

Supplement the Preliminary Invalidity Contentions Apple served on December 11, 2024, and the First Supplemental Preliminary Invalidity Contentions Apple served on February 24, 2025.

I. RESERVATION OF RIGHTS AND OBJECTIONS

A. Asserted Claims

Plaintiff Advanced Coding’s Disclosure of Asserted Claims and Preliminary Infringement Contentions Under Patent Local Rules 3-1 and 3-2, dated September 18, 2024 (“Advanced Coding’s Infringement Contentions”), identify the following Asserted Claims from the Asserted Patents:

U.S. Patent No.¹	Asserted Claims
8,090,025 (“the ’025 patent”)	1, 3-4, and 6-10
9,986,303 (“the ’303 patent”)	1-2
10,218,995 (“the ’995 patent”)	1-4 and 8-11
10,218,448 (“the ’448 patent”)	1-3
8,230,101 (“the ’101 patent”)	1-5 and 7
7,804,891 (“the ’891 patent”)	1-4, 6, and 8-9

Apple contends that the above identified claims asserted by Plaintiff in its P.R. 3-1 Disclosure of Asserted Claims and Infringement Contentions (collectively the “Challenged Claims”) are invalid.

B. General Reservation of Rights

These Second Supplemental Preliminary Invalidity Contentions, along with the information and documents that Apple produces herewith, are provisional in nature and subject to

¹ The ’025 patent, the ’303 patent, the ’995 patent, the ