes clear that sparse de-noising filters include deringing filters. *See* § IV.B.1(i)(b), *supra*. Thus, Respondents’ proposed negative limitation should not be adopted because (a) Respondents point to statements made during the prosecution history of related patents, but these statements are not a disclaimer of claim scope and, even if they were, do not satisfy the “exacting” standard for disavowal and (b) the negative limitation departs from the ordinary meaning of the term without words or expressions of manifest exclusion or restriction in the intrinsic record.

(a) There is No Clear and Unmistakable Disclaimer of Claim Scope That Compels the Negative Limitation

There is no disclaimer in the prosecution history because there are no “words or expressions of manifest exclusion or restriction” in the intrinsic record.” *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1358 (Fed. Cir. 2016) (quoting *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed. Cir. 2002)). The prosecution history does not demonstrate that the patentee intended to deviate from the ordinary and accustomed meaning of “sparse de-noising filter” discussed above. Respondents contest this, but the alleged statements do not disclaim claim scope and do not satisfy the high, exacting, standard for disavowal. *Avid Tech., Inc. v. Harmonic, Inc.*, 812 F.3d 1040, 1045 (Fed. Cir. 2016) (“When the prosecution history is used solely to support a conclusion of patentee disclaimer, the standard for justifying the conclusion is a high one.”).

During prosecution of the parent application to the '556 Patent,² the Examiner rejected “sparse de-noising filter” claims as anticipated by the de-ringing filter of the Lee reference. RXM-022 ('243 Patent File History), at LENOVO_1373-00160090. The applicant disagreed. (RXM-022 ('243 Patent File History), at LENOVO_1373-00160119). The applicant explained that “[t]he cited portions of Lee do not expressly or inherently disclose at least *a sparse de-noising filter for performing a second pass to reduce noise.*” *Id.* (emphasis original). Applicant continued “[w]hile the cited portions of Lee may disclose deringing filtering, Lee does not disclose or suggest *a sparse de-noising filter for performing a second pass to reduce noise.*” *Id.* (emphasis original); CXM-0002 (Richardson Decl.), at ¶¶ 141-142; *see also* RXM-0022 ('243 Patent File History), at LENOVO_1373-00160136.

Respondents now argue that these statements disclaimed all deringing filtering. Not so. The standard for disavowal is exacting. *Thorner*, 669 F.3d at 1366. Disavowal requires that “the specification [or prosecution history] make[] clear that the invention does not include a particular feature.” *Id.* As is clear from the statement itself, nothing was disavowed or disclaimed; rather, the applicant described what Lee is *not*. *See K-Fee*, Case No. 22-2042, 2023 U.S. App. LEXIS 34136 at *19 (Fed. Cir. Dec. 26, 2023) (“We conclude that Jarisch was distinguished not through any clear disavowal of claim scope, but because it was never within the scope of the claims”). This does not constitute disavowal. These statements do not go so far as to exclude all de-ringing filtering from the claimed sparse de-noising filter—instead, the only thing applicants distinguished

² Prosecution history statements that concern a different patent that does not recite the limitations of the subsequent patent are of little to no relevance, and here the parent application did not recite “adaptive sparse de-noising filter for performing a second pass to reduce noise” like the claims at issue in the '556 Patent. *See, e.g., Ventana Med. Sys., Inc. v. Biogenex Labs., Inc.*, 473 F.3d 1173, 1182 (Fed. Cir. 2006); *Invitrogen Corp. v. Clontech Labs., Inc.*, 429 F.3d 1052, 1078 (Fed. Cir. 2005); *ResQNet.com, Inc. v. Lansa, Inc.*, 346 F.3d 1374, 1383 (Fed. Cir. 2003); *Regents of the Univ. of Minn. V. AGA Med. Corp.*, 717 F.3d 929, 944-45 (Fed. Cir. 2013).

was Lee itself, and Lee does not disclose a sparse filter. CXM-0002 (Richardson Decl.), at ¶ 142. Simply put, there is no disavowal of claim scope when one points out that the claimed sparse de-noising filter is not anticipated by a filter that is not a sparse filter.

In response, the Examiner *agreed* that Lee was never within the scope of the claims and confirmed Lee “does not disclose that the de-noising filter is a sparse filter.” RXM-0022 (’243 Patent File History), at LENOVO_1373-00160136; *see also id.*, at LENOVO_1373-00160154 (“Rather, in apparent agreement with Applicants’ traversal, the final Office Action changes its position and acknowledges ‘Lee discloses an adaptive deringing filter (de-noising filter) (paragraph [0049]) but does not disclose that the de-noising filter is a sparse filter.’”); CXM-0002 (Richardson Decl.), at ¶ 141. The Examiner’s statement is fatal to Respondents’ disclaimer argument for two reasons. First, the Examiner understood that the applicant never argued that deringing filters cannot constitute the claimed sparse de-noising filter. Second, the Examiner characterized Lee’s deringing filter as “the de-noising filter,” underscoring that deringing filters are a form of de-noising filter.

Indeed, Lee itself discloses “the deringing filtering for reducing the ringing noise,” further confirming that persons having ordinary skill in the art would have understood that deringing filters are a form of de-noising filters.³ The prosecution history “provides evidence of how the [United States Patent & Trademark Office (PTO)] and the inventor understood the patent.” *Phillips*, 415 F.3d at 1317. Here, the Examiner’s statement demonstrates that deringing filters were

³ The Examiner also explained that Lee uses “a ringing flag indicating whether reduction of ringing noise near image edges is required (i.e., **disabling the de-noising (ringing) flag** when reduction of ringing noise near images edges is not required).” RXM-0020 (LENOVO_1373-00158603-4) (emphasis added).

not disclaimed from the ordinary meaning of “sparse de-noising filter” as Respondents now contend. CXM-0002 (Richardson Decl.), at ¶¶ 141-142.

Likewise, the amendment to the claims accompanying these remarks did not narrow the scope of the claims being prosecuted, meaning no claim scope was ever relinquished. An amendment that does not narrow the claim scope, as here, cannot operate as a disclaimer. *See, e.g., Omega Eng’g*, 334 F.3d at 1323 (holding that prosecution history statements did not amount to disclaimer because they did not “suggest[] a narrower meaning of the claim limitation.”); *Lazare Kaplan Int’l Inc. v. Photoscribe Techs., Inc.*, 628 F.3d 1359, 1370 (Fed. Cir. 2010) (“The court fails to see how either of these statements support the narrow construction.”). There was no disclaimer, nor was there any acquiescence to changes that amount to a withdrawal of the broader claim.

Moreover, these statements cannot constitute disclaimer or disavowal of claim scope because disclaimer “must be both clear and un mistakeable.” *Baxalta Inc. v. Genentech, Inc.*, 972 F.3d 1341, 1348 (Fed. Cir. 2020) (citation omitted). In the context of Lee, the applicant did not “act with sufficient clarity” so as to “disclaim . . . [the] plain meaning or prescribe a special definition.” *Papst Licensing GmbH & Co. KG v. Fujifilm Corp. (In re Papst Licensing Dig. Camera Patent Litig.)*, 778 F.3d 1255, 1261 (Fed. Cir. 2015) (“[N]othing in the prosecution history supports the district court’s narrow construction.”); *see also K-Fee Sys. GmbH v. Nespresso USA, Inc.*, Case No. 22-2042, 2023 U.S. App. LEXIS 34136 at *18 (Fed. Cir. Dec. 26, 2023) (“The only thing K-fee clearly distinguished before the EPO was Jarisch itself, which nowhere declares that its messages have bars of variable widths.”). Statements that give rise to multiple interpretations cannot rise to the level of clear disavowal. *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013) (“Where an applicant’s statements are amenable to multiple

reasonable interpretations, they cannot be deemed clear and unmistakeable.”). Here, the applicant statements simply explained that Lee did not disclose a sparse de-noising filter because, as the Examiner recognized, it does not disclose a sparse filter. CXM-0002 (Richardson Decl.), at ¶¶ 141-142. Even if not, at most the statements are “too vague or ambiguous to qualify as a disavowal of claim scope.” *Malvern Panalytical Inc. v. TA Instruments-Waters LLC*, 85 F.4th 1365, 1374 n.4 (Fed. Cir. 2023). Either way, there is no clear and unmistakeable disclaimer.

Although it is clear from consideration of the entire prosecution history that there was no disclaimer, Respondents’ proposed negative limitation should also be rejected because it is too confining. Here, the applicant’s remarks “all suggest that [the applicant] understood the relationship between” sparse de-noising filters and de-ringing filters “to be more complex than simply that” sparse de-noising filters cannot be de-ringing filters. *See K-Fee System GmbH v. Nespresso USA, Inc.*, Case No. 22-2042, 2023 U.S. App. LEXIS 34136 at *13 (Fed. Cir. Dec. 26, 2023). The statement itself explains that “[w]hile the cited portions of Lee may disclose deringing filtering, Lee does not disclose or suggest a sparse de-noising filter *for performing a second pass* to reduce noise.” Although it is clear that the issue with Lee is that it is not a sparse filter, the applicant’s statement also points out that Lee’s filter is not “for performing a second pass to reduce noise.” The multiple interpretations underscore that no clear and unmistakeable disclaimer occurred. *See 3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

Other prosecution history statements further confirm there was no disclaimer of de-ringing filters. For instance, during prosecution of a child application, the Examiner again confirms that reduction of ringing noise is a form of de-noising and that Lee does not disclose a sparse de-noising filter. *See, e.g.*, CXM-0002 (Richardson Decl.), at ¶ 142; RXM-0020 (’184 File History), at LENOVO_1373-00158603-04 (Lee teaches “a ringing flag indicating whether reduction of ringing

noise near image edges is required (i.e., disabling the de-noising (ringing) flag when reduction of noise near image edges is not required”), at LENOVO_1373-00158731; RXM-0021 (’462 File History), at LENOVO_1373-00159275 (“Lee discloses a ringing de-noising filter and does not disclose a sparse de-noising filter.”). In connection with the prosecution of a different child application, the Examiner explained that “[b]y definition sparse filtering works based on sparsity in the image feature distribution” and is used “for the purpose of denoising images.” *See* RXM-0021 (’243 Patent File History), at LENOVO_1373-00159438. Notably, the Examiner did not exclude deringing filtering from this definition despite the fact that these statements were made *after* the alleged disclaimer of deringing filters and the alleged disclaimer was made to this very same Primary Examiner. *Compare* RXM-0021 (’243 Patent File History), at LENOVO_1373-00159441 *with* JXM-0003 (’556 Patent), at Cover.

(b) *The Claims and the Specification Do Not Justify Importing the Negative Limitation*

Respondents’ proposed negative limitation should also not be adopted because it finds no support in the claim language itself, which is silent on deringing. The claim language—whether considered in isolation or in light of the surrounding claim language—therefore provides no basis to conclude that the term must exclude deringing filters. *See Linear Tech. Corp. v. ITC*, 566 F.3d 1049, 1060 (Fed. Cir. 2009) (determining a negative limitation was unwarranted when the “claim limitation [did] not state [it] *directly*” and “there [was] no basis in the patent specification for adding the negative limitation.”). Negative limitations must either find support directly in the claim or in “express” disclaimer or lexicography, and since there is no support in the claims, Respondents’ position last hinges on express disclaimer or independent lexicography. *See Omega Eng’g, Inc v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003) (looking “[b]eyond the words of the claim,” the court looked for “any express disclaimer or independent lexicography in the

written description that would justify adding [a] negative limitation” and determined “no basis in the patent specification for adding the negative limitation.”); *Ethicon LLC v. Intuitive Surgical, Inc.*, 847 Fed. Appx. 901, 907 (Fed. Cir. 2021) (non-precedential) (“We have identified claim constructions that exclude a particular element as including a ‘negative limitation’ and held that such exclusions must find support either in ‘the words of the claim’ or through an ‘express disclaimer or independent lexicography in the written description that would justify adding that negative limitation.’”). Respondents cannot substantiate the proposed negative limitation.

The specification does not mandate exclusion of deringing filters through express disclaimer or independent lexicography. In fact, as explained above, the ordinary meaning of “sparse de-noising filter” includes deringing filters. *See* § IV.B.1(i)(b), *supra*. Therefore, Respondents must establish one of the “two exceptions” applies: lexicography or disclaimer. *Thorner*, 669 F.3d at 1365. Here, again, Respondents find no support.

There is no lexicography that excludes deringing filters. “‘To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term’ other than its plain and ordinary meaning’ and must ‘clearly express an intent’ to redefine the term.” *K-Fee System GmbH v. Nespresso USA, Inc.*, Case No. 22-2042, 2023 U.S. App. LEXIS 34136 at *17 (Fed. Cir. Dec. 26, 2023) (citing *Thorner*, 669 F.3d at 1365). The ’556 Patent does not clearly express an intent to redefine the term, to the contrary, it contemplates various different filters including de-noising filters that remove coding artifacts such as ringing noise. *See* § IV.B.1(i), *supra*; *see also* CXM-0002 (Richardson Decl.), at ¶¶ 132-140; JXM-0003 (’556 Patent), at 1:12-17 (listing ringing artifacts as a form of quantization noise); 10:8-16 (listing a de-ringing filter as an example of one of the filters used in an embodiment of the invention); 16:45-48 (also listing a de-ringing filter as an example). Indeed, “[a]ccording to yet another aspect of the present principles . . . [t]he decoder

has at least two filters for successively performing in-loop filtering to respectively reduce at least a first and a second type of quantization artifact.” JXM-0003 (’556 Patent), at 5:7-12. This is consistent with the understanding of persons having ordinary skill in the art that de-noising is a broader class of filters than de-ringing. Respondents have pointed to nothing, because there is nothing, that clearly defines the “first and a second type of quantization artifact” such that it excludes “ringing artifacts.” CXM-0002 (Richardson Decl.), at ¶¶ 139-140; *see also id.*, ¶ 135.

It would be incorrect to argue that the specification’s exemplary “and/or” list of filters dictates that a de-noising filter is distinct from a de-ringing filter such that a sparse de-noising filter cannot be a de-ringing filter. CXM-0002 (Richardson Decl.), at ¶¶ 137-138; JXM-0003 (’556 Patent), at 10:8-16. For one, this reading is contrary to the rest of the specification as explained above. *See* § IV.B.1(i), *supra*. It is also contrary to the “and/or” language used for the list itself. JXM-0003 (’556 Patent), at 10:8-16 (reciting that “at least one “of the “succession of filters” can constitute a “de-noising filter” and a “de-ringing filter.”).

But this “and/or” argument also fails because, though the list of filters would be read as Complainants set forth above, even if not, it is at most ambiguous. *Prima Tek II, L.L.C. v. Polypap, S.A.R.L.*, 318 F.3d 1143, 1149 (Fed. Cir. 2003) (rejecting importation of limitation from a “teaching of the written description [that was] at most ambiguous” as to whether the limitation was required); *see Vehicle IP*, 594 F. App’x at 641–42 (Fed. Cir. 2014) (rejecting district court’s construction requiring that a term for time display, “expected time of arrival,” follow a particular format where “the written description [is] ambiguous as to [its] format”). The specification does not expressly state that the disclosed filters are alternatives, nor does it reject the understanding of persons having ordinary skill in the art that de-ringing filters have a genus/species relationship with de-noising filters. CXM-0002 (Richardson Decl.), at ¶¶ 133, 137-138; *see also id.*, ¶ 76. This

disclosure cannot constitute “words or expressions of manifest exclusion” such that the claims would be read so restrictively. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (declining to limit the invention’s scope to the disclosed embodiments when the specification did “not expressly or by clear implication reject the scope of the invention” to these embodiments).

Without lexicography, Respondents are left to justify their proposed negative limitation through disclaimer. Respondents cannot. There is simply no disclaimer or disavowal of claim scope in the specification that would compel removal of de-ringing filters from the scope of the claim. Indeed, the terms “ringing” or “de-ringing” only appear in three instances in the specification and each supports Complainants’ position, not Respondents. CXM-0002 (Richardson Decl.), at ¶¶ 137-138; *see also id.*, ¶¶ 15, 75-76. Thus, Respondents’ negative limitation is inconsistent with both the claims and the specification.

(iii) Respondents’ Alternative Construction Should be Rejected

Respondents offer an “alternative” construction that violates a hallmark rule of claim construction: limitations from the specification are not to be read into the claims. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904 (Fed. Cir. 2004) (“[W]e do not read limitations from the embodiments in the specification into the claims.”); Worse, Respondents’ alternative construction is copied directly from the ’556 Patent’s background section where a prior art filter is discussed and there is no clear and definite statement to so restrict the claims. Respondents then append their unsupported negative limitation that seeks to exclude deringing filters, which itself is inappropriate as discussed above. *See* § IV.B.1(ii), *supra*. Respondents’ alternative construction, which is inconsistent with the claims, specification, and file history should be rejected.

The inquiry again begins, as it must, with the claims. The Federal Circuit has made clear that “[e]mbodiments in the specification . . . cannot limit the scope of the claims absent the patentee’s ‘words or expressions of manifest exclusion or restriction.’” *Pulse Elecs., Inc. v. U.D. Elec. Corp.*, 860 Fed. Appx. 735, 737 (Fed. Cir. July 1, 2021) (non-precedential) (citation omitted). Indeed, “it is improper ‘to import limitations from the specification into the claims.’” *Pulse Elecs.*, 860 Fed. Appx. 735, 737 (quoting *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371–72 (Fed. Cir. 2014)). Here, there are no such words of manifest exclusion (*see* § IV.B.1(i), *supra*), yet Respondents’ alternative construction seeks to limit the claims to one embodiment.

Figure 5 of the patent does not support restricting the claims to Respondents’ proposed alternative construction. CXM-0002 (Richardson Decl.), at ¶ 118. The patent explains that Figure 5 is “an exemplary” embodiment that “involves the use of a ‘two-pass’ filter.” JXM-0003 (’556 Patent), at 10:62-64. The patent elsewhere describes Figure 5 in the same manner, “Fig. 5 shows a diagram for an exemplary succession of de-artifact filters, according to an embodiment of the present principles.” JXM-0003 (’556 Patent), at 10:62-64. Figure 5, therefore, shows one example of an embodiment, and, as Dr. Richardson explains, the scope of the claimed “sparse de-noising filter” is not limited to the specific structure exemplified in Figure 5. *See Polaris Innovations Ltd. v. Brent*, 48 F.4th 1365, 1377 (Fed. Cir. 2022) (“Polaris’s argument rests on importing that limitation from an embodiment in the figures, which is improper.”)

Respondents may argue that “a filter which exploits a sparse image model using an over complete set of linear transforms and hard thresh-holding” is the *only* embodiment and that their alternative construction is therefore appropriate. But such an argument would be wrong in both law and fact. The Federal Circuit has repeatedly held that it is “not enough that the only embodiments, or all of the embodiments, contain a particular limitation” to limit claims beyond

their plain meaning. *Thorner*, 669 F.3d at 1366; *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1359 (Fed. Cir. 2016). Therefore, it would not be enough even if all embodiments disclosed in the specification included each and every limitation of Respondents’ alternative construction.

But—crucially—that is not the case. Respondents’ alternative construction requires: “a filter which (i) exploits a sparse image model (ii) using an over complete set of (iii) linear transforms and (iv) hard thresh-holding.” None of the four predicate components of Respondents’ alternative construction are required by the specification, let alone present in “all embodiments” or “the only embodiment.” CXM-0002 (Richardson Decl.), at ¶ 119. To the contrary, construing “sparse de-noising filter” in this manner would **read out** preferred embodiments, which is rarely, if ever, correct and would require highly persuasive evidentiary support, which is wholly absent in this case. *See Eko Brands, LLC v. Adrian Rivera Maynez Enters.*, 946 F.3d 1367, 1373 (Fed. Cir. 2020). Each aspect of Respondents’ flawed construction is discussed below:

First, a sparse de-noising filter is not required to exploit a sparse image model. CXM-0002 (Richardson Decl.), at ¶ 120. The word “exploits” only appears once in the ’556 Patent to describe the Guleryuz paper in the background. *See JXM-0003* (’556 Patent), at 2:8. The claims do not include the limitation that the filter “exploits” a model or require a sparse image model in the first instance. In the detailed description, on the other hand, the ’556 Patent explains that “[i]n an embodiment . . . [t]he transform for the sparse de-noising step can be adaptively selected from a set of possible transforms.” JXM-0003 (’556 Patent), at 11:59-61. As Dr. Richardson explains, the person having ordinary skill in the art would understand from this disclosure that the use of a set of possible transforms is one embodiment of the invention, but the claims are not limited to that single embodiment. CXM-0002 (Richardson Decl.), at ¶ 120.

Second, a sparse de-noising filter does not necessarily need to use an overcomplete set of transforms, or even a set of transforms in the first instance. CXM-0002 (Richardson Decl.), at ¶ 121. Again, these terms do not appear in the claims. The term “overcomplete” describes the filter in Guleryuz as well as at one other point when “overcomplete” is used to describe “an adaptive sparse de-noising filter operation” as part of “an embodiment.” JXM-0003 (’556 Patent) at 13:21-60; CXM-0002 (Richardson Decl.), at ¶ 121. Limiting the claimed “sparse de-noising filter” to require an “overcomplete set of transforms” would read out an embodiment encompassing a set of “possible,” but not necessarily overcomplete, transforms. *See* CXM-0002 (Richardson Decl.), at ¶ 121 (citing JXM-0003 (’556 Patent) at 11:59-61 (“[i]n an embodiment . . . [t]he transform for the sparse de-noising step can be adaptively selected from a set of possible transforms.”)). *See Hill-Rom Servs. v. Stryker Corp.*, 755 F.3d 1367, 1379 (Fed. Cir. 2014) (“A construction that would exclude the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.”) (quotations omitted). Other references contemporaneous with the time of the invention confirm that persons having ordinary skill in the art would have understood that an overcomplete set of transforms was not required. *See* CXM-0002 (Richardson Decl.), at ¶¶ 121, 124 (citing CXM-005 (Gribonval 2006); *id.*, CXM-0002 (Richardson Decl.), at ¶¶ 122, 124 (citing RXM-0031 (Guleryuz 2006) (describing a single transform to obtain a sparse representation of the signal for de-noising) and RXM-0021 (’462 File History), at LENOVO_1373-00159119); *see also* SXM-0011 (*Xu*), at ¶ [0023]-[0025].

Third, a sparse de-noising filter does not strictly require **linear** transforms. The claims do not include the term “linear transforms.” CXM-0002 (Richardson Decl.), at ¶ 126. Persons having ordinary skill in the art would have understood that non-linear transforms and non-linear filtering would have been available approaches to sparse de-noising filtering, as well as using linear

transforms. *Id.* The '556 Patent discloses an embodiment of the invention that may include “a non-linear filter.” (JXM-0003 ('556 Patent), at 16:43-47). Once again, Respondent’s alternative construction would read out embodiments. *See Hill-Rom*, 755 F.3d at 1379.

Fourth, a sparse de-noising filter does not mandate the use of “hard thresh-holding.” The claims do not include the limitation “hard thresh-holding” or even require that thresholding be used in the first instance. CXM-0002 (Richardson Decl.), at ¶ 127. Even if thresholding were required, persons having ordinary skill in the art understood that thresholding can, for example, comprise soft or hard thresholding. CXM-0002 (Richardson Decl.), at ¶ 127 (citing RXM-0036 (Coifman), at 1 (describing “one method” of “transform-based thresholding” that includes the step “[a]pply soft or hard thresholding to the resulting coefficients”)). As Dr. Richardson explains, persons having ordinary skill in the art would have understood that the claimed sparse de-noising filter is not limited to the use of thresholding, let alone the specific “hard thresholding” that Respondents’ proposed construction requires. CXM-0002 (Richardson Decl.), at ¶ 127.

Altogether, not only is Respondents’ proposed construction not supported by the intrinsic record, but it would read out preferred embodiments. Furthermore, Respondents’ construction is derived from an example provided in the background section, but as discussed above, persons having ordinary skill in the art would not have understood the term “sparse de-noising filter” to be limited to this specific example nor to the transform and thresholding approach described by Guleryuz. CXM-0002 (Richardson Decl.), at ¶¶ 117-129.

2. “adaptive sparse de-noising filter” ('556 patent, Claims 1, 5)

Complainants’ Proposed Construction	Respondent’s Proposed Construction	Staff’s Proposed Construction
Plain and ordinary meaning (i.e., a sparse denoising filter (a filter that reduces noise based on a sparse	sparse de-noising filter for performing a second pass to reduce noise, which is not a deringing filter, that can	A sparse denoising filter (a filter that reduces noise based on a sparse representation of

representation of the signal) that can adjust its own parameters according to the image region)	adjust its own parameters automatically; Alternatively, a filter which exploits a sparse image model using an over complete set of linear transforms and hard thresh-holding, which is not a deringing filter, that can adjust its own parameters automatically.	the signal) that can adjust its own parameters automatically
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As with the above term, the plain and ordinary meaning of the term “adaptive sparse de-noising filter” should apply, which is “a sparse de-noising filter that can adjust its own parameters according to the image region.” The dispute between the parties centers on whether the term “automatically” should be imported into the claim; Complainants submit that it should not.

The construction proposed by Staff and Respondents is flawed because it is derived from wholly from extrinsic evidence, not intrinsic evidence. Moreover, the references identified as allegedly supporting the requirement that the filter “adapts its own parameters automatically” are directed to fields other than decoding image regions, as the claims require. CXM-0002 (Richardson Decl.), at ¶¶ 143-151 (citing SXM-0003 (Widrow 1975) at 1). Thus, the cited extrinsic evidence does not reflect the ordinary meaning the claim term would have in the context of the patent. The only use of the term “automatically” comes in the background section description of the prior art Guleryuz paper. There, the patent explains that this particular filter “*automatically* becomes high-pass, or low-pass, or band-pass, and so forth, *depending on the region the filter is operating on.*” JXM-0003 (’556 Patent), at 2:10-14. The word “automatically” otherwise never appears again in the intrinsic record and it would be improper to read this limitation into the claims. *Schindler Elevator Corp. v. Otis Elevator Co.*, 593 F.3d 1275, 1281-2 (Fed. Cir. 2010) (finding a proposed

claim construction including “without any sort of personal action by the passenger” to be too narrow when the phrase “personal action” appeared only once in the specification).

Accordingly, this single disclosure of “automatically” should not limit the claims. This same sentence, however, demonstrates that in the context of video decoding the filter adjusts “depending on the region the filter is operating on.” JXM-0003 (’556 Patent), at 2:10-14. This underscores the ordinary meaning proposed by Complainants. Unlike “automatically,” which is not used again in the specification, the concept of an adaptive filter that can adjust its own parameters in accordance with the image region is discussed throughout the specification and in the preferred embodiments. *See, e.g.*, JXM-0003 (’556 Patent), at 10:57-59, 16:25-34, 16:35-42, 16:65-17:4, 17:5-10. Therefore, in the context of the patent, the plain and ordinary meaning of “adaptive” in the term “adaptive sparse de-noising filter” is “a sparse de-noising filter that can adjust its own parameters according to the image region.”

The Federal Circuit has explained that “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *In re Papst*, 778 F.3d at 1261 (Fed. Cir. 2015) (citing *Phillips*, 415 F.3d at 1316). Claim 5 recites an apparatus to “decode ***an image region***, . . . including . . . ***an adaptive*** sparse de-noising filter for performing a second pass to reduce noise” JXM-0003 (’556 Patent), at Claim 5.⁴ Thus, the claim language confirms that the adaptive sparse de-noising filter is performing a second pass to reduce noise in the decoded image region. The person having ordinary skill in the art would have understood that the “adaptive” term in the context of these

⁴ Claim 1 recites similar language in the context of a method claim. *See* JXM-0003 (’556 Patent), at Claim 1 (“decoding ***an image region***, wherein the decoding includes performing in-loop filtering . . . including . . . ***an adaptive*** sparse de-noising filter for performing a second pass to reduce noise”).

claims would mean that the filter can adjust its own parameters according to the image region. CXM-0002 (Richardson Decl.), at ¶¶ 148-151.

The specification likewise supports Complainants' construction. For example, the patent explains that in an embodiment "*parameters may be adjusted based on*, for example, the encoder and/or decoder to be used and *the nature of the video data to be filtered*." JXM-0003 ('556 Patent), at 10:57-59 (emphasis added). The patent explains that for another embodiment, "another advantage/feature is the apparatus having the encoder that transmits side information as described above, wherein *the parameters of the at least one of the two or more filters are adaptively tuned* based at least in part on at least one of data characteristics and data statistics *corresponding to the image region*." JXM-0003 ('556 Patent), at 17:5-10 (emphasis added). Still "another advantage/feature is the apparatus having the encoder that, in turn, has at least two filters as described above, wherein the encoder transmits side information *corresponding to the image region to adaptively indicate parameters* of at least one of the two or more filters, the side information being transmitted at least one of a macroblock level, a slice level, a picture level, and a sequence level." JXM-0003 ('556 Patent), at 16:65-17:4 (emphasis added).

Moreover, the '556 Patent also discloses other preferred embodiments that are adaptive in that they base filter parameters on data characteristics and data statistics that again are according to the image region. *See* JXM-0003 ('556 Patent), at 16:35-42 ("Moreover, another advantage/feature is the apparatus having the encoder that, in turn, has at least two filters wherein at least one of the at least two filters is used to enforce at least one compression constraint as described above, wherein parameters of the at least one compression constraint is adaptively indicated based at least in part on at least one of data characteristics and data statistics corresponding to the image region."); *see also* JXM-0003 ('556 Patent), at 16:25-34 ("Still another

advantage/feature is the apparatus having the encoder that, in turn, has at least two filters wherein at least one of the at least two filters is used to enforce at least one compression constraint as described above, wherein at least one of, enablement information or disablement information for the at least one compression constraint and side information corresponding to the image region to adaptively indicate parameters of the at least one compression constraint, is signaled using at least one of at least one high level syntax element and at least one block level syntax element.”).

Complainants’ proposed ordinary meaning of “adaptive” encompasses the preferred embodiment described above—the adaptive sparse de-noising filter adjusts its own parameters in accordance with the image region. In Complainants’ view, the construction proposed by Staff and Respondents—requiring that the filter adjust “automatically”—likewise encompasses the preferred embodiment. However, to the extent that Respondents argue otherwise, then importation of “automatically” into the construction would be a further reason why that construction is incorrect. As the Federal Circuit has held, “[a] claim construction that excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.” *Eko Brands, LLC v. Adrian Rivera Maynez Enters*, 946 F.3d 1367, 1373 (Fed. Cir. 2020).

Finally, Respondents’ proposed negative limitation and alternative construction for this term stem from their flawed proposed constructions for the underlying term “sparse de-noising filter” and should not be adopted for the same reasons discussed above. *See* §§ IV.B.1(ii)—(iii), *supra*.

V. The ’859 Patent

A. Overview

The ’859 Patent is directed to methods and devices for arithmetic coding and decoding of symbols in a stream. As the patent specification describes, “entropy” coding and decoding can be used “[t]o transform symbols representative of a signal, for example a video or audio signal, into

binary codes.” JXM-002 (’859 Patent) at 1:23-25. The specification notes two types of entropy coding, “variable length coding” and “arithmetic coding.” *Id.* at 1:34-35 and Fig. 1 (variable length coding) and 1:47-48 and Fig. 2 (arithmetic coding)]. The patent explains that “[t]he invention [of the ’859 Patent] relates to an *arithmetic* method for coding symbols in a stream” (*id.* at 2:17-18 (emphasis added)), and asserted claims 10 and 15 likewise are directed to an “[a]*rithmetic* decoding method” and an “[a]*rithmetic* decoder,” respectively.

Entropy coding is the final step of a video encoding process. CXM-0002 (Richardson Decl.) at ¶ 49. It transforms symbols representing a video or audio signal and syntax elements into binary code, and it does so by associating short binary words with the most frequent (i.e., highest probability) symbol value. CXM-0002 (Richardson Decl.) at ¶¶ 85-87. The ’859 Patent describes shortcomings of prior art arithmetic coding methods, stating that “[o]ne of the disadvantages . . . is that the probability that a symbol takes a given value is intrinsically linked to the characteristics of the source signal which is not known a priori.” JXM-002 (’859 Patent) at 1:55–59; *see also id.* at 1:59–2:11 and Figs. 1 and 2 (describing and depicting the shortcomings of prior art arithmetic encoding and decoding). When the “estimated probability” (that a symbol has a certain value) is updated according to the prior art arithmetic coding method (“AC case”), the update “presumes a convergence time (T_d) before attaining the real probability.” *Id.* at 1:67 – 2:3. Accordingly, a drawback is that “the estimated probability . . . is regularly updated during the coding of the current signal in order to get closer to the real probability but with a delay time ([for the] AC case) all the greater as the real probability fluctuates during the coding process.” *Id.* at 2:4-11.

The invention of the ’859 Patent overcomes those shortcomings of the arithmetic coding/decoding methods and devices of the prior art. As the patent explains: “Advantageously the arithmetic coding method according to the invention enables the real probability to be

approached more rapidly than with a standard VLC [variable length coding] or AC [arithmetic coding] type method and thus enables the symbol or symbols to be coded more efficiently, i.e. at a lower coding cost.” Asserted claims 10 and 15 cover the inventive arithmetic coding/decoding method and device, specifically focusing on the decoding side (with claim 10 directed to an arithmetic decoding method, and claim 15 directed to an arithmetic decoder). In the invention, the method and the decoder will decode a current symbol according to a series of steps. The first step (whether in a method as per claim 10, or via an arithmetic decoder with appropriate “means” for performing the function as per claim 15) involves decoding a “probability model identifier” for a current symbol. The next step involves selecting a “probability model.” The probability model is selected using the probability model identifier, and the probability model is selected from among a set comprising a current probability model (defined from previously coded symbols) and a “subset” of other probability models (which includes at least one probability model that was defined by default). After selecting the probability model, the next step involves adding the current probability model to the “subset” noted above. As part of this step, the selected probability model becomes the “current probability model.” The next step involves decoding the current symbol with the current probability model. The final step then involves updating the current probability model according to the decoding of the current symbol.

B. Disputed Terms

The arithmetic decoding method summarized above is covered by claim 10 of the '859 Patent, and an arithmetic decoder device for performing the functions is covered by claim 15. The parties have two core claim construction disputes for the '859 Patent. The first dispute involves the preamble of claim 10, where the parties disagree about which terms are non-limiting and which terms are limiting. The second disputed involves the five means-plus-function terms in claim 15, namely the arithmetic decoder's “means for decoding,” “means for selecting,” “means for adding,”

“means for decoding,” and “means for updating.” The parties agree all five terms are in means-plus-function format subject to pre-AIA 112(6), but the parties disagree about their constructions. They disagree about both the functions recited in the claim terms, and they disagree about the corresponding structures described in the specification. For instance, for four of the means-plus-function terms, Complainants and Staff identify corresponding structures while Respondents contends that the specification (and its descriptions of an arithmetic decoder that performs these very functions) provides no corresponding structures, rendering four of the terms indefinite. Because each of the means-plus-function claim terms is clearly linked to corresponding structure in the specification, Respondents cannot meet their burden to prove (by clear and convincing evidence) that these five terms are indefinite. For the reasons discussed below, the ALJ should adopt Complainants’ proposed constructions for all the disputed terms.

1. Preamble – “[a]rithmetic decoding method for symbols coded in the form of a stream, comprising the following steps applied at switching points distributed in said stream to decode a current symbol” (’859 patent, Claim 10)

Complainants’ Proposed Construction	Respondent’s Proposed Construction	Staff’s Proposed Construction
The terms “stream” and “current symbol” are limiting at least to the extent that they provide antecedent basis for those terms as they appear elsewhere in the claim. <u>stream</u>: stream of data. <u>current symbol</u>: a symbol that is currently being decoded. “Switching points” is not limiting, but to the extent it is found limiting, a <u>switching point</u> is a point in the stream at	The portion of this claim term following “comprising” is not part of the preamble and therefore is limiting. Regardless, the entire term is limiting. The preamble is limiting. To the extent construction is necessary, <u>stream</u>: “stream of data” <u>current symbol</u>: “a symbol that is currently being decoded”	The portion of this claim term following “comprising” is not part of the preamble and therefore is limiting. Regardless, the terms “stream” and “current symbol” are limiting at least to the extent that they provide antecedent basis for those terms as they appear elsewhere in the claim. <u>stream</u>: stream of data.

the level of which the probability model used to code the current symbol can be modified.	<u>switching point</u> : “a point in the stream at the level of which the probability model used to code the current symbol can be modified—i.e., a probability model can be selected”	<u>current symbol</u> : a symbol that is currently being decoded. The term “switching points” is also limiting, regardless of whether it is considered to be part of the preamble. <u>switching points</u> : a point in the stream at the level of which the probability used to code the current symbol can be modified.
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(i) **Introduction.**

For claim 10 of the '859 patent, the parties dispute two claim construction issues, both of which pertain to the claim's preamble. The preamble recites: “[a]rithmetic decoding method for symbols coded in the form of a stream, comprising the following steps applied at switching points distributed in said stream to decode a current symbol.” '859 Patent, claim 10.

Both issues are discussed in detail in the sections that follow. But as an overview, the first issue concerns which portions of the preamble serve to limit the scope of the claimed invention. As the Federal Circuit has explained, “*a preamble is generally not limiting* unless there is ‘clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art.’” *Bio-Rad Labs., Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1369 (Fed. Cir. 2020) (emphasis added). A preamble may also limit the claimed invention “if it recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Id.* (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). Further, “[r]eliance on a preamble phrase for antecedent basis . . . may limit claim scope.” *Id.* Ultimately, “[w]hether a preamble is limiting is ‘determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution

history.” *Id.* (quoting *Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc.*, 98 F.3d 1563, 1572-73 (Fed. Cir. 1996)).

Here, the preamble is not limiting except as to the terms “stream” and “current symbol,” both of which provide antecedent basis for the same terms in the body of the claim. *See Bio-Rad*, 967 F.3d at 1369 (“Reliance on a preamble phrase for antecedent basis . . . may limit claim scope.”). For the rest of the preamble, the general rule applies, i.e., the preamble is not limiting because it was not relied on during prosecution, and it does not provide essential structure or provide “life, meaning, and vitality” to the claim. *Id.* The Respondents’ contrary position—specifically, Respondents’ theory that all of the language following the word “comprising” are part of the claim, and thus that the term “switching points” is a limitation—is merely an attempt to narrow the claim scope beyond what is warranted. The term “switching points” appears only in the preamble—not in the body of the claim—and thus it does not provide antecedent basis for any term and is not essential. Also, the term “switching points” is not “necessary to give life, meaning, and vitality to the claim,” nor was it relied on during prosecution to distinguish the claimed invention from the prior art. *Bio-Rad Labs.*, 967 F.3d at 1369. Thus, the term is not limiting.

The parties’ second issue arises only if the ALJ finds the preamble term “switching points” to be limiting. If the ALJ agrees that “switching points” is not limiting, no construction of the term is needed (since it does not limit the scope of the claim). On the other hand, if the ALJ adopts Respondents’ argument that the term is limiting, then the ALJ should construe the term. *See O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008) (“When the parties raise an actual dispute regarding the proper scope of these claims, the court . . . must resolve that dispute.”). The parties disagree on the proper construction of “switching points.” Complainants and Staff request that the ALJ adopt the definition expressly set forth in the ’859

patent specification. Respondents, by comparison, propose that same definition but then seek to append an “i.e.” clause at the end. Respondents’ “i.e.” clause changes the meaning of the term and thus should be rejected.

The parties’ two disputes over the preamble of claim 10 are addressed in more detail below.

(ii) The portion of the preamble following “comprising” is part of the preamble and is not limiting.

(a) The preamble language following the word “comprising” is still part of the preamble.

The parties dispute whether the preamble of claim 10 is the entire language preceding the colon (Complainants’ position) or whether instead the preamble ends with the word “comprising,” well before reaching the colon that leads to the body of the claim (Respondents’ position). Complainants’ position is correct.

Patent claims typically if not always have an opening phrase followed by a colon, where the colon provides a line of demarcation between the “preamble” of the claim and the “body” of the claim. As the Federal Circuit’s predecessor court explained, the preamble “is all that portion at the beginning of the claim preceding the colon.” *In re Dean*, 291 F.2d 947, 951 (C.C.P.A. 1961). Thus, the preamble is the entire set of language that precedes the colon in a claim. That principle is unchanged today. For example, as one court explained in the context of a lengthy preamble (with the word “comprising” situated ten words from the end), the preamble “is the part of the claim that appears before the first colon.” *Netjumper Software, L.L.C. v. Google, Inc.*, 2008 U.S. Dist. LEXIS 25842, at *10-11 (E.D. Mich. Mar. 29, 2008).

In the ’859 Patent, claim 10 has a single colon, and that colon indicates the conclusion of the preamble and the onset of the claim body:

10. Arithmetic decoding method for symbols coded in the form of a stream, comprising the following steps applied at switching points distributed in said stream to decode a current symbol:

decoding from the stream, for said current symbol, a probability model identifier,

selecting using said probability model identifier a probability model in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default,

adding in said subset said current probability model, the selected probability model becoming the current probability model,

decoding said current symbol with said current probability model, and

updating said current probability model according to the decoding of said current symbol.

Preamble

Body

'859 Patent, claim 10.

That the word “comprising” appears in the middle of the preamble does not change the fact that the preamble is the entire language preceding the colon. As one court explained, the word “comprising” does not “serve[] as a bright-line delimiter for where the preamble ends and the body of the claim begins.” *PersonalWeb Techs. LLC v. IBM*, Case No. 16-cv-01266-EJD, 2017 U.S. Dist. LEXIS 76162, at *30-31 (N.D. Cal. May 9, 2017) (ruling that “the Court agrees with [the patentee] that the preamble of claim 166 ends at the colon”). Another court made the same point, stating:

[T]he placement or use of the term “comprising” is not a bright line test in marking the delineation between inconsequential preambles and claims. To rely exclusively on the location of “comprising” to determine what constitutes the superfluous preamble distinct from the claims would be to place form over substance and would ignore vast precedent in determining whether terms or phrases contained in a preamble serve as claim limitations.

Novatek, Inc. v. Sollami Co., Consolidated Case No. 2:11-cv-00180, 2013 U.S. Dist. LEXIS 62488, at *12 (D. Utah Apr. 30, 2013).⁵

Instead of a bright-line rule, courts should consider the structure of the claim to see whether “the structure shows that [the] drafter intended this [preamble] language to provide context for the body of the claim[] that follow[s].” *Simpson Strong-Tie Co. v. Oz-Post Int’l LLC*, Case No. 3:18-cv-01188-WHO, 2020 U.S. Dist. LEXIS 105079, at *9 (N.D. Cal. June 15, 2020); *see also Novatek*, 2013 U.S. Dist. LEXIS 62488, at *12 (cautioning not to “place form over substance” in analyzing a claim preamble). Here, the structure of claim 10 demonstrates that all the language before the colon constitutes the preamble. Claim 10 is directed to a method. The body of the claim recites five steps of that method (“decoding,” “selecting,” “adding,” “decoding,” and “updating”). The preamble merely “provide[s] context for the body of the claim[] that follow[s].” The preamble—including the part following the word “comprising,” i.e., the language reciting, “the following steps applied at switching points distributed in said stream to decode a current symbol”—merely provides context for the method steps. That language is not part of the method, and the body of the claim recites a method. Thus, as in *PersonalWeb*, considering “[t]he structure of the claim” and “reading [the claim] in its entirety makes clear that the language leading up to the colon provides ‘introductory words.’” *See PersonalWeb*, 2017 U.S. Dist. LEXIS 76162, at

⁵ In fact, the Federal Circuit “has approved of” a preamble-within-a-preamble structure, such as “An apparatus comprising: a washer/nut member comprising:” *Simpson Strong-Tie, Co. v. Oz-Post Int’l LLC*, 2020 U.S. Dist. LEXIS 105079, at *8 (N.D. Cal. June 15, 2020) (citing *Microprocessor Enhancement Corp. v. Tex. Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008), and *HTC Corp. v. ICom GmbH & Co.*, 667 F.3d 1270, 1278 (Fed. Cir. 2012)). The court construed the phrase “washer/nut member” to be “a non-limiting preamble because it served as a contextual label for the body of the claim that followed rather than being essential to understanding the invention. *Id.* Thus, the fact that the word “comprising” first appeared in the middle of the preamble did not undermine that the remaining language also was part of the preamble. The same is true here.

*31 (quoting *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989)); *see also id.* (“the most sensible reading of the claim is that the preamble ends at the colon”).

For these reasons, all the language preceding the colon in claim 10 is part of the preamble. *See In re Dean*, 291 F.2d at 951 (the preamble “is all that portion at the beginning of the claim preceding the colon”). In particular, contrary to Respondents’ view, the preamble language that follows the word “comprising” (within the full preamble phrase “[a]rithmetic decoding method for symbols coded in the form of a stream, **comprising** the following steps applied at switching points distributed in said stream to decode a current symbol”) is part of the preamble. The ALJ should so rule. Identifying the language that properly constitutes the preamble matters here because, as addressed in the next section, the preamble “is generally not limiting.” *Bio-Rad Labs.*, 967 F.3d at 1369.

(b) *The term “switching points” in the preamble is not limiting.*

The preamble of claim 10 includes a phrase stating that “the following steps” are used “to decode a current symbol.” In between those words, the preamble provides an intended use for the method steps—that is, an intended application of the method steps. The preamble recites that intended use via the phrase “applied at switching points distributed in said stream.” Respondents seek to make this phrase a limitation of the claim. But it is not, as it is merely a statement of intended use for the method steps of claim 10.

As the Federal Circuit has made clear, “[p]reamble language that merely states the purpose or intended use of an invention is generally not treated as limiting the scope of the claim.” *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006). Stated another way, a preamble is not limiting “where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.” *Rowe v. Dror*, 112 F.3d

473, 478 (Fed. Cir. 1997). For example, in *Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, the Federal Circuit construed a claim preamble stating “[a] system for controlling the selection and dispensing of product coupons at a plurality of remote terminals ***located at predesignated sites such as consumer stores*** wherein each terminal comprises.” 289 F.3d 801, 805 (Fed. Cir. 2002) (emphasis added.) The court ruled that the emphasized language in the preamble was not limiting:

In this case, the claims, specification, and prosecution history of the '041 patent demonstrate that the preamble phrase “located at predesignated sites such as consumer stores” is not a limitation of Claim 1. The applicant did not rely on this phrase to define its invention nor is the phrase essential to understand limitations or terms in the claim body.

Id. at 810. The court also emphasized that “[t]he applicants also did not rely on the preamble phrase to distinguish over the [prior art]” during prosecution. *Id.* The Federal Circuit continued:

Moreover, deletion of the disputed phrase from the preamble of Claim 1 does not affect the structural definition or operation of the [claimed] terminal itself. The claim body defines a structurally complete invention. The location of the terminals in stores merely gives an intended use for the claimed terminals. As already noted, the applicants did not rely on this intended use to distinguish their invention over the prior art.

In this case, the disputed preamble language does not limit Claim 1—an apparatus claim. To hold otherwise would effectively impose a method limitation on an apparatus claim without justification. Accordingly, this court holds that the district court erroneously treated the preamble as a limitation of Claim 1.

Id.; see also, e.g., *Georgetown Rail Equip. Co. v. Holland L.P.*, 867 F.3d 1229, 1236 (Fed Cir. 2017) (ruling that the preamble phrase “to be mounted on a vehicle for movement along the railroad track” was not limiting and only “describe[d] the intended use of the invention” and was “not an essential feature of the invention”).

The same is true here for the preamble phrase “applied at switching points distributed in said stream.” As in *Catalina Marketing*, here the preamble phrase is not a limitation of claim 10. See *Catalina Marketing*, 289 F.3d at 810. The '859 Patent applicants did not rely on the phrase to

define its invention nor is the phrase essential to understand the method steps in the claim body. As described earlier, the phrase “applied at switching points distributed in said stream” merely gives an intended use for the claimed method.

Still further, as in *Catalina Marketing*, deleting the disputed phrase from the preamble of claim 10 does not affect the method steps recited in the body of the claim, which by themselves define a complete invention. *Id.* Performing the method steps does not require applying them at “switching points.” As the Federal Circuit has made clear, “[a] preamble is not regarded as limiting . . . ‘when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention.’” *TomTom, Inc. v. Adolph*, 790 F.3d 1315 (Fed. Cir. 2015) (alterations in original) (quoting *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358-59 (Fed. Cir. 2010)). Respondents cannot demonstrate that deleting the disputed preamble phrase would affect the steps of the claimed invention. The steps recited in claim 10 have nothing to do with “switching points.” The switching points are merely an intended use of the method steps. Under Federal Circuit precedent, the “switching points” phrase is not limiting.⁶ See *Catalina Mktg. Int’l*, 289 F.3d at 810.

Perhaps most notably, the applicants “did not rely on the preamble phrase to distinguish over the [prior art]” during prosecution. *Catalina Mktg.*, 289 F.3d at 810. According to the Federal

⁶ That some parts of the preamble are limiting—like the terms “stream” and “current symbol,” which provide antecedent basis for the body of the claim—does not affect the non-limiting nature of the “switching points” term. A preamble may be “partially limiting.” *Bio-Rad Labs.*, 967 F.3d at 1371. In *Bio-Rad Labs.*, the Federal Circuit described an earlier ruling as follows: “We held that the first part of the preamble . . . was not limiting and did not provide an antecedent basis for any claim terms. We also found that the term did not recite essential structure or steps, or give necessary life, meaning, and vitality to the claim; rather, it stated ‘a purpose or intended use.’ At the same time, we held that the second part of the preamble . . . was limiting because it provided antecedent basis for [a term] recited in the body of the claims. Thus, we found that [the case] involved a partially-limiting preamble.” *Id.* (citations omitted).

Circuit, “a preamble is generally not limiting *unless there is ‘clear reliance on the preamble during prosecution* to distinguish the claimed invention from the prior art.”” *Bio-Rad Labs.*, 967 F.3d at 1369; *see also, e.g., Catalina Mktg.*, 289 F.3d at 808 (“clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention”). Here, the applicants never relied on the preamble to distinguish prior art. Instead, they relied on distinguishing features set forth in the body of the claims, not any part of the preamble. *See* JXM-005 (Aug. 27, 2013 Office Action Response) at IDG1373_0000218–19 response (The applicants distinguished the reference relying on the “coding of an identifier of the selected probability model,” and also pointed out that “the set of models (e.g. L models) can be updated dynamically”) (emphasis added).

The general rule in claim construction is that a preamble phrase is *not limiting*. *See, e.g., Am. Med. Sys.*, 618 F.3d at 1358 (“‘Generally,’ we have said, ‘the preamble does not limit the claims.’” (quoting *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002))). Here, in considering the preamble phrase “applied at switching points distributed in said stream,” there is no reason to depart from the general rule. The phrase is merely a statement of intended use. It does not provide antecedent basis or recite an essential feature of the invention, and it does not provide “life, meaning, and vitality” to the claim. It was not relied on during prosecution. And the body of the claim itself recites a complete invention. For these reasons, the ALJ should conclude that the “switching points” phrase is not limiting.

(iii) If the preamble term “switching point” is deemed limiting, the ALJ should construe it according to the explicit definition given in the ’859 Patent.

As noted earlier, if the ALJ agrees that the “switching points” phrase in the preamble is not limiting, no construction of the term is needed. But if a construction is needed, the ALJ should

adopt the proposal offered by Complainants and Staff, which is the definition expressly set forth in the specification for the '859 Patent. Respondents' proposal, while similar, adds a phrase at the end of the definition that is unwarranted under the circumstances.

As the ALJ is aware, 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.” *Thorner*, F.3d at 1362. One exception to that general rule is “when a patentee sets out a definition and acts as his own lexicographer.” *Id.* “To act as its own lexicographer, a patentee must ‘clearly set forth a definition of the disputed claim term’ other than its plain and ordinary meaning.” *Id.* (quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)); *see id.* (“the patentee must ‘clearly express an intent’ to redefine the term” (quoting *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1381 (Fed. Cir. 2008))).

Here, all parties agree that in the '859 Patent, the patentee clearly set forth a definition for the term “switching point.” The patent defines the term (three times, using the same wording each time), as follows: “A switching point SP is defined according to the invention as a point in the stream at the level of which the probability model used to code the current symbol can be modified.” JXM-002 ('859 Patent) at 4:57-60, 9:56-59, 10:65 – 11:1.

Complainants and Staff request that the ALJ adopt the definition expressly set forth in the '859 Patent specification. Respondents, by comparison, propose that same definition but then seek to append an “i.e.” clause at the end. Respondents' “i.e.” clause recites: “i.e., a probability model can be selected.” While it is not clear why Respondents propose to add this phrase, what is clear is that the phrase changes the meaning of the term as expressly defined in the patent. For that reason, it should be rejected.

According to the express definition of “switching points” in the patent, a switching point is a point in the stream where “the *current symbol* can be *modified*.” JXM-002 (’859 Patent) at 4:57-60, 9:56-59, 10:65 – 11:1 (emphasis added). Respondents’ proposed “i.e.” clause, in comparison, suggests that a switching point is where “a *probability model* can be *selected*.” Respondents’ proposal clearly changes the meaning of the term. Based on the parties’ meet-and-confer discussions, Respondents apparently seek this change based on Respondents’ view that step 204 (involving selecting a probability model) is shown in some patent figures (such as Fig. 11, below) as occurring soon after step 200 (involving verifying if the location is on a switching point). See JXM-002 (’859 Patent) at 9:55-56 (“During a step **200**, it is verified if the location is on a switching point SP.”); *id.* at 10:15-16 (“During a step **204**, the probability model of L for which the identifier is m is selected.”).

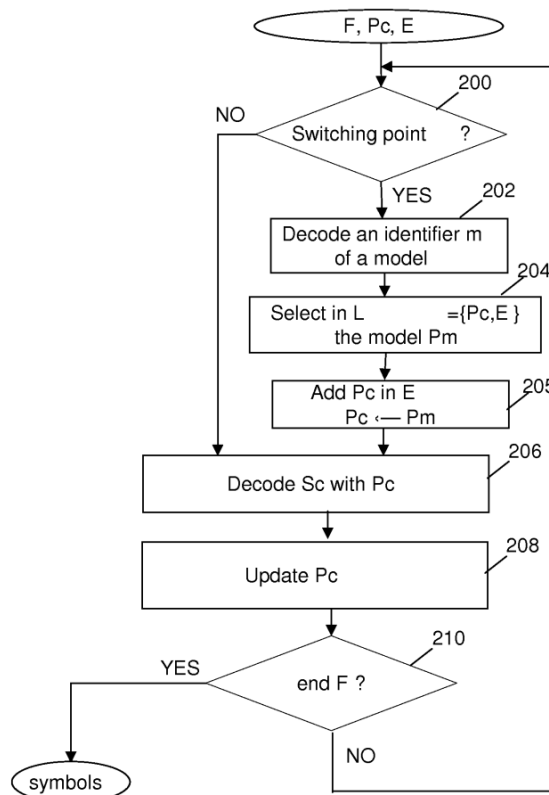


FIGURE 11

The fact that step 204 is purportedly near step 200 does not mean that the definition of “switching points” should be altered to include a point where “a ***probability model*** can be ***selected***,” as Respondents propose. There is no basis for such a view. Moreover, the figures are flow chart of certain preferred embodiments, not a restriction on the claims or a rework of the express set forth in the patent. *See, e.g.*, JXM-002 (’859 Patent) at 10:61 (“Another embodiment is represented in FIG. 11.”).

In the end, there is no basis for departing from the lexicographer’s express definition of “switching points.” Thus, the ALJ should adopt that express definition without including Respondents’ proposed “i.e.” clause. *See, e.g., ParkerVision, Inc. v. Vidal*, 2023 U.S. App. LEXIS 33171 at *10-16 (Fed. Cir. Dec. 15, 2023) (adopting the patentee’s definition when it opted to act as its own lexicographer); *Nestle USA, Inc. v. Steuben Foods, Inc.*, 686 Fed. Appx. 917, 919 (Fed. Cir. 2017) (same).

2. Claim 15 – Means-Plus-Function Terms

While claim 10 (addressed above) is directed to an “[a]rithmetic decoding ***method*** for symbols coded in the form of a stream,” claim 15 (addressed here) is directed to the “[a]rithmetic ***decoder***” itself. The preamble of claim 15 states that the claim covers an “[a]rithmetic decoder for decoding symbols coded in the form of a stream,” where the arithmetic decoder includes five features: “means for decoding” a probability model identifier, “means for selecting” a probability model, “means for adding” the current probability model, “means for decoding” the current symbol using the current probability model, and “means for updating” the current probability model according to the decoding of the current symbol.

The parties’ disputes over the means-plus-function terms are similar for all five terms. There are two core disputes—one relating to identifying the “function” in the claim language, and the other relating to identifying the corresponding “structure” described in the specification for

performing that function. Both issues are addressed in more detail below with respect to the five individual means-plus-function terms in claim 15. But there are overarching concepts that apply equally to all five terms, and those concepts will be explained before turning to the individual terms.

Identifying the Pertinent “Function.” For each means-plus-function term, the parties dispute which portions of the claim language constitute “function” and which portions constitute separate limitations not subject to the requirements of section 112(6). The ALJ’s determination of the “function” for each term—while an important, indeed required part of the claim construction process—may be largely academic. That is because the parties’ proposals for the corresponding structure for performing the function does not differ depending on the ALJ’s view of the function. For each term, Complainants identify the corresponding structure as an arithmetic decoder (and its equivalents), or if additional detail is warranted, an arithmetic decoder operable to perform the claimed function as described in the specification (and its equivalents). Respondents, by comparison, argue that the specification identifies no corresponding structure for four of the five terms and regardless of the ALJ’s view of the claimed functions. The Staff, on the other hand, agrees with Complainants that the specification discloses the structure of a “decoding device” (more specifically, an entropy decoding module)—akin to the “arithmetic decoder” structure offered by Complainants—and Staff’s view of the structure do not differ depending on the ALJ’s determinations of the appropriate function for each term.

Identifying the claimed function is the first step of a means-plus-function analysis. *See, e.g., Lockheed Martin Corp. v. Space Sys./Loral, Inc.*, 324 F.3d 1308, 1318 (Fed. Cir. 2003) (“The first step in analyzing a claim written in means-plus-function form is to identify the claimed function.”). The challenges in identifying the function have been explained as follows:

Differentiating between what is merely a claim limitation and what is part of the function is an important task because only the limitations that are part of the function have to adhere to the requirements of 35 U.S.C.A. § 112, para. 6. Yet, “[t]he Federal Circuit . . . has [had] difficulty teasing out the function within a means-plus-function limitation from a separate [claim] limitation not subject to the constraints of 35 U.S.C. § 112, ¶ 6.” *Joovy L.L.C. v. Baby Trend, Inc.*, 3:06-CV-0616-P, 2007 WL 5688725, at *3 (N.D. Tex. July 31, 2007).

King Pharms. Inc. v. Purdue Pharma L.P., 718 F. Supp. 2d 703, 712 (W.D. Va. June 22, 2010) (alterations in original); *see also, e.g., Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) (“An error in identification of the function can improperly alter the identification of structure in the specification corresponding to that function.”).

In performing this task, courts are consistent in one key respect—the identified function should be limited to ***the function itself***, not other words in the claim that describe “where,” “when,” or “how” that function is accomplished. *See, e.g., BBA Nonwovens Simpsonville, Inc. v. Superior Nonwovens, Inc.*, 303 F.3d 1332, 1344 (Fed. Cir. 2002) (excluding a “positioned” claim phrase from the function because “[w]hat the ‘corona means’ is and ***where it is located*** are two different things” (emphasis added)); *Uship Intellectual Props., LLC v. United States*, 98 Fed. Cl. 396, 427-28, *aff’d* 714 F.3d 1311 (Fed. Cir. 2013) (excluding claim phrase from the function because it “describes ***when*** storage happens and is not part of the function” for the “means for storing” term (emphasis added)), *aff’d* 714 F.3d 1311 (Fed. Cir. 2013); *Global Traffic Techs., LLC v. Emtrac Sys.*, 2012 U.S. Dist. LEXIS 96866, at *11-15 (D. Minn. July 13, 2012) (excluding claim phrase from the function because it describes ***where*** the “mapping means” is placed, and “the physical location . . . is irrelevant to performing the [claimed] functions” (emphasis added)); *Medtronic Minimed, Inc. v. Smiths Med. MD, Inc.*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (D. Del. 2005) (excluding claim phrase from the function because it “describ[es] ***how*** the ‘controller means’ accomplishes the function” (emphasis added)). That principle is important to the ALJ’s resolution

of the parties' disputes over the claimed functions. The principle is explained in context and more fully *infra*, in connection with the five individual means-plus-function terms in dispute.

Identifying the Corresponding “Structure.” The second step of a means-plus-function analysis is to “look next to the written description to identify the structure corresponding to the function.” *Lockheed Martin*, 324 F.3d at 1320. “[T]he ‘means’ term in a means-plus-function limitation is essentially a generic reference for the corresponding structure disclosed in the specification.” *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1308 (Fed. Cir. 1998). As the statute itself states, the corresponding structure “cover[s] the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 USCS § 112(f); *see also Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974 (Fed. Cir. 1985) (the statute “requir[es] that the limitation *shall* be construed to cover the structure described in the specification *and* equivalents thereof” (emphasis in original)).

The parties' core dispute over the structure is whether, as Complainants contend, the corresponding structure for each of the means-plus-function terms is an arithmetic decoder (as described in the specification), or whether, as Respondents contend, the specification lacks any structure that a skilled artisan would understand to perform the recited functions, thus rendering four of the five means-plus-function terms invalid for indefiniteness. The Staff agrees with Complainants that the specification identifies corresponding structure (the disclosed decoding device) but would welcome expert testimony clarifying that the specification provides sufficient structure such that a person of ordinary skill in the art would know how to perform the functions. Complainants have supplied such testimony in the declaration of Dr. Iain Richardson accompanying this brief. The specifics of the corresponding structure are addressed below on a term-by-term basis for all five disputed terms.

- (i) “means for decoding from the stream, at switching points distributed in said stream to decode a current symbol, for said current symbol, a probability model identifier” (’859 patent, Claim 15)

Complainants’ Proposed Construction	Respondents’ Proposed Construction	Staff’s Proposed Construction
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Subject to § 112, ¶ 6 Function: decoding from the stream . . . a probability model identifier Structure: an arithmetic decoder and equivalents thereof. See FIG. 13 and 13:25-52. Alternatively, the structure is an arithmetic decoder operable to perform the claimed function, as described in the specification in connection with step 202 and equivalents thereof, step 202 being described in the specification, for example at the following figures and passages: FIG. 13 and 13:25-52 and FIGS. 10, 11 and 10:1-14, 11:12-34.	Subject to § 112, ¶ 6. Function: decoding a probability model identifier for the current symbol from the stream, at switching points distributed in the stream Structure: indefinite for lack of sufficient corresponding structure.	Subject to § 112, ¶ 6 Function: at switching points in the stream, decoding a probability model identifier for the current symbol Structure: Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that implements this step/function. However, it is unclear whether this disclosure alone provides a sufficient structure to a person of ordinary skill in the art, such that they would know how to perform this function. Complainant cites to Figs. 10, 11, and 13 and 10:1-14, 11:12-34, and 13:25-52 as disclosing an arithmetic decoder operable to perform the claim function in connection with step 202 and as describing step 202. These figures and cited paragraphs do not appear to disclose an algorithm that shows how the claimed function is carried out. However, absent expert testimony, it is not clear whether an algorithm must be disclosed in addition to the decoding device. In view of this, the Staff is not in a position to say that there is clear and convincing evidence showing indefiniteness. Further discovery, including expert discovery, may reveal that the patent does not disclose a corresponding structure, or it
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		may narrow the precise portions of the specification that are the required structure.
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(a) The function is “decoding from the stream . . . a probability model identifier.”

The claim phrase “*means for decoding from the stream, at switching points distributed in said stream to decode a current symbol, for said current symbol, a probability model identifier,*” includes both a “means for decoding” term as well as other claim requirements describing where the decoding occurs and which symbol is involved. The “function” is appropriately limited to the functional language alone, meaning the portion of the phrase reciting “means for decoding from the stream . . . a probability model identifier.” The remaining words in the claim phrase are two clauses (both of which are set off from the recited function using commas) describing **where** the decoding function occurs—“at switching points distributed in said stream to decode a current symbol”—and for **which** symbol the decoding function is performed—“for said current symbol.” Those are not part of the function. They are separate requirements of the claim. *See Micro Chem.*, 194 F.3d at 1258 (“An error in identification of the function can improperly alter the identification of structure in the specification corresponding to that function.”).

The Federal Circuit’s analysis in *BBA Nonwovens* is instructive. *See* 303 F.3d at 1332. The claim at issue there referenced “corona means cooperating with said attenuator and positioned for electrostatically charging the filaments so that repelling forces are induced in the filaments to more uniformly spread the filaments before they are deposited on said collection surface to form a web.” *Id.* at 1343. As the Federal Circuit explained, the district court read this phrase as if it said “means for forming a corona,” and the court omitted from the function the entire “positioned for” phrase. *Id.* at 1344. The Federal Circuit affirmed that construction, explaining:

Rather than reciting the function of the corona means, the expression following the word “positioned” describes *where the corona means is located* and is a separate limitation not subject to section 112, paragraph 6. *What the “corona means” is and where it is located are two different things.*

Id. (emphasis added). Thus, the portion of the claim phrase reciting “**where**” the means is located was not part of the function. So too here. The portion of the claim phrase reciting “at switching points distributed in said stream to decode a current symbol, for said current symbol” describes where (and for which symbol) the decoding occurs. That portion is not part of the function.

In another case, *Global Traffic*, the court determined that a claim phrase reciting “mapping means, associated with the location, for storing a plurality of positions” included both a “means for storing” term as well as another claim requirement—“associated with the location”—describing **where** the storing occurs. 2012 U.S. Dist. LEXIS 96866, at *14. The court explained that “the physical location of the ‘computer map memory’ [i.e., the corresponding structure] is irrelevant to performing the [claimed] twin functions of storing positions and providing a map of allowed approaches.” *Id.* Regarding the phrase “associated with the location,” the court explained that this “past participial phrase is set-off by commas from the rest of the sentence, and it serves to modify ‘mapping means’ rather than to impose a limitation on the means-plus-function phrase.” *Id.* at *14-15. As in *Global Traffic*, here claim 15 includes two clauses reciting “at switching points distributed in said stream to decode a current symbol, for said current symbol.” Those clauses are set off by commas from the rest of the claim phrase and serve to modify the “means for decoding” rather than form part of the structure that must be accomplished by the “means.” Thus, the clauses are not part of the function. The function is merely the portions of the claim that actually recite function—the phrase “decoding from the stream . . . a probability model identifier.”

In a third instructive case, *Uship*, the court analyzed the means-plus-function term “means for storing the inputted information once said item is disposed in said secured storage means.” 98

Fed. Cl. at 426. The parties disagreed “whether the phrase ‘once said item is disposed in said secured storage means’ is part of the function.” *Id.* Much like Complainants’ and Respondents’ dispute here, in *Uship* the patent owner argued that the phrase “is not a function, but instead designates **when** the function is ‘operating,’” and the adversary argued that excluding the phrase “improperly truncates the function.” *Id.* at 426-27 (emphasis added); *id.* at 427 (“What the ‘means for storing inputted information’ is and when it operates . . . are different.”). The court agreed with the patentee, explaining:

Since the function is construed by the limitations in claim 1, neither limiting nor broadening it, the applicable function is “to store,” but what is being stored is “the inputted information.” Therefore, [the claim phrase] “once said item is disposed in said secured storage” **describes when storage happens and is not part of the function**. The adverb “once” describes the temporal occasion when the storage function begins, but does not describe what the means for “storing” is. *See BBA Nonwovens*, 303 F.3d at 1343-44 (holding that means-plus-function claim construction is limited to language that described what the function is and does not extend to other language, such as language describing where the means is located).

Id. at 427-28 (citation omitted) (emphasis added). As in *Uship*, here the clauses reciting “at switching points distributed in said stream to decode a current symbol, for said current symbol” describe **when** or **where** to decode the probability model identifier, and for which symbol. They are “not part of the function.” *Uship*, 98 Fed. Cl. at 428; *see also, e.g., Precise Exercise Equip. v. Voit Sports*, 1998 U.S. Dist. LEXIS 19457, at *13 (C.D. Cal. June 17, 1998) (holding that the phrase “secured to said frame” was not part of a means-plus-function phrase because it merely “**defines the relationship** between the ‘support means’ and the frame” (emphasis added)).

Both Respondents’ and Staff’s proposals seek to extend the “function” beyond the functional portion of the claim phrase. Using slightly different phrasing, both seek to include within the “function” two prepositional phrases: “at switching points distributed in the stream” (or, per Staff, “at switching points in the stream”) and “for the current symbol.” As discussed above,

both clauses are set-off from the actual function via commas, delineating that these clauses are not part of the function. The function is straightforward: decoding from the stream a probability model identifier. The function is decoding (from the stream), and the thing being decoded is a probability model identifier. That is the full function. *See, e.g., BBA Nonwovens*, 303 F.3d at 1344; *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *14; *Uship*, 98 Fed. Cl. at 428. The “at” and “for” prepositional phrases identified by Respondents and Staff are not part of the function; instead they merely describe where and on what symbol to perform the actual decoding function. Those aspects are separate portions of the claim that must be satisfied; they are not part of the means-plus-function term.

The specification makes clear that the phrases are not part of the decoding function. The step of determining whether the decoding is at a switching point is shown, for example, by step 200 in Figure 11. *See JXM-002* ('859 Patent) at FIG. 11 (flow chart showing step 200 as “Switching point?”). If the location is at a switching point, meaning “a point in the stream at the level of which the probability model used to code the current symbol can be modified,” then the method proceeds to the next step, which is step 202. Step 202 is the decoding step where “an identifier *m* is decoded . . . enab[ling] identification of a probability model in a set *L*.” *JXM-002* ('859 Patent) at 10:64–11:34. Also separate from the decoding function is the claim term “distributed in said stream to decode a current symbol, for said current symbol.” Figure 4 of the '859 Patent depicts how a switching point may be distributed in a stream, uniformly or irregularly. *JXM-002* ('859 Patent) at FIG. 4; 4:55–5:7 (“the switching points *SP* are distributed in the stream so as to correspond either to the starts of block lines as shown on the left part of FIG. 4, or irregularly as shown on the right part of FIG. 4”). Accordingly the claim language’s explanation that the decoding function is applied “at switching points distributed in said stream to decode a

current symbol, for said current symbol” is consistent with the description in the written description and figures indicating where to “decod[e] from the stream, . . . a probability model identifier.” This clause is not a recitation of function, it is an explanation of “where” to perform the function. *See, e.g., BBA Nonwovens*, 303 F.3d at 1344; *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *14; *Uship*, 98 Fed. Cl. at 428.

In sum, only the phrase “means for decoding from the stream . . . a probability model identifier” is subject to section 112, paragraph 6, as that is the only **functional** claim language associated with the “means.” As discussed in the next section, the ’859 Patent specification makes clear that the corresponding structure for performing the function (under any parties’ proposed function) is an “arithmetic decoder.”

(b) *The Specification Provides Sufficient
Corresponding Structure for Performing the
Claimed Function—an Arithmetic Decoder.*

Section 112(6) “allows a patentee to express an element of a claim as a means for performing a specified function.” *Nevro Corp. v. Boston Sci. Corp.*, 955 F.3d 35, 42 (Fed. Cir. 2020). “In exchange for using this form of claiming, the patent specification must disclose with sufficient particularity the corresponding structure for performing the claimed function and clearly link that structure to the function.” *Id.* If the specification identifies sufficient corresponding structure, that ends the inquiry. *Id.*

For the reasons discussed below, the ’859 Patent specification clearly discloses an arithmetic decoder as the structure that performs the function of the “means for decoding”

limitation.⁷ Thus, the ALJ should rule that the structure for this limitation is an arithmetic decoder and its equivalents. *See, e.g., Palumbo*, 762 F.2d at 974 (the statute “requir[es] that the limitation *shall* be construed to cover the structure described in the specification *and* equivalents thereof” (emphasis in original)).

The specification describes the function as a discrete numbered step 202:

During a step 202, an identifier m [i.e., a probability model identifier] is decoded from the stream F. This identifier enables identification of a probability model in a set L of at least two probability models. The set L comprises the current probability model Pc which is defined from the symbols coded previous to the current symbol Sc and a subset E of probability models defined by default. The subset E comprises at least one such probability model defined by default noted as P0. For example, P0 is a uniform probability model, i.e. all the probabilities of this model are equal. The subset E may contain other models defined by default such as a Gaussian probability model or models obtained by learning on a database representative of the signal to be coded.

JXM-002 ('859 Patent) at 10:1-13; *see also id.* at 11:12-34 (describing step 202 of an embodiment). The specification depicts this same functionality in Figures 10 and 11, which are

⁷ This remains true even should the ALJ adopt Respondents' or Staff's view of the function for the “means for decoding” term. The specification makes clear that the arithmetic decoder performs the function.

Staff's proposed structure appears to be consistent with Complainants' proposal. Staff explains the structure as follows: “Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that implements [the claimed] step/function.” Complainants' proposal makes clear that the device is an *arithmetic* decoder, as the written description confirms in the “Summary of the Invention” section. *See, e.g., JXM-002 ('859 Patent)* at 2:17-18, 2:29, 2:35, 2:41, 3:31, 3:51 (the invention involves “arithmetic” coding/decoding methods and devices).

flow charts that illustrate arithmetic decoding methods.⁸ Figure 11 is exemplary, depicting step 202 as the step of “Decode an identifier m of a model”:

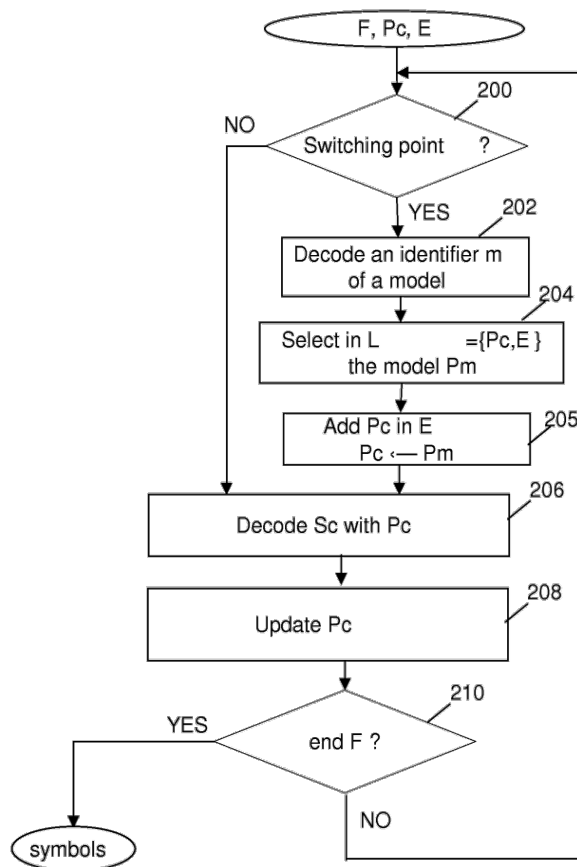


FIGURE 11

The written description of (and associated figures regarding) step 202 mirror the function of the “means for decoding” phrase in claim 15. The function requires decoding a probability model identifier from the stream, and that is precisely what the specification discloses in connection with step 202.⁹

⁸ Figures 10 and 11 are the same as concerns step 202. The figures differ only as to whether and how they implement separate steps 204 and 205.

⁹ Under similar circumstances, courts have consistently found that where a specification identifies a particular function with a numbered element, the structure identified as performing that function is clearly linked for purposes of satisfying section 112(6). For example, the structure of “processor

Importantly, the specification clearly identifies the structure that performs this function—an arithmetic decoder—and the specification clearly links that structure to step 202. *See MobileMedia Ideas LLC v. Apple Inc.*, 780 F.3d 1159, 1169 (Fed. Cir. 2015) (“corresponding structure” exists if the “specification or prosecution history clearly links or associates that structure to the function recited in the claim.”)

The specification describes the arithmetic decoder in terms of a “decoding device” 13 that has an “entropy decoding module” 1300. As explained by Complainants’ expert, Dr. Richardson, persons of ordinary skill in the art readily understand that the disclosed device is an *arithmetic* decoder. *See, e.g.*, CXM-0002 (Richardson Decl.), at ¶¶ 159-162. Indeed, the specification makes clear that “[t]he invention relates to an arithmetic method for coding symbols in a stream,” as opposed to, for example, a variable length coding method. JXM-002 (’859 Patent) at 2:17-18; *cf. id.* at 1:23-54 (describing both variable length coding and arithmetic coding).

Regarding the arithmetic decoder (decoding device 13), the specification explains:

A decoding device in accordance with the invention is shown in FIG. 13. The decoding device 13 receives at input a stream F of coded data representative of a sequence of images. The stream F is for example generated and transmitted by a coding device 12. The decoding device 13 comprises an entropy decoding module 1300 able to generate decoded data, for example coding modes and decoded data relating to the content of the images. For this purpose, the entropy decoding module 1300 implements the steps 200, 202, 204, 206, 208, 210 and possibly 205 of the arithmetic decoding method according to the invention.

interface element 114” was clearly linked to the recited function of “providing the demodulated data to a MAC layer” when the specification described “[d]escrambled data may be provided to a processor interface 114 which may control the passage of the data to another device such as a media access control (‘MAC’) circuit.” *Intellectual Ventures I, LLC v. Ricoh Ams. Corp. Ricoh Elecs. Inc.*, 2016 U.S. Dist. LEXIS 1613, at *10-11 (D. Del., Jan. 7, 2016). As another example, a “battery receptacle 142” was linked to the function of “receiving the at least one rechargeable battery” as the specification indicated the “structure actually performs the claimed function.” *Chamberlain Grp., Inc. v. Techtronic Indus. Co.*, 2017 U.S. Dist. LEXIS 53509, at *77-78 (N.D. Ill. April 7, 2017). Additionally, a “receiving function” was clearly linked when the specification stated that the “RF transceiver 206 may be configured to receive RF transmissions.” *CenTrak, Inc. v. Sonitor Techs., Inc.*, 2015 U.S. Dist. LEXIS 173756 at *24-25, *28-29 (D. Del. Dec. 30, 2015).

JXM-002 ('859 Patent) at 13: 25-35. This language leaves no doubt: the arithmetic decoding device 13 includes a decoding module that “implements the step[] . . . 202.” *Id.* at 13:33.

The specification also depicts the arithmetic decoder (including the decoding module 1300) in Figure 13:

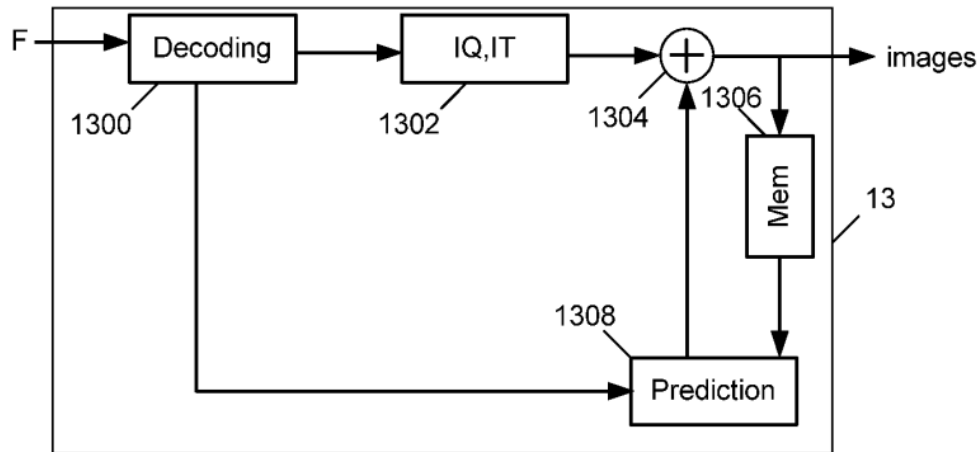


FIGURE 13

'859 Patent, Fig. 13. As explained by Dr. Richardson, Figure 13 depicts a clear example of an arithmetic decoder in a way that a POSITA would understand how the structure supports the claimed function:

162. The arithmetic decoders of the '859 Patent have a well-known structure. As shown in FIG. 13, and consistent with implementations of well-known decoders like H.264 decoders, the arithmetic decoder includes specific subcomponents for decoding, including structure to receive a coded bitstream and output a decoded image. (JXM-002 ('859 Patent) at FIG. 13). By 2009, each piece of this structure was a known component of known video decoders. (JXM-002 ('859 Patent) at 4:33–54). The decoder of FIG. 13 is specifically an “arithmetic” decoder because the entropy decoding module 1300 implements steps 200-210 “of the arithmetic decoding method according to the invention,” as shown, for example, in FIG. 11. (JXM-002 ('859 Patent) at 13:25-52, FIGS. 11, 13). This arithmetic entropy coding operates in a way that is distinct from other forms of entropy decoding, such as variable length coding (VLC). The '859 Patent explains that the decoding device of FIG. 13 “receives at input a stream F of coded data representative of a sequence of images.” (JXM-002 ('859 Patent) at 13:25–27).

Then, the decoded data are “transmitted to a module 1302 able to carry out an inverse quantization followed by an inverse transform.” (Id. at 13:36–40). Calculation module 1304 is “able to add pixel by pixel, the block from the module 1302 and a prediction block Xpred to generate . . . data that is stored in a memory 1306.” (Id. at 13:42–45). And “prediction module 1308” determines prediction module Xpred from reference images stored in the memory 1306. (Id. at 13:45–52). Therefore, the ’859 Patent makes clear that the claimed functions of the five means-plus-function terms in claim 15, each performed by the entropy coding module 1300, are performed by an arithmetic decoder. And because an arithmetic decoder is a well-known structure to a POSITA, a POSITA would understand the invention claimed in claim 15.

(...)

168. With the teachings of the ’859 Patent, a POSITA would understand how the arithmetic decoder of the ’859 Patent decode from the stream a probability model identifier. The arithmetic decoder receives a stream F which includes “a probability model identifier,” and the arithmetic decoder is structured to process data using that probability model identifier by applying, e.g., inverse quantization, prediction, and storage to memory. (JXM-002 (’859 Patent) at FIG. 13). Such a disclosure would be more than adequate to tell a POSITA, having a “bachelor’s degree in electrical engineering . . . and . . . three years of experience in design of . . . video . . . coding,” the structure of an arithmetic decoder that is used to “decod[e] . . . a probability model identifier.”

CXM-0002 (Richardson Decl.), at ¶¶ 162, 168.

Moreover, Complainants’ structure—an arithmetic decoder and its equivalents—is consistent with precedent. In *Hitachi Maxell, Ltd. v. Top Victory Electronics (Taiwan) Co.*, the structure for a “means for decoding” term was “an information decoder (107) and its equivalents.” 143 F. Supp. 3d 485, 495 (E.D. Tex. 2015) Also, in *Koninklijke Philips N.V. v. Asustek Computer, Inc.*, the structure for a “means for decoding” term was a “decoder and switch.” 2017 U.S. Dist. LEXIS 106501, at *10 (D. Del. 2017) The parties disputed the structure, with the patentee explaining that a decoder and switch “are well-known structural elements that can be implemented in hardware or software.” *Id.* at n. 21. The same is true here. As Dr. Richardson describes in the accompanying declaration, the structure of the arithmetic decoder is a well-known structural element in video coding. (CXM-002 (Decl. of Dr. Richardson) at ¶ 162).

The ALJ should reach the same outcome as courts in other cases, finding that a decoder, like the arithmetic decoder here, constitutes sufficient structure for performing the claimed function. In one example, a “Video Compress Decoder 1104a” and a “Digital/Digital Video Encoder (DDVE) 1104c” respectively constituted sufficient structure for the functions of (1) “to decompress the compressed video signal to a decompressed video signal” and (2) “to encode the decompressed video signal to produce an encoded signal for transmission to the digital television through a digital output interface, the encoded signal comprising a decompressed digital video signal.” *Va. Innovation Scis., Inc. v. Amazon.com, Inc.*, Civil Action No. 4:18-cv-474, 2019 U.S. Dist. LEXIS 152664, at *67 (E.D. Tex. Sep. 9, 2019). As another example, “a media player that includes an MPEG-compatible decoder” was found to be sufficient structure for a “means for decoding the encoded signal.” *Dish Network L.L.C v. TQ Beta LLC* IPR2015-01756, Paper 12 at 13 (PTAB Feb. 19, 2016), Final Written Decision, Paper 31 at 20 (PTAB Jan. 30, 2017). Similarly, in another case, a “voice coder” or “vocoder” was sufficient structure for the claim term at issue. *High Point SARL v. Sprint Nextel Corp.*, Civil Action No. 2:09-CV-02269-CM-DJW, 2011 U.S. Dist. LEXIS 155932, at *61 (D. Kan. Jan. 24, 2011). Like the coding devices in these cases, here the arithmetic decoder 13 provides adequate structure for performing the claimed function.

For these reasons, the ALJ should adopt Complainants’ structure for the “means for decoding” term: “an arithmetic decoder and its equivalents.”

(c) *Because the corresponding structure—an arithmetic decoder—is not a general-purpose computer or processor, no algorithm is needed.*

Respondents’ proposal for this term merely states that the specification “lacks sufficient corresponding structure,” without indicating why. Complainants understand Respondents’ position to be that the arithmetic decoding device described in the specification is a general-

purpose computer or processor, for which an algorithm must be provided, and that the specification lacks a sufficient algorithm. Respondents are incorrect for multiple reasons.

First, if the structure disclosed in the specification “is *not* a general-purpose computer, it does not trigger the algorithm requirement.” *Qualcomm Inc. v. Intel Corp.*, 6 F.4th 1256, 1267 (Fed. Cir. 2021) (emphasis added); *cf. Nevro*, 955 F.3d at 42 (“If the function is performed by a general-purpose computer or microprocessor, then the specification must also disclose the algorithm that the computer performs to accomplish the function.” (citing *Aristocrat Techs. Australia Pty. Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008))); *see also, e.g., WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999).

In *Qualcomm*, the specification disclosed a “power tracker” as the structure that performs the claimed function of “determining a single power tracking signal.” 6 F.4th at 1266-67. The Federal Circuit ruled that a “power tracker” was “understood by persons of ordinary skill to include a range of specific structural circuits,” and thus the Federal Circuit concluded that, “because power tracker 582 is not a general-purpose computer, it does not trigger the algorithm requirement.” *Id.* at 1267. The circuitry “provides structure that necessarily limits the scope of a claim without the aid of special programming,” so no algorithm was needed. *Id.*

Similarly, in *Nevro* the patentee “argue[d] that the asserted patent specifications’ disclosure of a signal generator as the structure for [the means-plus-function] limitation should end the inquiry.” 955 F.3d at 42. The Federal Circuit stated: “We agree.” *Id.* The court explained that the law “does not require a specific algorithm when the identified structure is not a general-purpose computer or processor.” *Id.* at 43. The court ruled that “the specification clearly recites a signal or pulse generator, not a general-purpose computer or processor.” *Id.*

The same is true here. As described earlier, the specification for the '859 Patent clearly discloses an arithmetic decoder as the structure that performs the “decoding” function. The patent calls it a decoding device 13, including an entropy decoding module 1300. In the context of the full written description, it is clear that the decoder is an “arithmetic” decoder. *See* '859 Patent (the entropy decoding module implements an “arithmetic decoding method according to the invention”). JXM-002 ('859 Patent) at 13:32–35. An arithmetic decoder is not a general-purpose computer or processor. As Dr. Richardson explains:

In my opinion, an arithmetic decoder is a decoder with a specific kind of entropy decoding module. It is not a general-purpose computer or processor. A general-purpose computer or processor can be configured to perform almost any type of computational task. An arithmetic decoder, by comparison, performs the specific function of receiving an arithmetic encoded bitstream and decoding the bitstream to generate decoded data. As I described in a 2010 book that I wrote and had published, an arithmetic decoder converts an arithmetic encoded bitstream that represents an entire sequence of syntax element values into a sequence of decoded variables or symbols, based on an estimate of the probability of occurrence of each variable or symbol. RXM-0026 (Richardson, I., 2010, *The H.264 Advanced Video Compression Standard* (2nd Ed.), my “H.264 Book”) at LENOVO_1373-00161346–349. An arithmetic decoder operates in a different way from decoders with other types of entropy decoding modules, such as variable length decoders (RXM-0026 (H.264 Book) at LENOVO_1373-00161339-00161346; JXM-002 ('859 Patent) 1:34-54)) and is capable of overcoming limitations of variable length decoders, , which represent each syntax element value as an integer number of bits , for example by improving compression through efficiently representing a complete series of syntax element values as a single sequence of bits. (RXM-0026 (H.264 Book) at LENOVO_1373-00161346, LENOVO-1373-00161349).

CXM-0002 (Richardson Decl.) at ¶ 156.

Consistent with Dr. Richardson’s testimony, tribunals that have considered the issue have determined that a “decoder” is not a general-purpose computer or processor, and therefore does not require an algorithm. *See, e.g., Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *69 (ruling that “no algorithm requirement applies” because the “[d]efendants fail[ed] to show that the ‘Video Compress Decoder 1104a’ and ‘Digital/Digital Video Encoder (DDVE) 1104c’ are general-purpose computers”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (finding

“voice coder” or “vocoder” did not create a “case in which an algorithm is required to complete the structure under § 112.”). As such, like the power tracker in *Qualcomm*, the video decoder and video encoder in *Va. Innovation Scis.*, and the voice coder or vocoder in *High Point*, here the arithmetic decoder of the ’859 Patent is not a general-purpose computer or processor.

While the specific structure of the arithmetic decoder 13 can be configured in software and/or physically distinguishable units (JXM-002 (’859 Patent) at 13:53–61), that fact fails to make the arithmetic decoder a general-purpose computer or processor. The pulse generator 101 in *Nevro*, too, was not a general-purpose processor (955 F.3d at 43 (the pulse generator 101 was not a general-purpose processor even though the Patent specified the function could “be performed by computer-executable instructions contained on computer-readable media, e.g., at the processor(s) 107 and/or memory(s) 108,” (U.S. Patent No. 9,327,125 at 3:65–4:2) Like the pulse generator 101 of *Nevro*, the disclosure regarding an arithmetic decoder in the ’859 Patent is “clearly recit[ing] a[n] [arithmetic decoder], not a general-purpose computer or processor, as the structure” for the claimed function. 955 F.3d at 43. And like *Va. Innovation Scis.* and *High Point*, the structure here is a decoding device and therefore not subject to the algorithm requirement. 2019 U.S. Dist. LEXIS 152664, at *69; 2011 U.S. Dist. LEXIS 155932, at *61.

Additionally, the arithmetic decoder is not a general-purpose computer or processor because the structure of an arithmetic decoder informs a POSITA of the scope of the invention. The algorithm requirement (in situations where the specification merely discloses a general-purpose computer or processor) arises out of a need to specify the scope of the invention to a POSITA with reasonable certainty. For example, the court in *Qualcomm* explained that the “power tracker” did not trigger the algorithm requirement because the applicants explained it was “understood by persons of ordinary skill to include a range of specific structural circuits.”

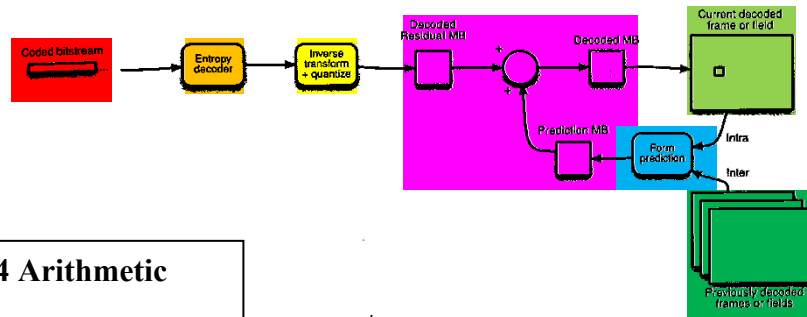
Qualcomm, 6 F.4th at 1267. Like the power tracker in *Qualcomm*, here the arithmetic decoder is a well-known structure to a POSITA, such that a POSITA would understand the invention. CXM-0002 (Richardson Decl.) at ¶ 156-162.

The '859 Patent itself describes that arithmetic decoders were known in the art. JXM-002 ('859 Patent) at 1:23–58. As Dr. Richardson explains, one such known decoder (existing at the time of the '859 Patent) was a standardized “H.264” decoder. In Dr. Richardson’s 2010 book, he describes a typical H.264 decoder for the H.264 standard, published in 2003, before the 2009 priority date of the '859 Patent. CXM-0002 (Richardson Decl.) at ¶ 18. By the priority date of the '859 Patent, H.264 had become highly significant to the broadcast, internet, consumer electronics, mobile and security industries, among others CXM-0002 (Richardson Decl.) at ¶ 158; RXM-0026 (H.264 Book) at LENOVO 1373-00161498-00161501. A POSITA would have been aware of a binary arithmetic coding process for entropy coding of video images of an H.264 decoder, or at least familiar with similar such processes such as the binary arithmetic coding processes for entropy coding of still or video images specified in earlier standards such as the JPEG and H.263 industry standards for image and video coding. CXM-0002 (Richardson Decl.) at ¶ 158.

Because each of the structural components of FIG. 13 correspond to a component of a typical H.264 decoder, a POSITA would understand the structure of FIG. 13 and the role of each component. CXM-0002 (Richardson Decl.) at ¶ 160. As shown below, each component, of FIG. 13 has a direct parallel in decoders conforming to H.264. *Id.* The entropy decoding module, the subject of the '859 Patent which performs each of the claimed functions, is one of a handful of video coding tools that “form the basis of the reliable and effective coding model that has dominated the field of video compression for over 10 years,” and “is at the heart of the H.264/AVC standard.” *Id.* at ¶¶ 160–162. The entropy decoder of H.264 implements the arithmetic decoding

of H.264. *Id.* As shown in FIG. 13, and in well-known decoders like H.264 decoders, both shown below, the arithmetic decoder includes specific subcomponents for decoding, structure to receive a coded bitstream and output a decoded image. JXM-002 ('859 Patent) at FIG. 13; *Id.* at ¶¶ 160–162.

Module Color	Well-Known H.264 Arithmetic Decoder (top)	'859 Patent Arithmetic Decoder (bottom)
Red	“coded bitstream”	“stream F of coded data”
Orange	“entropy decoder”	“entropy decoding module 1300”
Yellow	“Inverse transform + quantize”	“a module 1302 able to carry out an inverse quantization followed by an inverse transform”
Pink	“add[er]”	“calculation module 1304 able to add”
Dark Green	“previously decoded frames or fields”	“image data stored in a memory 1306”
Blue	“form prediction”	“prediction module 1308”
Light Green	“current decoded frame or field”	“images”



Well-Known H.264 Arithmetic Decoder

Figure 4.5 Typical H.264 decoder

'859 Patent Arithmetic Decoder 13

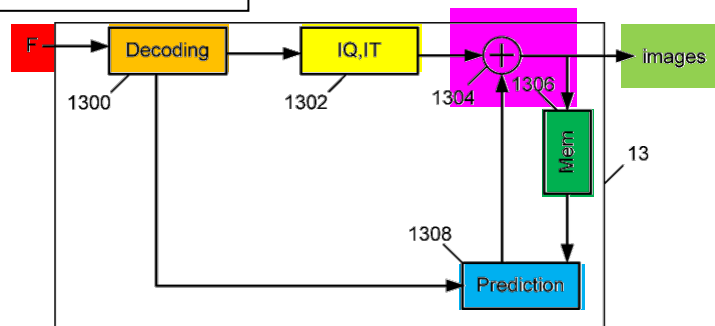


FIGURE 13

Accordingly, because an arithmetic decoder is known in the art and not a general-purpose computer or processor, no algorithm is needed. *See, e.g., See Qualcomm*, 6 F.4th at 1266-67 (ruling

that the corresponding structure, a “power tracker,” “is not a general-purpose computer” and thus “does not trigger the algorithm requirement”).

(d) *Alternatively, the Algorithm of Step 202 Performed by the Arithmetic Decoder Provides Sufficient Structure.*

As described in the previous section, the corresponding structure—an arithmetic decoder—is not a general-purpose computer or processor. To the extent the ALJ finds that the corresponding structure (arithmetic decoder) *is* a general-purpose computer or processor, an algorithm would be needed. *Nevro*, 955 F.3d at 42. Here, the specification for the ’859 Patent provides a sufficient algorithm for performing the claimed function of the “means for decoding” term.

As the Federal Circuit has explained, there is no required way for the algorithm to be presented in the specification. It may be presented “in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure.” *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1385 (Fed. Cir. 2011). The critical inquiry is whether the specification explains “how” to perform the claimed function. *See Function Media, L.L.C. v. Google Inc.*, 708 F.3d 1310, 1318 (Fed. Cir. 2013). Here, the disclosures pertaining to step 202 (quoted and identified earlier) are sufficient algorithmic structure because they are clearly linked to the functional claim language of decoding a probability model identifier from the stream.

Complainants’ view is consistent with precedent. In *Typhoon*, “the specific algorithm connoting the structure of the means for cross-referencing element [was] not explicitly disclosed in the specification.” *Id.* at 1386. However, the specification recited in prose a sufficient algorithm to be implemented by the programmer. *Id.* Specifically, the disclosure stated “that cross-referencing entails the steps of data entry, then storage of data in memory, then the search in a

library of responses, then the determination if a match exists, and then reporting action if a match is found.” *Id.* at 1385. That was sufficient structure. *Id.* at 1385–86.

The specification of the ’859 Patent makes clear how to perform step 202: (1) locate an identifier coded in the input stream F and thereafter (2) identify, based on the identifier, the location of a probability model from a set L of probability models. CXM-0002 (Richardson Decl.) at ¶ 172. Step 202 is identified in the context of decoding presented in FIG. 11, below (annotation added).

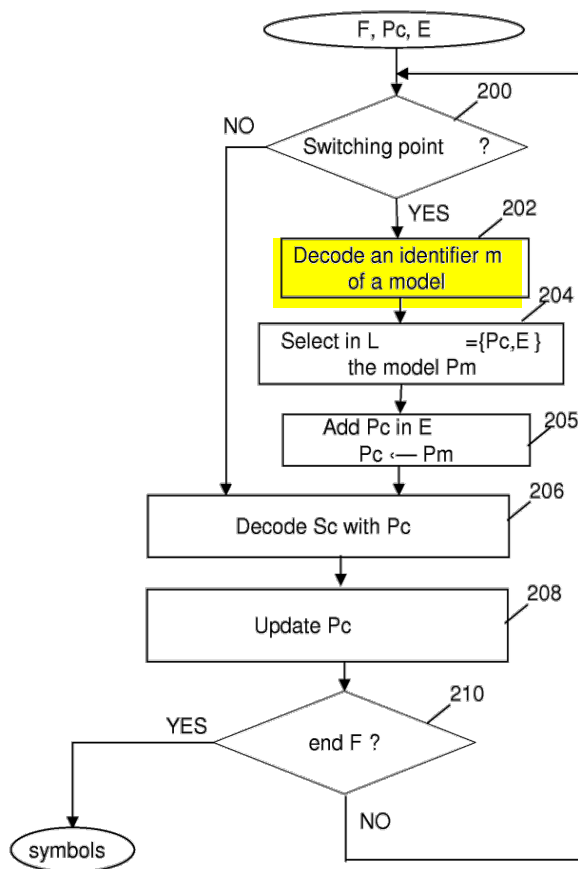


FIGURE 11

During step 202, which is carried out by the decoding device 13, “an identifier m is decoded from the stream F.” JXM-002 (’859 Patent) at 11:12–13, FIG. 11. “This identifier enables identification of a probability model in a set L of at least two probability models,” which includes the “current

probability model PC which is defined from the symbols coded previous to the current symbol Sc and a subset E of probability models defined by default.” *Id.* at 11:13–17, FIG. 11. An example set L is shown in Figure 11 probability models of Pc and the subset E, $L = \{P_c, E\}$. *Id.* The subset E can contain one example probability model P0. *Id.* at 11:17–34, FIG. 11.

A POSITA would need only understand how m encoded in the stream F could be (1) located and (2) used to identify (and thereafter select in step 204) Pc or P0 from the set L in the exemplary embodiment. CXM-0002 (Richardson Decl.) at ¶ 172. The ’859 Patent, viewed from the perspective of a person of ordinary skill in the art, describes how to do it. First, a POSITA would understand how to use the arithmetic decoder 13 of the entropy decoding module 1300 to specifically locate in the stream a probability model identifier. CXM-0002 (Richardson Decl.) at ¶ 174. A POSITA would be aware that, consistent with known video decoding methods, an entropy decoder decodes specific syntax elements specific points in the bitstream, e.g. decoding coding modes at one point, decoding motion vectors at another point, decoding coefficients at yet another point, etc. *Id.* at 167–169. For example, an example syntax element order is shown on page 119 of Dr. Richardson’s book, illustrating the syntax of a coded macroblock in an H.265 bitstream. CXM-0002 (Richardson Decl.), at ¶ 165. These syntax elements are decoded in an order known beforehand. CXM-0002 (Richardson Decl.), at ¶ 165. Therefore, because the ’859 Patent informs the reader that an entropy decoding module of an arithmetic decoder performs the function, a POSITA would understand that decoding the probability model identifier of the ’859 Patent, as with known arithmetic decoders, involves the step of locating the probability model identifier in the bitstream at a pre-known location. CXM-0002 (Richardson Decl.), at ¶ 165.

Second, a POSITA would understand from the disclosures of the ’859 Patent, that m is an index or a pointer that can be used to **identify** in a set of data which data from the set is desired.

CXM-0002 (Richardson Decl.), at ¶ 177. The patent explains that a probability model identifier, *m*, is a variable or pointer to other probability models. The identifier is a value encoded in the stream to locate a second value (e.g., *Pc* or *P0*) in a set. *See* JXM-002 ('859 Patent) at FIG. 11, 11:12–36; 6:34–40 CXM-0002 (Richardson Decl.), at ¶ 174. In a set of 2 probability models, (*Pc*, *P0*), a POSITA would understand that 0 or 1 could indicate the location in the set of a first or second probability model, respectively. CXM-0002 (Richardson Decl.), at ¶ 174. A POSITA would understand, for example, how the identifier *m* encoded in the stream *F* is used to identify (and thereafter select in step 204) *Pc* or *P0* from the set *L* in the exemplary embodiment. CXM-0002 (Richardson Decl.), at ¶ 174. The patent explains that an example set *L* is shown in Figure 11 and contain probability models of *Pc* and the subset *E*, $L = \{Pc, E\}$. JXM-002 ('859 Patent) at FIG. 11. The subset *E* can contain one example probability model *P0*. JXM-002 ('859 Patent) at 11:17–19; CXM-0002 (Richardson Decl.), at ¶ 174. Therefore, given a set of 2 probability models, (*Pc*, *P0*), a POSITA would understand that *m*, having a value of 0 or 1, could identify the location in the set of a first or second probability model, respectively. CXM-0002 (Richardson Decl.), at ¶ 174.

In sum, a POSITA would understand the specific algorithm of how the entropy coding module 1300 and the arithmetic decoder perform the function of the “means for decoding” term.

- (ii) **“means for selecting using said probability model identifier a probability model in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default” ('859 patent, Claim 15)**

Complainants' Proposed Construction	Respondents' Proposed Construction	Staff's Proposed Construction
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Subject to § 112, ¶ 6 Function: selecting . . . a probability model Structure: an arithmetic decoder and equivalents thereof. See FIG. 13 and 13:25-52. Alternatively, the structure is an arithmetic decoder operable to perform the claimed function, as described in the specification in connection with step 204 and equivalents thereof, step 204 being described in the specification, for example at the following figures and passages: FIG. 13 and 13:25-52 and FIGS. 10, 11 and 5:36-43, 10:1-17, 11:12-36.	Subject to § 112, ¶ 6 Function: using the probability model identifier to select a probability model in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein said subset comprises at least one probability model defined by default Structure: indefinite for lack of sufficient corresponding structure.	Subject to § 112, ¶ 6 Function: selecting a probability model using the probability model identifier, where the probability model is selected from a current probability model and a subset of probability models, including a default probability model Structure: Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that implements this step/function. Complainant cites to Figs. 10, 11 and 13 and 5:36-43, 10:1-17, 11:12-36, and 13:25-52 as disclosing an arithmetic decoder operable to perform the claimed function in connection with step 204 and as describing step 204. It is unclear whether these figures and cited paragraphs disclose an algorithm that shows how the claimed function is carried out. However absent expert testimony, it is not clear whether an algorithm must be disclosed in addition to the decoding device. Further discovery, including expert discovery, may reveal that the foregoing disclosures provide a sufficient structure, or may reveal
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		that the patent does not disclose a sufficient corresponding structure.
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(a) *The function is “selecting . . . a probability model.”*

The claim phrase “*means for selecting using said probability model identifier a probability model in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default*” includes both a “means for selecting” term as well as other requirements describing how to perform the function and describing the set of information from which the selecting function occurs. The portion describing **how** to perform the function is the phrase “using said probability model identifier.” The portion describing the **set of information** from which the selecting function occurs is the phrase “in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default.” Neither of these is part of the function itself. The “function” is appropriately limited to the functional language alone—“selecting . . . a probability model.” *See, e.g., Micro Chem.*, 194 F.3d at 1258; *BBA Nonwovens*, 303 F.3d at 1343-44; *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *14; *Uship*, 98 Fed. Cl. at 428.

The case law described above in connection with the first means-plus-function term (“means for decoding . . . a probability model identifier”) applies equally here. As described earlier, the function should be limited to ***the function itself***, not other words in the claim that describe “where,” “when,” or “how” that function is accomplished. *See, e.g., BBA Nonwovens*, 303 F.3d at 1344 (excluding a “positioned” claim phrase from the function because “[w]hat the ‘corona means’ is and ***where it is located*** are two different things” (emphasis added)); *Uship*, 98 Fed. Cl. 396, 427-

28 (excluding claim phrase from the function because it “describes *when* storage happens and is not part of the function” for the “means for storing” term (emphasis added)); *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *11-15 (excluding claim phrase from the function because it describes *where* the “mapping means” is placed, and “the physical location . . . is irrelevant to performing the [claimed] functions” (emphasis added)); *Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim phrase from the function because it “describ[es] *how* the ‘controller means’ accomplishes the function” (emphasis added)); *Precise Exercise Equip.*, 1998 U.S. Dist. LEXIS 19457, at *13 (holding that the phrase “secured to said frame” was not part of a means-plus-function phrase because it merely “*defines the relationship* between the ‘support means’ and the frame” (emphasis added)).

Respondents’ and Staff’s proposed functions improperly seek to include portions of the claim language beyond the functional part of the claim term. Both seek to add the phrase “using said probability model identifier.” Also, Respondents seek to add the phrase “in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default,” while Staff proposes a shortened version reciting “is selected from a current probability model and a subset of probability models, including a default probability model.” None of these phrases is part of the actual *function*.

First, the claim phrase “using said probability model identifier” describes *how* to perform the function of selecting—the selecting function is performed by using the probability model identifier. That language is not part of the function itself; the function is simply selecting a probability model identifier. Language describing how to perform the “selecting” function should be excluded. *See, e.g., Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim

phrase from the function because it “describ[es] *how* the ‘controller means’ accomplishes the function” (emphasis added)). An input for performing the selecting function is not part of the function itself.

Second, the claim language reciting “in a set comprising a current probability model defined from symbols coded previous to the current symbol and a subset of probability models wherein subset comprises at least one probability model defined by default” *describes only the set of information on which the selecting function will be performed*. This language is not part of the function itself. No part of the phrase is functional. It merely describes what probability models are included in the set (on which the “selecting” function is performed). Per the claim language, that set “compris[es]”: (1) “a current probability model defined from symbols coded previous to the current symbol,” and (2) a “subset of probability models wherein [the] subset comprises at least one probability model defined by default.”

This part of the claim language provides only structural limitations, namely, defining the set of information to select from. *See, e.g., Billingnetwork Patent, Inc. v. Cerner Physician Practice, Inc.*, No. 8:04-CV-1515-T-27MAP, 2006 U.S. Dist. LEXIS 5995, at *42–43 (M.D. Fla. Feb. 1, 2006) (holding that a claim phrase recites “structure” for the linking function, “which cannot, therefore, be construed as part of the means-plus-function limitation”). Therefore, only the language “selecting . . . a probability model” is functional language subject to § 112(6).

The specification makes clear that the phrases are not part of the “selecting” function. The selecting function is described and depicted as step 204. *See, e.g., JXM-002* (*859 Patent) at 10:1-17; 11:12-36; FIGs. 10, 11; 5:36-43. The step involves selecting a probability model. To do so, a probability model identifier “m” is used to select a probability model from a set “L” of possible probability models. *Id.* The specification describes that m is part of the stream “F,” which is an

“input . . . of coded data.” (JXM-002 (’859 Patent) at 11:12–13; 13:25-28). Thereafter, m is used in step 204 to select in a set L. *Id.* at FIG. 11. Accordingly L and m, corresponding to the claimed “probability model identifier” and the claimed “set” describe the inputs upon which the function is performed, not functional steps.

In sum, only the phrase “means for selecting . . . a probability model” is subject to section 112, paragraph 6, as that is the only *functional* claim language associated with the “means.” As discussed in the next section, the ’859 Patent specification makes clear that the corresponding structure for performing the function (under any parties’ proposed function) is an “arithmetic decoder.”

(b) *The Specification Provides Sufficient
Corresponding Structure for Performing the
Claimed Function—an Arithmetic Decoder.*

For largely the same reasons as described earlier in connection with the “means for decoding” term, the structure for the “means for selecting” term is an arithmetic decoder (and its equivalents). As with all the means-plus-function terms in claim 15, the ’859 Patent specification clearly links the function to the corresponding structure of an arithmetic decoder. For the “means for selecting” term, the specification clearly discloses an arithmetic decoder as the structure that performs the function.¹⁰ Thus, the ALJ should rule that the structure for this limitation is an arithmetic decoder and its equivalents. *See, e.g., Palumbo*, 762 F.2d at 974 (the statute “requir[es]

¹⁰ This remains true even should the ALJ adopt Respondents’ or Staff’s view of the function for the “means for selecting” term. The specification makes clear that the arithmetic decoder performs the function.

that the limitation *shall* be construed to cover the structure described in the specification *and* equivalents thereof”).

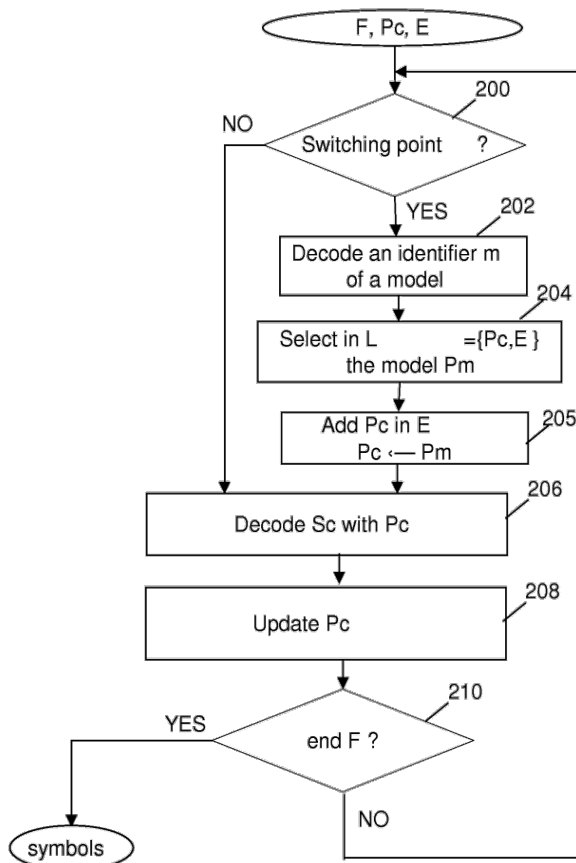


FIGURE 11

The specification describes the function as a discrete numbered step 204. For example: “During a step 204, the probability model of L for which the identifier is m is selected.” (11:35–36; *see also* 10:14-18). The specification depicts this same functionality in Figures 10 and 11, which are flow charts that illustrate arithmetic decoding methods according to particular embodiments. *Id.* at 4:21 – 24. Figure 11 is exemplary and depicts step 204 as “Select in $L = \{P_c, E\}$ the model P_m .”

The written description (and associated figures) regarding step 202 mirror the “means for selecting” term of claim 15. The specification explains that the function involves selecting a

probability model, which is described by the specification: “During a step 204, the probability model of L for which the identifier is m is selected.” JXM-002 (’859 Patent) at 11:35-36.

The specification clearly identifies the structure that performs this function—an arithmetic decoder—and the specification clearly links that structure to step 204. *See MobileMedia*, 780 F.3d at 1169 (“corresponding structure” exists if the “specification or prosecution history clearly links or associates that structure to the function recited in the claim”). As explained earlier in detail (in connection with the “means for decoding” term), the specification describes the arithmetic decoder in terms of a “decoding device” 13 that has an “entropy decoding module” 1300 that implements “arithmetic decoding” according to the invention. JXM-002 (’859 Patent) at 13:32–35. As explained by Dr. Richardson, persons of ordinary skill in the art readily understand that the decoding device is an arithmetic decoder. *See, e.g., CXM-0002* (Richardson Decl.), at ¶ 159; *see also, e.g., JXM-002* (’859 Patent) at 2:17-18 (the invention relates to “arithmetic” coding and decoding).

Regarding the arithmetic decoder (decoding device 13), the specification makes clear that the device includes an entropy decoding module that “implements the step[] . . . 204.” *Id.* at 13:33. As discussed *supra*, the specification also depicts the arithmetic decoder (including the decoding module 1300) in Figure 13.

As explained by Dr. Richardson, Figure 13 depicts a clear example of an arithmetic decoder in a way that a POSITA would understand how the structure supports the claimed function:

With the teachings of the ’859 Patent, a POSITA having knowledge of video decoding and knowledge of entropy coding would understand how to use the arithmetic decoder of the ’859 Patent to select a probability model using a pointer, m. The ’859 Patent makes clear that the steps of claim 15, each performed by the arithmetic decoder, are performed by that device by receiving a coded stream F which includes “a probability model identifier” and is structured with, *e.g.,* inverse quantization, prediction, and storage to memory. (JXM-002 (’859 Patent) at 13:25-52). The ’859 Patent explains that at the corresponding coding step 104, this

identifier m enables a decoding method to find in the set L the model intended by the coding method. (JXM-002 ('859 Patent) at 5:35-43, 8:4-7). After decoding the probability model identifier from the coded stream F, the arithmetic decoder uses the identifier m to select the “probability model of L for which the identifier is m.” (JXM-002 ('859 Patent) at 11:35-36). Based on these disclosures, a POSITA would understand that the arithmetic decoder would be operable to use the value m, decoded from the stream F, to select a probability model of a set L. The value m could be 0 or 1, for example, and would then be used as a pointer to respectively select from the 0th or 1st position in the set L. (see '859 Patent at FIG. 11, 11:12-36; 6:34-40). Once the probability model is identified in step 202, a POSITA would understand the probability model is loaded in step 204 because it is then used to decode in step 206. (See JXM-002 ('859 Patent) at FIG. 11, 11:12-64). Therefore, in my opinion, a POSITA would be reasonably informed of the scope of this means for selecting step, based on the '859 Patent's teaching that the arithmetic decoder is the structure for the claimed function “selecting . . . a probability model.”

CXM-0002 (Richardson Decl.), at ¶ 177.

Furthermore, as discussed above in connection with the “means for decoding” term, Complainants' proposed structure—an arithmetic decoder and its equivalents—is consistent with precedent. See, e.g., *Hitachi Maxell*, 143 F. Supp. 3d at 495 (the structure for a “means for decoding” term was “an information decoder (107) and its equivalents”); *Koninklijke Philips*, 2017 U.S. Dist. LEXIS 106501, at *10 & *10 n.21 (the structure for a “means for decoding” term was “decoder and switch,” which “are well-known structural elements that can be implemented in hardware or software”).

As Dr. Richardson describes in the accompanying declaration, the structure of the arithmetic decoder is a well-known structural element in video coding. CXM-0002 (Richardson Decl.) at ¶ 162.

. As numerous courts have held, decoders like the arithmetic decoder here, constitute sufficient structure for performing claimed functions. See, e.g., *Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *67 (corresponding structure was a “Video Compress Decoder 1104a” and a “Digital/Digital Video Encoder (DDVE) 1104c”); *Dish Network*, IPR2015-01756 at 13

(corresponding structure of “a media player that includes an MPEG-compatible decoder ”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (corresponding structure of a “voice coder” or “vocoder”).

For these reasons, the ALJ should adopt Complainants’ structure for the “means for selecting” term: “an arithmetic decoder and its equivalents.”

(c) *Because the corresponding structure—an arithmetic decoder—is not a general-purpose computer or processor, no algorithm is needed.*

As with all the means-plus-function terms except the last one (“means for updating”), Respondents’ proposed structure of this term merely states that the specification “lacks sufficient corresponding structure,” without indicating why. Complainants understand Respondents’ position to be that the arithmetic decoding device described in the specification is a general-purpose computer or processor, for which an algorithm must be provided, and that the specification lacks a sufficient algorithm. Respondents are incorrect for the many reasons described earlier in connection with the “means for decoding” term.

As explained earlier, the specification for the ’859 Patent clearly discloses an arithmetic decoder as the structure that performs the “decoding” function. The patent calls it a decoding device 13, including an entropy decoding module 1300. In the context of the full written description, it is clear that the disclosed arithmetic decoder is not a general-purpose computer or processor. Consistent with the specification, Dr. Richardson’s declaration confirms that an arithmetic decoder is not a general-purpose computer or processor. CXM-0002 (Richardson Decl.) at ¶ 156.

Because the arithmetic decoder is not a general-purpose computer or processor, no algorithm is required. *See, e.g., See Qualcomm*, 6 F.4th at 1266-67 (ruling that the corresponding structure, a

“power tracker,” “is not a general-purpose computer” and thus “does not trigger the algorithm requirement”); *Nevro*, 955 F.3d at 43 (ruling that “the specification clearly recites a signal or pulse generator, not a general-purpose computer or processor”); *Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *69 (“no algorithm requirement applies” because the “[d]efendants fail[ed] to show that the ‘Video Compress Decoder 1104a’ and ‘Digital/Digital Video Encoder (DDVE) 1104c’ are general-purpose computers”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (“voice coder” or “vocoder” structure did not create a “case in which an algorithm is required to complete the structure under § 112.”). Accordingly, because an arithmetic decoder is known in the art and not a general-purpose computer or processor, no algorithm is needed.

(a) *Alternatively, the Algorithm of Step 204
performed by the Arithmetic Decoder
Provides Sufficient Structure.*

To the extent the ALJ finds that the corresponding structure (arithmetic decoder) *is* a general-purpose computer or processor, the specification provides a sufficient algorithm for performing the claimed function. The disclosures in the ’859 Patent pertaining to step 204 (quoted and identified earlier) provide a sufficient algorithm for performing the claimed function of the “means for selecting” term.

As explained earlier, the algorithm may be presented “in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure.” *Typhoon Touch*, 659 F.3d at 1385. The critical inquiry is whether the specification explains “how” to perform the claimed function. *See Function Media*, 708 F.3d at 1318. Here, the specification makes clear how step 204 is performed. Step 204 involves selecting a probability model. The patent describes using a probability model *m* to select from a set of probability models *L*. JXM-002 (’859 Patent) at 11:35-36; CXM-0002 (Richardson Decl.) at ¶ 177.

. Step 204 is also depicted in flow charts such as Figure 11 (in the context of decoding):

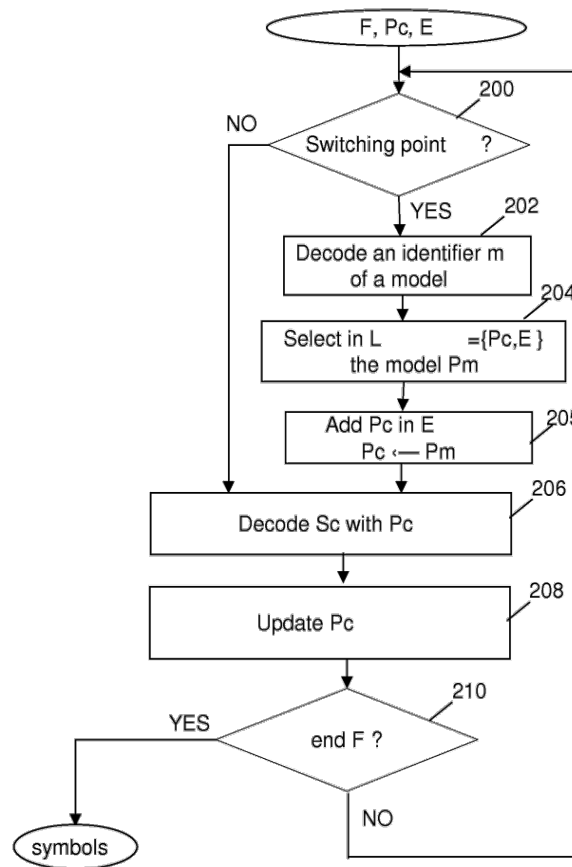


FIGURE 11

During step 204, which is carried out by the decoding device 13, “the model P_m” is “[s]elect[ed] in L = {P_c, E}.” JXM-002 (’859 Patent) at FIG. 11; CXM-0002 (Richardson Decl.), at ¶ 179.

“This identifier enables identification of a probability model in a set L of at least two probability models,” which includes the “current probability model PC which is defined from the symbols coded previous to the current symbol S_c and a subset E of probability models defined by default.” JXM-002 (’859 Patent) at 11:13-17; CXM-0002 (Richardson Decl.), at ¶ 179. An example set L is shown in Figure 11 with probability models of P_c and the subset E, L = {P_c, E}. Fig. 11. The subset E can contain one example probability model P₀. JXM-002 (’859 Patent) at

11:17-19; CXM-0002 (Richardson Decl.), at ¶ 179. The specification explains that once the model P_c is selected, it can be used to decode the current symbol S_c . JXM-002 ('859 Patent) at 10:18-19; CXM-0002 (Richardson Decl.), at ¶ 179. By disclosing that the identifier m identifies the model P_c in a set, and can be subsequently used it to decode a current symbol, S_c , a POSITA would understand the disclosure to mean that the selecting of the probability model is loading the model P_c from the set. CXM-0002 (Richardson Decl.), at ¶ 179.

Here, a POSITA, being educated in video coding and presented with the disclosures of the '859 Patent, would understand how the probability model identifier is used to select a probability model (e.g., P_c or P_0) in a set. *Id.* at ¶ 180. A POSITA would understand, for example, how data encoded in the stream F could be used to select P_c or P_0 from the set L in the exemplary embodiment. *Id.* A POSITA would understand that this is an index or a pointer that can be used to identify in the set of data which data from the set is desired (e.g., using 0 or 1 to choose the first or second probability model in an ordered set). *Id.* Accordingly, the '859 Patent provides a sufficient algorithm for how the arithmetic decoder can be used to perform the function of the “means for selecting” term.

- (iii) “means for adding in said subset said current probability model, the selected probability model becoming the current probability model” (’859 patent, Claim 15)

Complainants’ Proposed Construction	Respondents’ Proposed Construction	Staff’s Proposed Construction
Subject to § 112, ¶ 6 Function: adding in said subset said current probability model Structure: an arithmetic decoder and equivalents thereof. See FIG. 13 and 13:25-52. Alternatively, the structure is an arithmetic decoder operable to perform the claimed function, as described in the specification in connection with step 205 and equivalents thereof, step 205 being described in the specification, for example at the following figures and passages: FIG. 13 and 13:25-52 and FIGS. 8, 10, 11 and 11:37-43 (describing 205 and additionally that step 205 can be identical to step 105), FIG. 7 and 8:8-37 (describing step 105).	Subject to § 112, ¶ 6 Function: adding the current probability model into the subset of probability models Structure: indefinite for lack of sufficient corresponding structure.	Subject to § 112, ¶ 6 Function: adding the current probability model into the subset of probability models Structure: Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that possibly implements this step/function. Complainant cites to Figs. 7, 8, 10, 11, and 13 and 11:37-43 (describing 205 and additionally that step 205 can be identical to step 105) and 8:8-37 (describing step 105) as disclosing an arithmetic decoder operable to perform the claimed function in connection with step 205 and as describing step 205. Fig. 8 and col. 11, ll. 37-43 appear to disclose an algorithm for performing this step. However, absent expert discovery, it is unclear whether this disclosure provides a sufficient structure to a person of ordinary skill in the art, such that they would know how to perform this function.

(a) *The function is “adding in said subset said current probability model”*

The next means-plus-function phrase recites “***means for adding in said subset said current probability model.***”¹¹ Complainants, Respondents, and Staff do not appear to meaningfully disagree on the substance of the functional language, but they do disagree on the appropriate wording of that function. Respondents and Staff’s proposal—“adding in said subset said current probability model”—changes and rearranges the wording that the patentee chose for the claims, which is improper. Complainants, by comparison, properly use the patentee’s chosen words—the words directly in the claim, which is “adding the current probability model into the subset of probability models.”

Complainants’ proposed function is the correct one. As the Federal Circuit has held, “[t]he function of a means-plus-function claim must be construed to include ***the limitations contained in the claim language.***” *Lockheed Martin Corp. v. Space Systems/Loral, Inc.*, 324 F.3d 1308, 1319 (Fed. Cir. 2003) (emphasis added). “Courts do not rewrite claims; instead, we give effect to ***the terms chosen by the patentee.***” *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999) (emphasis added). Here, while presumably seeking to clarify what they perceive as warranting clarification, Respondents’ and Staff’s proposal violates these rules.

A prior limitation in claim 15 describes the “subset” referenced in this means-plus-function term (reciting “a subset of probability models”). The present term merely builds on that same subset, stating a function of adding certain things “in said subset,” and reciting that the thing being added in the subset is “said current probability model.” The patentee chose to write this function

¹¹ No party contends that the portion of the claim phrase reciting “the selected probability model becoming the current probability model” is part of the “means for adding” term. The parties agree that the term at issue is “means for adding in said subset said current probability model.”

as “adding in said subset said current probability model.” The ALJ should adopt the patentee’s chosen words. *See Lockheed Martin*, 324 F.3d at 1319; *K-2 Corp.*, 191 F.3d at 1364.

(b) *The Specification Provides Sufficient
Corresponding Structure for Performing the
Claimed Function—an Arithmetic Decoder.*

For largely the same reasons described earlier in connection with the “means for decoding” and “means for selecting” terms, the structure for the “means for adding” term is an arithmetic decoder (and its equivalents). As with all the means-plus-function terms in claim 15, the ’859 Patent specification clearly links the function to the corresponding structure of an arithmetic decoder. For the “means for adding” term, the specification clearly discloses an arithmetic decoder as the structure that performs the function.¹² Thus, the ALJ should rule that the structure for this limitation is an arithmetic decoder and its equivalents. *See, e.g., Palumbo*, 762 F.2d at 974 (the statute “requir[es] that the limitation shall be construed to cover the structure described in the specification and equivalents thereof”).

The specification describes the function as a discrete numbered step 205. For example: “During a step 205, the current probability model P_c is added to the subset E” such that “the probability model P_m . . . becomes the current probability model P_c .” JXM-002 (’859 Patent) at 11:37-41; 13:25-52. In another passage, the specification states:

During a step **205**, the current probability model P_c is added to the subset E This step is detailed in FIG. **8**. The probability model P_m is re-copied in the current probability model P_c , i.e. the probability model P_m selected in step **204** becomes the current probability model P_c . This step is identical to step **105** of the coding method according to the third embodiment.

¹² This remains true even should the ALJ adopt Respondents’ or Staff’s view of the function for the “means for adding” term. The specification makes clear that the arithmetic decoder performs the function.

Id. at 11:7–43. The specification depicts this same functionality in Figures 10 and 11, which are flow charts that illustrate arithmetic decoding methods according to particular embodiments. *Id.* at 4:21 – 24. Figure 11 is exemplary and depicts step 205 as “Add Pc in E” where “ $P_c \leftarrow P_m$.”

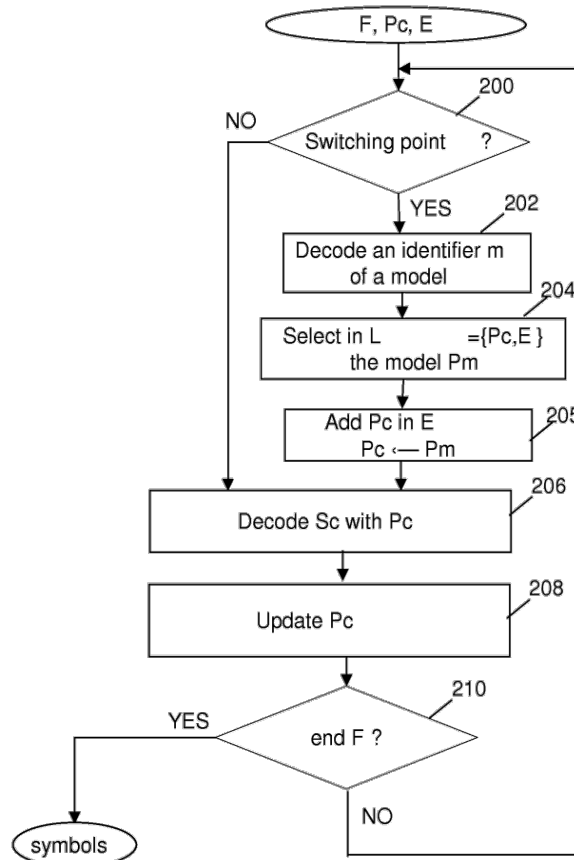


FIGURE 11

The written description (and associated figures) regarding step 205 mirror the “means for adding” term of claim 15. The specification explains that the function involves adding the current probability model, which is described by the specification: “During a step 205, the current probability model P_c is added to the subset E ” such that “the probability model P_m . . . becomes the current probability model P_c .” *Id.* at 11:38–41; 13:25-52. The specification explains that P_c is the current probability model, E is a subset of probability models, and P_m is the selected probability model. *Id.* at 11:12–43.

Additionally, the '859 Patent describes a multi-step process for step 205 and “adding in said subset said current probability model.” *Id.* at 11:43–54. The process includes managing the probability models in a subset, and deleting older probability models if additional space in the subset is needed. Specifically, step 205 “is detailed in FIG. 8,” shown below:

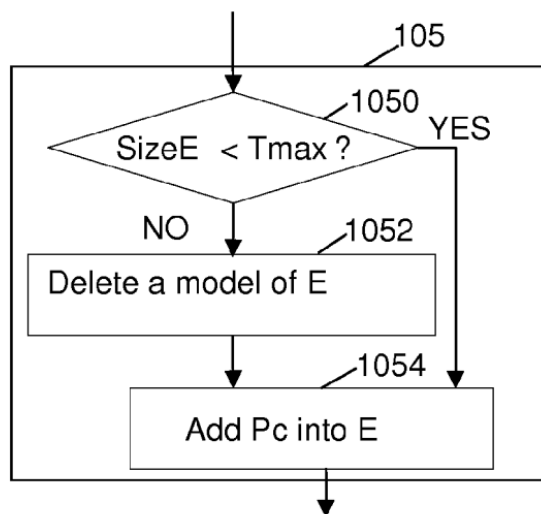


FIGURE 8

'859 Patent, FIG. 8. The specification describes the figure, stating: “During a step 1050, the size SizeE of E is compared to a threshold value Tmax.” *Id.* at 8:38-39; 11:44-45. If SizeE is less than Tmax, then the current probability model is added in E in step 1054. *Id.* at 8:40–46. If SizeE is not less than Tmax, the method proceeds to step 1052, where “one probability model is deleted from the subset E,” for example, “the model that is least often selected.” JXM-002 ('859 Patent) at 8:40-42, 45-46.

The specification clearly identifies the structure that performs this function—an arithmetic decoder—and the specification clearly links that structure to step 205. *See See MobileMedia*, 780 F.3d at 1169 (“corresponding structure” exists if the “specification or prosecution history clearly links or associates that structure to the function recited in the claim”). As explained earlier in detail (in connection with the “means for decoding” term), the specification describes the arithmetic

decoder in terms of a “decoding device” 13 that has an “entropy decoding module” 1300 that implements “arithmetic decoding” according to the invention. JXM-002 (’859 Patent) at 13:25-52; FIGS. 11, 13). As explained by Dr. Richardson, persons of ordinary skill in the art readily understand that the disclosed device is an arithmetic decoder. *See, e.g.*, CXM-0002 (Richardson Decl.) at ¶ 159; *see also, e.g.*, JXM-002 (’859 Patent) at 2:17-18 (the invention relates to “arithmetic” coding and decoding).

Regarding the arithmetic decoder (decoding device 13), the specification makes clear that the device includes an entropy decoding module that “implements the step[] . . . 205.” *Id.* at 13:33. As discussed *supra*, the specification also depicts the arithmetic decoder (including the decoding module 1300) in Figure 13.

As explained by Dr. Richardson, Figure 13 depicts a clear example of an arithmetic decoder in a way that a POSITA would understand how the structure supports the claimed function:

For the specific adding function claimed by the ’859 Patent, i.e., the “adding in said subset said current probability model,” the ’859 Patent explains that at “step 205, the current probability model P_c is added to the subset E,” such that the “probability model P_m is re-copied in the current probability model P_c , i.e. the probability model P_m selected in step 204 becomes the current probability model P_c .” (JXM-002 (’859 Patent) at 11:37-41). The ’859 patent explains that the step of adding a probability model to subset E includes adding to the subset E, or when subset E is full, that a probability model is deleted from a set E. (JXM-002 (’859 Patent) at 11:37-54; 8:8-37). Based on the disclosure that a subset E is maintained (e.g., JXM-002 (’859 Patent) at 11:12-54), a POSITA would understand a probability model could be stored, including at a location in the arithmetic decoder’s memory. The ’859 Patent makes it clear that probability models are a form of variable, stored in memory, which associates a probability with each possible value of a symbol and which is periodically updated during decoding (JXM-002 (’859 Patent) at 4:39-54). The patent explains that the entropy coding model adds to available space in subset E or otherwise overwrites a probability model. (JXM-002 (’859 Patent) at 11:37-54; 8:8-37). Based on these disclosures, a POSITA would readily understand what it means to maintain (store) a set of probability models, and add or “re-cop[y]” probability models.

CXM-0002 (Richardson Decl.), at ¶ 184.

Furthermore, as discussed above in connection with the “means for decoding” term, Complainants’ proposed structure—an arithmetic decoder and its equivalents—is consistent with precedent. *See, e.g., Hitachi Maxell*, 143 F. Supp. 3d at 495 (the structure for a “means for decoding” term was “an information decoder (107) and its equivalents”); *Koninklijke Philips*, 2017 U.S. Dist. LEXIS 106501, at *10 & *10 n.21 (the structure for a “means for decoding” term was “decoder and switch,” which “are well-known structural elements that can be implemented in hardware or software”).

As Dr. Richardson describes in the accompanying declaration, the structure of the arithmetic decoder is a well-known structural element in video coding. CXM-0002 (Richardson Decl.), at ¶ 162. As numerous courts have held, decoders like the arithmetic decoder here, constitute sufficient structure for performing claimed functions. *See, e.g., Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *67 (corresponding structure was a “Video Compress Decoder 1104a” and a “Digital/Digital Video Encoder (DDVE) 1104c”); *Dish Network*, IPR2015-01756 at 13. (corresponding structure of “a media player that includes an MPEG-compatible decoder”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (corresponding structure of a “voice coder” or “vocoder”).

For these reasons, the ALJ should adopt Complainants’ structure for the “means for adding” term: “an arithmetic decoder and its equivalents.”

(c) *Because the corresponding structure—an arithmetic decoder—is not a general-purpose computer or microprocessor, no algorithm is needed.*

Respondents’ proposed structure for this term merely states that the specification “lacks sufficient corresponding structure,” without indicating why. Complainants understand Lenovo’s position to be that the arithmetic decoding device described in the specification is a general-

purpose computer or processor, for which an algorithm must be provided, and that the specification lacks a sufficient algorithm. Lenovo is incorrect for the many reasons described earlier in connection with the “means for decoding” term.

As explained earlier, the specification for the ’859 Patent clearly discloses an arithmetic decoder as the structure that performs the “decoding” function. The patent calls it a decoding device 13, including an entropy decoding module 1300. In the context of the full written description, it is clear that the disclosed arithmetic decoder is not a general-purpose computer or processor. Consistent with the specification, Dr. Richardson’s declaration confirms that an arithmetic decoder is not a general-purpose computer or processor. CXM-0002 (Richardson Decl.), at ¶ 156.

Because the arithmetic decoder is not a general-purpose computer or processor, no algorithm is required. *See, e.g., Qualcomm*, 6 F.4th at 1266-67 (ruling that the corresponding structure, a “power tracker,” “is not a general-purpose computer” and thus “does not trigger the algorithm requirement”); *Nevro*, 955 F.3d at 43 (ruling that “the specification clearly recites a signal or pulse generator, not a general-purpose computer or processor”); *Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *69 (“no algorithm requirement applies” because the “[d]efendants fail[ed] to show that the ‘Video Compress Decoder 1104a’ and ‘Digital/Digital Video Encoder (DDVE) 1104c’ are general-purpose computers”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (“voice coder” or “vocoder” structure did not create a “case in which an algorithm is required to complete the structure under § 112.”). Accordingly, because an arithmetic decoder is known in the art and not a general-purpose computer or processor, no algorithm is needed.

(d) *Alternatively, the Algorithm of Step 205
Performed by the Arithmetic Decoder 13
Provides Sufficient Structure.*

To the extent the ALJ finds that the corresponding structure (arithmetic decoder) *is* a general-purpose computer or processor, the specification provides a sufficient algorithm for performing the claimed function. The disclosures pertaining to step 205 (quoted and identified earlier) provide a sufficient algorithm for performing the claimed function of the “means for adding” term. *See, e.g.*, FIGS. 8, 10, 11 and 11:37-43 (describing 205 and additionally that step 205 can be identical to step 105), FIG. 7 and 8:8-37 (describing step 105).

As explained earlier, the algorithm may be presented “in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure.” *Typhoon Touch*, 659 F.3d at 1385. The critical inquiry is whether the specification explains “how” to perform the claimed function. *See Function Media*, 708 F.3d at 1318. Here, the specification makes clear how step 205 is performed. Step 205 involves adding the current probability model to the subset of probability models. The patent describes performing this function by adding a current probability model P_c to the subset E. (JXM-002 (’859 Patent) at 11:37–43). . Step 205 is also depicted in flow charts such as Figure 11 (in the context of decoding):

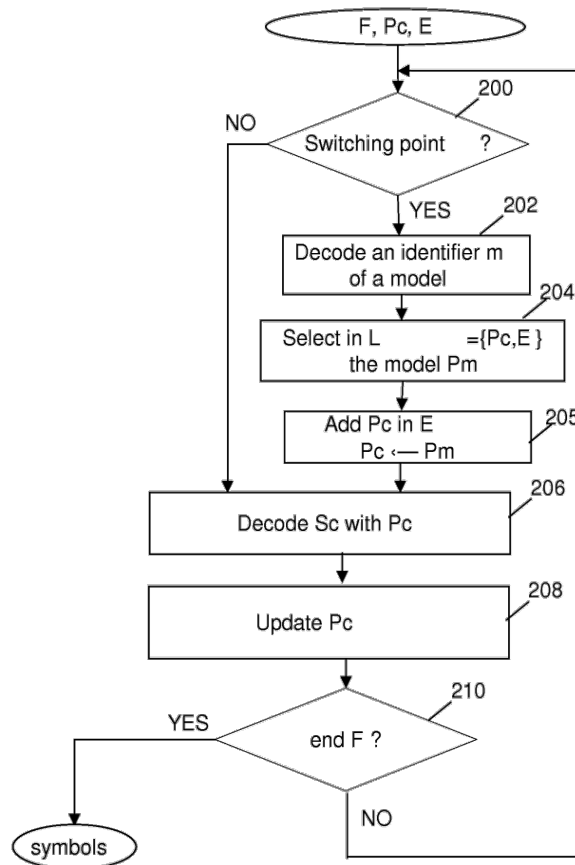


FIGURE 11

During step 205, which is carried out by the decoding device 13, “the current probability model P_c is added to the subset E .” JXM-002 (’859 Patent) at 11:37-41. The ’859 Patent explains that due to this step, the “probability model P_m is re-copied in the current probability model P_c , i.e. the probability model P_m selected . . . becomes the current probability model P_c .” JXM-002 (’859 Patent) at 11:38-41; CXM-0002 (Richardson Decl.), at ¶ 184. The patent also ties step 205 to the reciprocal coding step 105. JXM-002 (’859 Patent) at 11:41-43; CXM-0002 (Richardson Decl.), at ¶ 186. Step 105 includes dynamically varying the subset E according to the coding of symbols by including in the subset the current probability model associated with the current symbol. JXM-002 (’859 Patent) at 11:12–34.). Thus, the subset E “comprises more probability

models adapted to the characteristics of the source signal, i.e. defined using the coding of symbols coded previous to the current symbol Sc .” JXM-002 (’859 Patent) at 8:22-24; . CXM-0002 (Richardson Decl.), at ¶ 186. Accordingly, the ’859 Patent makes clear that step 205 includes the process of dynamically varying the subset E based on current symbols by copying the current symbol into the subset. . CXM-0002 (Richardson Decl.), at ¶ 186.

Additionally, the ’859 Patent describes a multi-step process for “adding in said subset said current probability model.” CXM-0002 (Richardson Decl.), at ¶ 187. The process includes managing the probability models in a subset, and deleting older probability models if additional space in the subset is needed. *Id.* The patent describes this in the context of step 105 (which, as noted above, is reciprocal to the decoding step 205). Step 105 (reciprocal to step 205) “is detailed in FIG. 8,” shown below.

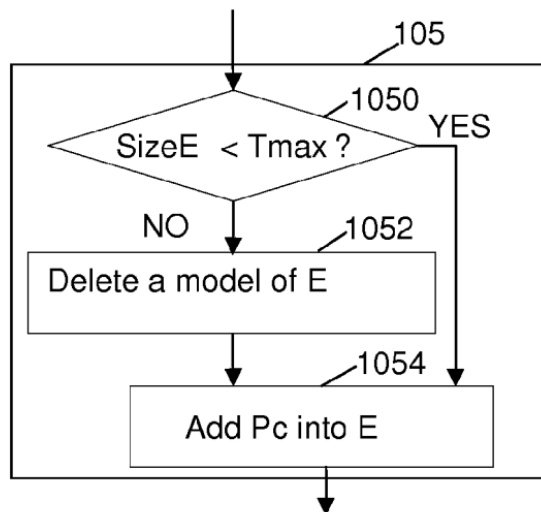


FIGURE 8

’859 Patent, FIG. 8. As the specification explains, “During a step 1050, the size $SizeE$ of E is compared to a threshold value $Tmax$.” JXM-002 (’859 Patent) 8:38-39; 11:44-45; CXM-0002 (Richardson Decl.), at ¶ 188. If $SizeE$ is less than $Tmax$, then the current probability model is added in E in step 1054. JXM-002 (’859 Patent) at 8:40-46; CXM-0002 (Richardson Decl.), at ¶

188. If SizeE is not less than Tmax, the method proceeds to step 1052, where “one probability model is deleted from the subset E,” for example, “the model that is least often selected.” JXM-002 (’859 Patent) at 8:40-42, 45-46; CXM-0002 (Richardson Decl.), at ¶ 188.

Here, a POSITA, being educated in video coding and presented with the disclosures of the ’859 Patent, would understand how the current probability model is added to the subset of probability models. CXM-0002 (Richardson Decl.), at ¶ 188. POSITA would understand, for example, how to add a current probability model P_c to a subset E of probability models. *Id.* Accordingly, the ’859 Patent provides a sufficient algorithm for how the arithmetic decoder can be used to perform the function of the “means for adding” term.

- (iv) “means for decoding said current symbol with said current probability model” (’859 patent, Claim 15)

Complainants' Proposed Construction	Respondents' Proposed Construction	Staff's Proposed Construction
Subject to § 112, ¶ 6 Function: decoding said current symbol Structure: an arithmetic decoder and equivalents thereof. See FIG. 13 and 13:25-52. Alternatively, the structure is an arithmetic decoder operable to perform the claimed function, as described in the specification in connection with step 206 and equivalents thereof, step 206 being described in the specification, for example at the following figures and passages: FIG. 13 and 13:25-52 and FIGS. 10, 11 and 10:18-19, 11:55-57.	Subject to § 112, ¶ 6 Function: decoding the current symbol with the current probability model Structure: indefinite for lack of sufficient corresponding structure.	Subject to § 112, ¶ 6 Function: decoding the current symbol with the current probability model Structure: Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that implements this step/function. However, it is unclear whether this disclosure alone provides a sufficient structure to a person of ordinary skill in the art, such that they would know how to perform this function. Complainant cites to Figs. 10, 11, and 13 and 10:18-19, 11:55-57, and 13:25-52 as disclosing an arithmetic decoder operable to perform the claimed function in connection with step 206 and as describing step 206. These figures and cited paragraphs do not appear to disclose an algorithm that shows how the claimed function is carried out, but absent expert testimony, the Staff is not in a position to say that there is clear and convincing evidence showing indefiniteness. Further discovery, including expert discovery, may reveal that the patent does not disclose a corresponding structure, or it may narrow the precise portions of the specification that are the required structure.

(a) *The function is “decoding said current symbol”*

The claim phrase “*means for decoding said current symbol with said current probability model*” includes both a “means for decoding” term as well as another requirement describing how to perform the function. The portion describing **how** to perform the function is the phrase “with said current probability model.” This language is not part of the function itself. The “function” is appropriately limited to the functional language alone—“decoding said current symbol.”

The case law described above in connection with the first means-plus-function term (“means for decoding . . . a probability model identifier”) applies equally here. As described earlier, the function should be limited to *the function itself*, not other words in the claim that describe “where,” “when,” or—as pertinent here—“how” that function is accomplished. *See, e.g., Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim phrase from the function because it “describ[es] **how** the ‘controller means’ accomplishes the function” (emphasis added)); *BBA Nonwovens*, 303 F.3d at 1344 (excluding a “positioned” claim phrase from the function because “[w]hat the ‘corona means’ is and **where it is located** are two different things” (emphasis added)); *Uship*, 98 Fed. Cl. at 427-28 (excluding claim phrase from the function because it “describes **when** storage happens and is not part of the function” for the “means for storing” term (emphasis added)); *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *11-15 (excluding claim phrase from the function because it describes **where** the “mapping means” is placed, and “the physical location . . . is irrelevant to performing the [claimed] functions” (emphasis added)); *Precise Exercise Equip.*, 1998 U.S. Dist. LEXIS 19457, at *13 (holding that the phrase “secured to said frame” was not part of a means-plus-function phrase because it merely “**defines the relationship** between the ‘support means’ and the frame” (emphasis added)).

Both Respondents and Staff propose including the additional, non-functional phrase “with the current probability model” as part of the function. That phrase is not part of the function. Instead, it describes **how** to perform the function of “decoding said current symbol”—namely, by decoding the current symbol “with said current probability model.” That statement of how to perform the function is not part of the function itself and should be excluded. *See, e.g., Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim phrase from the function because it “describ[es] **how** the ‘controller means’ accomplishes the function” (emphasis added)). Similar to the excluded phrase in *Medtronic*, here the phrase “with said current probability model” is merely an input indicating how to perform the decoding function, meaning it is not part of the function itself. Therefore, the ALJ should conclude that the function for this “means for decoding term” is “decoding said current symbol.”

(b) *The Specification Provides Sufficient
Corresponding Structure for Performing the
Claimed Function—an Arithmetic Decoder.*

For largely the same reasons discussed earlier in connection with the first “means for decoding” term (as well as the other means-plus-function terms), the structure for this second “means for decoding” term is an arithmetic decoder (and its equivalents). As with all the means-plus-function terms in claim 15, the ’859 Patent specification clearly links the function to the corresponding structure of an arithmetic decoder. For this “means for decoding” term, the specification clearly discloses an arithmetic decoder as the structure that performs the function.¹³ Thus, the ALJ should rule that the structure for this limitation is an arithmetic decoder and its

¹³ This remains true even should the ALJ adopt Respondents’ or Staff’s view of the function for the “means for decoding” term. The specification makes clear that the arithmetic decoder performs the function.

equivalents. *See, e.g., Palumbo*, 762 F.2d at 974 (the statute “requir[es] that the limitation shall be construed to cover the structure described in the specification and equivalents thereof”).

The specification describes the function as a discrete numbered step 206. For example: “During a step 206, the current symbol S_c is decoded with the current probability model P_c which is the probability model P_m selected in step 204.” JXM-002 (’859 Patent) at 11:55–57. The specification depicts this same functionality in Figures 10 and 11, which are flow charts that illustrate arithmetic decoding methods according to particular embodiments. *Id.* at 4:21 – 24). Figure 11 is exemplary and depicts step 206 as “Decode S_c with P_c .” *Id.* at FIG. 11.

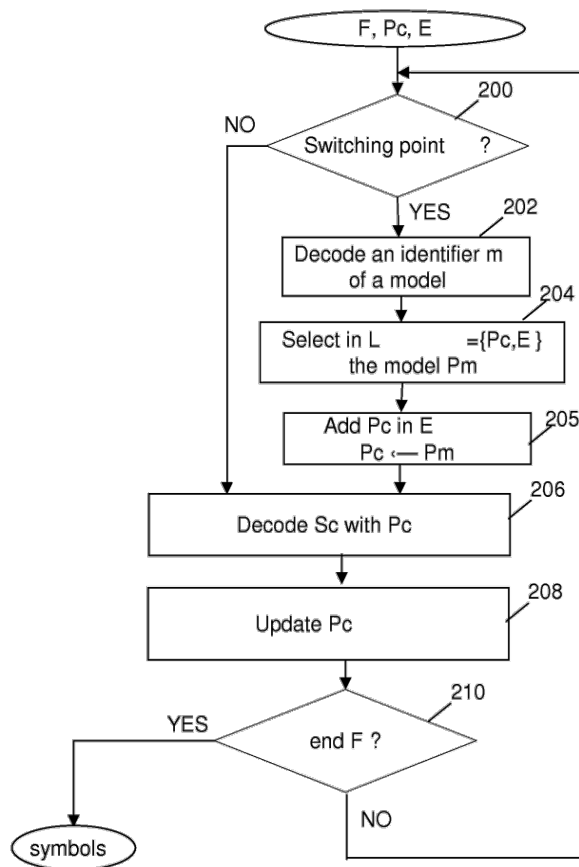


FIGURE 11

The written description (and associated figures) regarding step 206 mirror the “means for decoding said current symbol” term of claim 15. The specification explains that the function

involves decoding the current symbol, which is described by the specification: During a step 206, the current symbol S_c is decoded with the current probability model P_c which is the probability model P_m selected in step 204.” JXM-002 (’859 Patent) at 11:55–57.

The specification clearly identifies the structure that performs this function—an arithmetic decoder—and the specification clearly links that structure to step 206. *See MobileMedia*, 780 F.3d at 1169 (“corresponding structure” exists if the “specification or prosecution history clearly links or associates that structure to the function recited in the claim”). As explained earlier in detail (in connection with the first “means for decoding” term), the specification describes the arithmetic decoder in terms of a “decoding device” 13 that has an “entropy decoding module” 1300 that implements “arithmetic decoding” according to the invention. JXM-002 (’859 Patent) at 13:32–35. As explained by Dr. Richardson, persons of ordinary skill in the art readily understand that the disclosed device is an arithmetic decoder. *See, e.g., CXM-0002* (Richardson Decl.), at ¶ 159; *see also, e.g., JXM-002* (’859 Patent) at 2:17-18 (the invention relates to “arithmetic” coding and decoding).

Regarding the arithmetic decoder (decoding device 13), the specification makes clear that the device includes an entropy decoding module that “implements the step[] . . . 206.” *Id.* at 13:33. As discussed *supra*, the specification also depicts the arithmetic decoder (including the decoding module 1300) in Figure 13.

As explained by Dr. Richardson, Figure 13 depicts a clear example of an arithmetic decoder in a way that a POSITA would understand how the structure supports the claimed function:

191. With the disclosures of the ’859 Patent, a POSITA would understand that the arithmetic decoder as shown by example in FIG. 13 provides structure for the function of “decoding said current symbol.” A POSITA with knowledge of video decoding would of course understand how to use a decoder to decode, as that is the fundamental purpose of a decoder, and a POSITA would further understand from the ’859 Patent how to decode “said current symbol” as

recited by this claim term. As explained above, it was well known that entropy coding modules decode syntax elements or symbols from a stream in a specific order. (Section VIII.A, above). This is a fundamental part of entropy coding. (Id.). A POSITA would understand how to the arithmetic decoder disclosed in the '859 Patent to specifically decode from the stream the current symbol. Given that entropy decoders decode bits in a given order, "current" simply refers to a symbol currently decoded at a point of reference (e.g., after some symbols but before others). (Id.). This was a known concept of video decoding. (RXM-0026 (H.264 Book) at LENOVO_1373-00161400).

192. In my opinion, the specification makes clear that a current symbol *Sc* is decoded using arithmetic decoding, where (1) the coded value is read from the stream *F* and (2) the decoded value is determined by arithmetic decoding using a corresponding probability model. The current symbol *Sc* is received as part of a coded stream *F*. (JXM-002 ('859 Patent) at 9:53-54 (describing FIG. 10 as a method for decoding a stream *F*), FIG. 10, FIG. 11 (showing current symbol *Sc* is part of the stream); FIG. 13 (showing coded stream being received)). "During a step 206, the current symbol *Sc* is decoded with the current probability model *PC*." (JXM-002 ('859 Patent) at 10:18-19). If the "symbol *Sc* takes the values in the set {a, b, c, d} then a probability is associated with each value 'a', 'b', 'c' and 'd.'" (JXM-002 ('859 Patent) at 4:40-42). Therefore, the decoding step 206, uses the probabilities of the current probability model *Pc* to decode the current symbol *Sc*. (JXM-002 ('859 Patent) at 10:18-19). A POSITA would understand that this disclosure means the current symbol *Sc* is received and then decoded according to arithmetic decoding, where the coded value is read from the Symbol *Sc* and the decoded value is determined by decoding using the corresponding value in the probability model. (RXM-0026 (H.264 Book) at LENOVO_1373-00161346-00161349, LENOVO 1373-00161498-00161501).

193. I understand Respondents and Staff both offer that the phrase "with said current probability model" is part of the function. To the extent this language is considered part of the function, a POSITA would understand that the arithmetic decoder provides the structure for performing that function. Using probability models or contexts to decode with an arithmetic decoder was well known as of the priority date of the '859 Patent in 2009. This fact is acknowledged by the '859 Patent itself. (JXM-002 ('859 Patent) at 1:23-54). The '859 Patent further explains how an arithmetic decoder uses probabilities to decode symbols. (JXM-002 ('859 Patent) at 4:33-54). As an example, in H.264, decoding a bin or a symbol makes use of a selected probability model or context. In H.264's Context Adaptive Binary Arithmetic Coding or "CABAC," non-binary values are converted into binary strings known as bin strings or binarizations, before encoding using the binary arithmetic coder (BAC). The BAC encodes using an estimate of the probability of each bit being 0 or 1, which can be adapted based on recently encoded values (Context Adaptation). This step is performed by the entropy decoding module of H.264. (RXM-0026 (H.264 Book) at LENOVO 1373-00161498-00161501). Accordingly, a POSITA with the disclosures of the '859 Patent, would be well informed of how to decode a current symbol with a current probability model.

Furthermore, as discussed above in connection with the first “means for decoding” term, Complainants’ proposed structure—an arithmetic decoder and its equivalents—is consistent with precedent. *See, e.g., Hitachi Maxell*, 143 F. Supp. 3d at 495 (the structure for a “means for decoding” term was “an information decoder (107) and its equivalents”); *Koninklijke Philips*, 2017 U.S. Dist. LEXIS 106501, at *10 & *10 n.21 (the structure for a “means for decoding” term was “decoder and switch,” which “are well-known structural elements that can be implemented in hardware or software”).

As Dr. Richardson describes in the accompanying declaration, the structure of the arithmetic decoder is a well-known structural element in video coding. CXM-0002 (Richardson Decl.), at ¶ 162. As numerous courts have held, decoders like the arithmetic decoder here, constitute sufficient structure for performing claimed functions. *See, e.g., Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *67 (corresponding structure was a “Video Compress Decoder 1104a” and a “Digital/Digital Video Encoder (DDVE) 1104c”); *Dish Network*, IPR2015-01756 at 13 (corresponding structure of “a media player that includes an MPEG-compatible decoder ”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (corresponding structure of a “voice coder” or “vocoder”).

For these reasons, the ALJ should adopt Complainants’ structure for the term “means for decoding said current symbol”: “an arithmetic decoder and its equivalents.”

(c) *Because the corresponding structure—an arithmetic decoder—is not a general-purpose computer or processor, no algorithm is needed.*

As with the previous means-plus-function terms, Respondents’ proposed structure for this term merely states that the specification “lacks sufficient corresponding structure,” without indicating why. Complainants understand Respondents’ position to be that the arithmetic decoding

device described in the specification is a general-purpose computer or processor, for which an algorithm must be provided, and that the specification lacks a sufficient algorithm. Respondents are incorrect for the many reasons described earlier in connection with the first “means for decoding” term.

As explained earlier, the specification for the ’859 Patent clearly discloses an arithmetic decoder as the structure that performs the “decoding” function. The patent calls it a decoding device 13, including an entropy decoding module 1300. In the context of the full written description, it is clear that the disclosed arithmetic decoder is not a general-purpose computer or processor. Consistent with the specification, Dr. Richardson’s declaration confirms that an arithmetic decoder is not a general-purpose computer or processor. CXM-0002 (Richardson Decl.), at ¶ 156.

Because the arithmetic decoder is not a general-purpose computer or processor, no algorithm is required. *See, e.g., Qualcomm*, 6 F.4th at 1266-67 (ruling that the corresponding structure, a “power tracker,” “is not a general-purpose computer” and thus “does not trigger the algorithm requirement”); *Nevro*, 955 F.3d at 43 (ruling that “the specification clearly recites a signal or pulse generator, not a general-purpose computer or processor”); *Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *69 (“no algorithm requirement applies” because the “[d]efendants fail[ed] to show that the ‘Video Compress Decoder 1104a’ and ‘Digital/Digital Video Encoder (DDVE) 1104c’ are general-purpose computers”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (“voice coder” or “vocoder” structure did not create a “case in which an algorithm is required to complete the structure under § 112.”). Accordingly, because an arithmetic decoder is known in the art and not a general-purpose computer or processor, no algorithm is needed.

(d) *Alternatively, the Algorithm of Step 206 performed by the Arithmetic Decoder Provides Sufficient Structure.*

To the extent the ALJ finds that the corresponding structure (arithmetic decoder) *is* a general-purpose computer or processor, the specification provides a sufficient algorithm for performing the claimed function. The disclosures pertaining to step 206 (quoted and identified earlier) provide a sufficient algorithm for performing the claimed function of the “means for decoding” term. *See, e.g.*, JXM-002 (’859 Patent) at FIG. 13 and 13:25-52; *id.* at FIGS. 10, 11 and 10:18-19, 11:55-57.

As explained earlier, the algorithm may be presented “in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure.” *Typhoon Touch*, 659 F.3d at 1385. The critical inquiry is whether the specification explains “how” to perform the claimed function. *See Function Media*, 708 F.3d at 1318. Here, the specification makes clear how step 206 is performed. Step 206 includes decoding

a current symbol with a current probability model. CXM-0002 (Richardson Decl.), at ¶ 192. Step 206 is also depicted in flow charts such as Figure 11 (in the context of decoding):

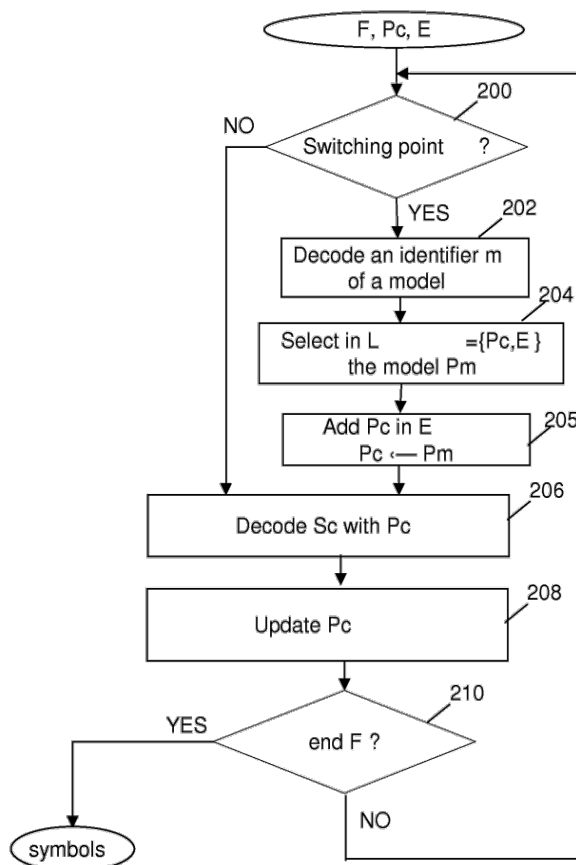


FIGURE 11

As the specification explains, “[d]uring a step 206, the current symbol S_c is decoded with the current probability model P_c which is the probability model P_m selected in step 204.” JXM-002 (’859 Patent) at 11:55–57. As explained by Dr. Richardson, the specification thus makes clear that a current symbol S_c is decoded according to arithmetic coding, where the (1) the coded value is read from the Stream F and (2) the decoded value is determined by arithmetic decoding using a corresponding probability model. CXM-0002 (Richardson Decl.), at ¶ 192.

192. In my opinion, the specification makes clear that a current symbol S_c is decoded using arithmetic decoding, where (1) the coded value is read from the stream F and (2) the decoded value is determined by arithmetic decoding using a corresponding probability model. The current symbol S_c is received as part of a

coded stream F. (JXM-002 ('859 Patent) at 9:53-54 (describing FIG. 10 as a method for decoding a stream F), FIG. 10, FIG. 11 (showing current symbol Sc is part of the stream); FIG. 13 (showing coded stream being received)). “During a step 206, the current symbol Sc is decoded with the current probability model PC.” (JXM-002 ('859 Patent) at 10:18-19). If the “symbol Sc takes the values in the set {a, b, c, d} then a probability is associated with each value ‘a’, ‘b’, ‘c’ and ‘d.’” (JXM-002 ('859 Patent) at 4:40-42). Therefore, the decoding step 206, uses the probabilities of the current probability model Pc to decode the current symbol Sc. (JXM-002 ('859 Patent) at 10:18-19). A POSITA would understand that this disclosure means the current symbol Sc is received and then decoded according to arithmetic decoding, where the coded value is read from the Symbol Sc and the decoded value is determined by decoding using the corresponding value in the probability model. (RXM-0026 (H.264 Book) at LENOVO_1373-00161346-00161349, LENOVO 1373-00161498-00161501).

CXM-0002 (Richardson Decl.), at ¶ 192.

Here, a POSITA, being educated in video coding and presented with the disclosures of the '859 Patent, would understand how the current symbol is decoded with the current probability model. CXM-0002 (Richardson Decl.), at ¶ 192. Accordingly, the '859 Patent provides a sufficient algorithm for how the arithmetic decoder can be used to perform the function of the term “means for decoding said current symbol.”

- (v) **“means for updating said current probability model according to the decoding of said current symbol” (’859 patent, Claim 15)**

Complainants' Proposed Construction	Respondents' Proposed Construction	Staff's Proposed Construction
Subject to § 112, ¶ 6 Function: updating said current probability model Structure: an arithmetic decoder and equivalents thereof. See FIG. 13 and 13:25-52. Alternatively, the structure is an arithmetic decoder operable to perform the claimed function, as described in the specification in connection with step 208 and equivalents thereof, step 208 being described in the specification, for example at the following figures and passages: FIG. 13 and 13:25-52 and FIGS. 10, 11, 4:33-54, 10:20-22, 11:57-61.	Subject to § 112, ¶ 6 Function: updating the current probability model according to the decoding of the current symbol Structure: an algorithm wherein an occurrence number for the current symbol is increased by 1	Subject to § 112, ¶ 6 Function: updating the current probability model according to the decoding of the current symbol Structure: Fig. 13 and col. 13, ll. 25-52 disclose the structure of a decoding device and, more specifically, an entropy decoding module that implements this step/function. However, it is unclear whether this disclosure alone provides a sufficient structure to a person of ordinary skill in the art, such that they would know how to perform this function. Complainant cites to Figs. 10, 11, and 13 and 4:33-54, 10:20-22, 11:57, and 13:25-52 as disclosing an arithmetic decoder operable to perform the claimed function in connection with step 208 and as describing step 208. Col. 4, ll. 33-45 describes "AC entropy coding." However, absent expert discovery, it is unclear whether this disclosure provides a sufficient structure to a person of ordinary skill in the art, such that they would know how to perform this function.

(a) *The function is “updating said current probability model”*

The claim phrase “*means for updating said current probability model according to the decoding of said current symbol*” includes both a “means for updating” term as well as another requirement describing how to perform the function. The portion describing **how** to perform the function is the phrase “according to the decoding of said current symbol.” This language is not part of the function itself. The “function” is appropriately limited to the functional language alone—“updating said current probability model.”

The case law described above in connection with the first means-plus-function term (“means for decoding . . . a probability model identifier”) applies equally here. As described earlier, the function should be limited to *the function itself*, not other words in the claim that describe “where,” “when,” or—as pertinent here—“how” that function is accomplished. *See, e.g., Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim phrase from the function because it “describ[es] **how** the ‘controller means’ accomplishes the function” (emphasis added)); *BBA Nonwovens*, 303 F.3d at 1344 (excluding a “positioned” claim phrase from the function because “[w]hat the ‘corona means’ is and **where it is located** are two different things” (emphasis added)); *Uship*, 98 Fed. Cl. at 427-28 (excluding claim phrase from the function because it “describes **when** storage happens and is not part of the function” for the “means for storing” term (emphasis added)); *Global Traffic*, 2012 U.S. Dist. LEXIS 96866, at *11-15 (excluding claim phrase from the function because it describes **where** the “mapping means” is placed, and “the physical location . . . is irrelevant to performing the [claimed] functions” (emphasis added)); *Precise Exercise Equip.*, 1998 U.S. Dist. LEXIS 19457, at *13 (holding that the phrase “secured to said frame” was not part of a means-plus-function phrase because it merely “**defines the relationship** between the ‘support means’ and the frame” (emphasis added)).

Both Respondents and Staff propose including the additional, non-functional phrase “according to the decoding of said current symbol” as part of the function. That phrase is not part of the function. Instead, it describes **how** to perform the function of “updating said current probability model”—namely by updating the current probability model “according to the decoding of said current symbol.” *See, e.g., Medtronic*, 2005 U.S. Dist. LEXIS 10583, at *27-28 (excluding claim phrase from the function because it “describ[es] **how** the ‘controller means’ accomplishes the function” (emphasis added)). Similar to the phrase excluded by the court in *Medtronic*, here the phrase Respondents seek to add merely indicates how to perform the updating function. It is not part of the function itself. Therefore, the ALJ should conclude that the function for the “means for updating” term is “updating said current probability model.”

(b) *The Specification Provides Sufficient
Corresponding Structure for Performing the
Claimed Function—an Arithmetic Decoder.*

For largely the same reasons discussed earlier in connection with the first “means for decoding” term (as well as the other means-plus-function terms), the structure for the “means for updating” term is an arithmetic decoder (and its equivalents). *See, e.g., Palumbo*, 762 F.2d at 974 (the statute “requir[es] that the limitation shall be construed to cover the structure described in the specification and equivalents thereof”). As with all the means-plus-function terms in claim 15, the ’859 Patent specification clearly links the function to the corresponding structure of an arithmetic decoder. For the “means for updating” term, the specification clearly discloses an arithmetic decoder as the structure that performs the function.

The specification describes the function as a discrete numbered step 208. For example: “During a step 208, the current probability model P_c is updated.” JXM-002 (’859 Patent) at 10:22-23; 11:57-59. The specification depicts this same functionality in Figures 10 and 11, which are flow charts that illustrate arithmetic decoding methods according to particular embodiments. *Id.* at

4:21–24. Figure 11 is exemplary and depicts step 208 as “Update Pc,” where Pc is a reference to the current probability model. JXM-002 (’859 Patent) at FIG. 11; 11:57–59.

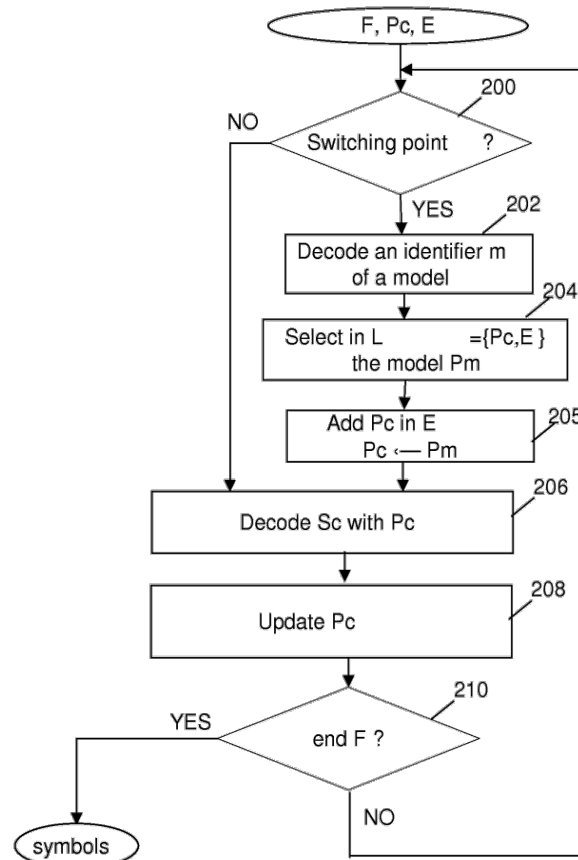


FIGURE 11

The written description (and associated figures) regarding step 208 mirror the “means for updating” term of claim 15. The specification explains that the function is updating the current probability model, which is described by the specification as follows: “During a step 208, the current probability model Pc is updated according to the method described previously in reference to the AC coding.” *Id.* at FIG. 11; 11:57–59.

The specification clearly identifies the structure that performs this function—an arithmetic decoder—and the specification clearly links that structure to step 208. *See MobileMedia*, 780 F.3d

at 1169 (“corresponding structure” exists if the “specification or prosecution history clearly links or associates that structure to the function recited in the claim”). As explained earlier in detail (in connection with the first “means for decoding” term), the specification describes the arithmetic decoder in terms of a “decoding device” 13 that has an “entropy decoding module” 1300 that implements “arithmetic decoding” according to the invention. JXM-002 (’859 Patent) at 13:32–35. As explained by Dr. Richardson, persons of ordinary skill in the art readily understand that the disclosed device is an arithmetic decoder. *See, e.g.*, CXM-0002 (Richardson Decl.) at ¶ 159; *see also, e.g.*, JXM-002 (’859 Patent) at 2:17-18 (the invention relates to “arithmetic” coding and decoding).

Regarding the arithmetic decoder (decoding device 13), the specification makes clear that the device (which includes an entropy decoding module) “implements the step[] . . . 208.” JXM-002 (’859 Patent) at 13:34. As discussed *supra*, the specification also depicts the arithmetic decoder (including the decoding module 1300) in Figure 13. As explained by Dr. Richardson, Figure 13 depicts a clear example of an arithmetic decoder in a way that a POSITA would understand how the structure supports the claimed function:

A POSITA would understand how an arithmetic decoder 13 is corresponding structure for performing the claimed function of “***updating said current probability model.***” The ’859 Patent explicitly states that the updating step is done “according to the method described previously in reference to the AC coding.” (JXM-002 (’859 Patent) at 5:45-46; 6:45-46; 8:56-57; 10:22-23; 11:58-59). In this method, the ’859 Patent explains, a symbol S_c takes possible values {a, b, c, d}, each with an associated probability. In this example, “[i]f the symbol S_c takes the value ‘b’ then in the step of updating of the current probability model P_c , the associated probability is increased, *i.e.* the occurrence number $F(S_c=b)$ is increased by 1.” (JXM-002 (’859 Patent) at 4:40-45). A POSITA, being familiar with the structure of an arithmetic decoder, would understand that this updating occurs within the decoder’s entropy decoding module (labeled 1300 in the ’859 Patent).

CXM-0002 (Richardson Decl.) at ¶ 196.

Furthermore, as discussed above in connection with the first “means for decoding” term, Complainants’ proposed structure—an arithmetic decoder and its equivalents—is consistent with precedent. *See, e.g., Hitachi Maxell*, 143 F. Supp. 3d at 495 (the structure for a “means for decoding” term was “an information decoder (107) and its equivalents”); *Koninklijke Philips*, 2017 U.S. Dist. LEXIS 106501, at *10 & *10 n.21 (the structure for a “means for decoding” term was “decoder and switch,” which “are well-known structural elements that can be implemented in hardware or software”).

As Dr. Richardson describes in the accompanying declaration, the structure of the arithmetic decoder is a well-known structural element in video coding. *See* CXM-0002 (Richardson Decl.), at ¶ 162. As numerous courts have held, decoders (like the arithmetic decoder here), constitute sufficient structure for performing claimed functions. *See, e.g., Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *67 (corresponding structure was a “Video Compress Decoder 1104a” and a “Digital/Digital Video Encoder (DDVE) 1104c”); *Dish Network*, IPR2015-01756 at 13 (corresponding structure of “a media player that includes an MPEG-compatible decoder”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (corresponding structure of a “voice coder” or “vocoder”).

For these reasons, the ALJ should adopt Complainants’ structure for the “means for updating” term: “an arithmetic decoder and its equivalents.”

(c) *Because the corresponding structure—an arithmetic decoder—is not a general-purpose computer or processor, no algorithm is needed.*

Unlike each of the previous means-plus-function terms, Respondents propose structure for this term (instead of contending that the specification “lacks sufficient corresponding structure,” as Respondents propose for the other means-plus-function terms). Respondents argue that the

arithmetic decoding device described in the specification is a general-purpose computer or processor, for which an algorithm must be provided, and that the structure is “an algorithm wherein an occurrence number for the current symbol is increased by 1.”

Respondents are incorrect that the disclosed structure (an arithmetic decoder) is a general-purpose computer or processor such that an algorithm is required. *See, e.g., See Qualcomm*, 6 F.4th at 1266-67 (ruling that the corresponding structure, a “power tracker,” “is not a general-purpose computer” and thus “does not trigger the algorithm requirement”); *Nevro*, 955 F.3d at 43 (ruling that “the specification clearly recites a signal or pulse generator, not a general-purpose computer or processor”); *Va. Innovation Scis.*, 2019 U.S. Dist. LEXIS 152664, at *69 (“no algorithm requirement applies” because the “[d]efendants fail[ed] to show that the ‘Video Compress Decoder 1104a’ and ‘Digital/Digital Video Encoder (DDVE) 1104c’ are general-purpose computers”); *High Point*, 2011 U.S. Dist. LEXIS 155932, at *61 (“voice coder” or “vocoder” structure did not create a “case in which an algorithm is required to complete the structure under § 112.”). In the context of the ’859 Patent, it is clear that the disclosed arithmetic decoder is not a general-purpose computer or processor. Moreover, consistent with the specification, Dr. Richardson’s declaration confirms that an arithmetic decoder is not a general-purpose computer or processor. As Dr. Richardson explains:

In my opinion, an arithmetic decoder is a decoder with a specific kind of entropy decoding module. It is not a general-purpose computer or processor. A general-purpose computer or processor can be configured to perform almost any type of computational task. An arithmetic decoder, by comparison, performs the specific function of receiving an arithmetic encoded bitstream and decoding the bitstream to generate decoded data. As I described in a 2010 book that I wrote and had published, an arithmetic decoder converts an arithmetic encoded bitstream that represents an entire sequence of syntax element values into a sequence of decoded variables or symbols, based on an estimate of the probability of occurrence of each variable or symbol. RXM-0026 (Richardson, I., 2010, *The H.264 Advanced Video Compression Standard* (2nd Ed.), my “H.264 Book”) at LENOVO_1373-00161346–349. An arithmetic decoder operates in a different way from decoders with other types of

entropy decoding modules, such as variable length decoders (RXM-0026 (H.264 Book) at LENOVO_1373-00161339-00161346; JXM-002 ('859 Patent) 1:34-54)) and is capable of overcoming limitations of variable length decoders, , which represent each syntax element value as an integer number of bits , for example by improving compression through efficiently representing a complete series of syntax element values as a single sequence of bits. (RXM-0026 (H.264 Book) at LENOVO_1373-00161346, LENOVO-1373-00161349).

CXM-0002 (Richardson Decl.), at ¶ 156.

For these reasons, Respondents are incorrect that the '859 Patent discloses using a general-purpose computer or processor for performing the function of “updating said current probability model.” The structure is instead an arithmetic decoder, and therefore no algorithm is needed.

*(d) Alternatively, the Algorithm of Step 208
Performed by the Arithmetic Decoder
Provides Sufficient Structure.*

To the extent the ALJ finds that the corresponding structure (arithmetic decoder) *is* a general-purpose computer or processor, the specification provides—as Respondents agree—a sufficient algorithm for performing the claimed function. The parties disagree, however, on what that algorithm is. Respondents’ position is that the algorithm is where “an occurrence number for the current symbol is increased by 1.” That is too narrow, and thus incorrect. As the specification makes clear, the algorithm is updating the current probability model according to AC coding.

The disclosures pertaining to step 208 (quoted and identified earlier) describe the algorithm for performing the claimed function of the “means for updating” term. *See, e.g.*, JXM-002 ('859 Patent) at FIGS. 10, 11, 4:33-54, 10:20-22, 11:57-61. Step 208 involves updating the current probability model P_c . *See* CXM-0002 (Richardson Decl.) at ¶ 195-196. As the specification explains, “[d]uring a step 208, the current probability model P_c is updated according to the method described previously in reference to the AC coding.” JXM-002 ('859 Patent) at 11:57–59. Step 208 is also depicted in flow charts such as Figure 11 (in the context of decoding):

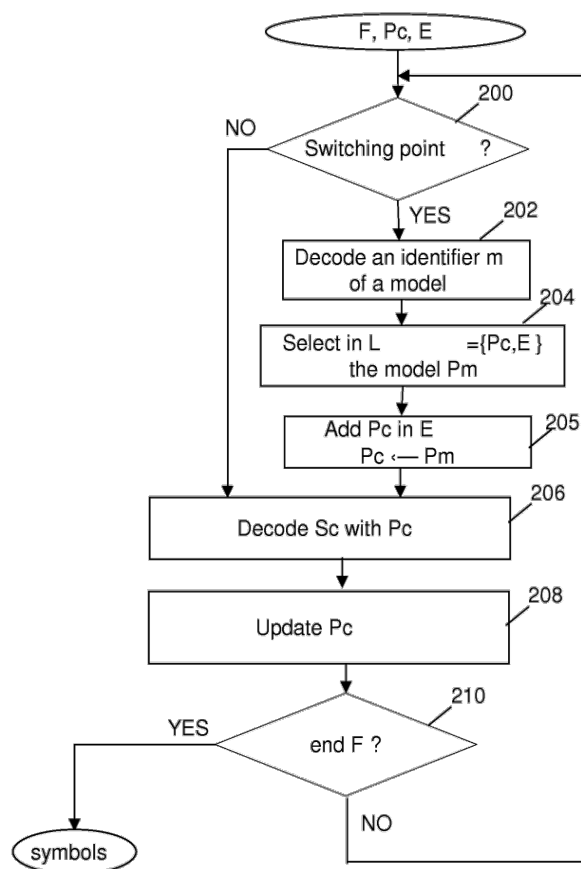


FIGURE 11

As explained by Dr. Richardson, a POSITA being educated in video coding and presented with the disclosures of the '859 Patent, would understand how the current probability model is updated:

The specification makes clear that at step 208 “the current probability model P_c is updated according to the method described previously in reference to the AC coding.” (JXM-002 ('859 Patent) at 10:22-23; 11:58-59). Updating according to AC coding includes the sub-steps of (1) determining what value a symbol took and (2) accordingly altering the probability of that value appearing. Regarding the first sub-step, the '859 Patent explains that it determines “[i]f the symbol S_c takes the value ‘b,’” for example. (JXM-002 ('859 Patent) at 4:40-41). Then, in the second sub-step, “the associated probability is increased, *i.e.* the occurrence number $F(S_c=b)$ is increased by 1.” (JXM-002 ('859 Patent) at 4:39-45). Therefore, this step-by-step

process provides an algorithm in understandable terms: that the value of a symbol is determined and its probability is increased

CXM-0002 (Richardson Decl.) at ¶ 198.

Thus, as Dr. Richardson's testimony makes clear, Respondents' proposed algorithm (that updating requires "an occurrence number for the current symbol [to be] increased by 1") is wrong. It inappropriately reads an additional requirement into the claim. Respondents' argument apparently stems from an example in the '859 Patent specification. In discussing exemplary embodiments shown in Figures 10 and 11, the patent describes updating a probability model in step 208 according to AC coding. JXM-002 ('859 Patent) '859 Patent at 11:57–59. The patent identifies two principal steps of AC coding, which includes updating the probability model generally:

AC entropy coding comprises principally the following steps to code a current symbol S_c : coding of the current symbol S_c according to a current probability model P_c , and updating the current probability model P_c according to the coding of the current symbol S_c .

JXM-002 ('859 Patent at 4:33–38). The '859 Patent provides an illustrative "example" of how updating occurs:

A probability model associates with each possible value of a symbol a probability. For example, if the symbol S_c takes the values in the set $\{a, b, c, d\}$ then a probability is associated with each value 'a', 'b', 'c' and 'd'. If the symbol S_c takes the value 'b' then in the step of updating of the current probability model P_c , the associated probability is increased, i.e. the occurrence number $F(S_c=b)$ is increased by 1.

JXM-002 ('859 Patent at 4:38–54) (emphasis added).

The Federal Circuit has made clear that while corresponding structure must be grounded in the specification, it can encompass more than just one embodiment. *See Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("Identification of corresponding structure may embrace more than the preferred embodiment. A means-plus-function claim

encompasses ***all structure*** in the specification corresponding to that element and equivalent structures.”) (emphasis added); *Monterey Rsch., LLC v. Vidal*, 2023 U.S. App. LEXIS 32712, at *7 (Fed. Cir. Dec. 12, 2023) (non-precedential) (“This court refrains from imputing the requirement of a unitary physical structure where the claims and specification do not require one, even when the only preferred embodiment in the claimed invention shows a single physical structure, so long as the specification doesn’t otherwise limit the invention to a single component.”).

A means-plus-function claim limitation is not limited to every piece of structure in an example embodiment. Instead, a court should look to only the structure needed to perform the claimed function. *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1334 (Fed. Cir. 2004). In *Golight*, a means-plus-function term required a “horizontal drive means for rotating said lamp unit in a horizontal direction.” *Id.* at 1333-34. And the “only structure identified in the [] patent is one which rotates through 360 degrees.” *Id.* at 1330. Despite this recitation, the court held that the 360° rotation was **not a required structure** of the claim. *Id.* at 1334-35. The court reasoned that “in construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use “to particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.” *Id.* at 1331 (Fed. Cir. 2004) (internal citations omitted) (emphasis added).

Other courts have also held that the proper structure of a means-plus-function claim term includes only **necessary** structural limitations for performing the function. For example, one court considered whether the means term “device for reading out a signal” and required the specific structure of a magnetic read head or optical read head. *Koninklijke Philips N.V. v. Asustek Comput. Inc.*, No. 15-1125-GMS, 2017 U.S. Dist. LEXIS 106501, at *13 n.4 (D. Del. July 11, 2017). The

specification disclosed no other type of read head, and these structures performed the claimed function. *Id.* However, the corresponding structure was not limited to these specific read heads. *Id.* The court ruled that the disclosed “magnetic and optical read heads are merely specific **embodiments of a reader** that are not necessary to perform the claimed function.” *Id.* Instead, a “broad construction of ‘reader’ . . . provide[d] the needed structural support.” *Id.*

Here, the algorithmic structure is not properly limited to situations where “an occurrence number for the current symbol is increased by 1” because increasing by 1 is “not necessary” to perform the claimed function. *Id.* Common sense indicates the explanatory example should not be read as a claim limitation. The example relied on by Respondents also states that the symbol takes the value “b”—but it is not a requirement of the claims that a symbol must take the value “b” for an update to occur. JXM-002 (’859 Patent at 4:38–54) (stating “*For example* . . . the symbol Sc takes the value ‘b’” (emphasis added)). Thus, “b” is just an example of the value a symbol can take, just like the example that an occurrence count can be increased by 1. In the same way that the example “b” should not be read into the claims, neither should the example result of increasing by 1.

The conclusion is supported by precedent. Like *Golight*, where the structure controlling the amount of rotation to 360 degrees was not part of the claim claimed means for rotating, here the structure of an occurrence number increasing by the amount of 1 is not necessary to achieve the function of updating. *See* 355 F.3d at 1334. And like *Koninklijke Philips*, the particulars of an example embodiment, like the specific “example” of updating, should not be read into the structure of the means-plus-function claim. 2017 U.S. Dist. LEXIS 106501, at *13 n. 4 “In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves,” which recites only updating, and is not limited to only updating by 1. *See Golight*,

355 F.3d at 1331. As Dr. Richardson opines, the “updating” function described in the specification can be performed with numbers other than 1:

In my opinion, a POSITA would understand that updating is not limited to an increase by 1 as probability or occurrence can be tracked in a number of ways. For example, in the known H.264 standard, the arithmetic decoder (BAC decoder) decodes using an estimate of the probability of each bit being 0 or 1, which can be adapted based on recently encoded values. Each probability estimate is recorded in the decoder as two variables, pStateIdx (which represents the probability of the Least Probable Symbol (LPS) occurring), and valMPS (which represents the value of the Most Probable Symbol (MPS)). The probability of a 0 or 1 occurring is thus fully represented by pStateIdx and valMPS. In H.264, updating of a probability model according to the decoding of a bit comprises updating pStateIdx and valMPS. In H.264, pStateIdx and valMPS are updated according to a state transition process. pStateIdx is updated by a value that may range from +1 to -22. valMPS may be updated by calculating 1-valMPS. Thus, in the well-known H.264 arithmetic decoding method, updating the probability of occurrence for a symbol, as represented by pStateIdx and valMPS, is not limited to increasing an occurrence number by 1 (RXM-0026 (H.264 Book) at LENOVO 1373-00161498-00161501).

CXM-0002 (Richardson Decl.) at ¶ 199.

Accordingly, the algorithm described in the '859 Patent is not “an algorithm wherein an occurrence number for the current symbol is increased by 1,” as Respondents propose. Instead, the algorithm is updating according to AC coding—which includes the sub-steps of (1) determining what value a symbol took and (2) accordingly altering the probability of that value appearing. CXM-0002 (Richardson Decl.) at ¶ 198. Thus, if the ALJ deems an algorithm necessary for construing this claim, the ALJ should reject Respondents’ narrow view that the algorithm is merely where “an occurrence number for the current symbol is increased by 1.” Instead, the algorithm is updating according to AC coding.

CONCLUSION

For the reasons above, Complainants respectfully request that the ALJ construe the terms as Complainants have set forth.

CERTIFICATE OF COMPLIANCE WITH G.R. 1.14.1

The undersigned certifies that the foregoing document is 129 pages, which complies with the 150 page limit set forth in G.R. 1.14.1.

/s/ Scott Stevens

M. Scott Stevens

Dated: January 26, 2024

Respectfully Submitted,

/s/ Scott Stevens

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this day, a true and correct copy of the foregoing document was served by the indicated means to the persons at the addresses below:

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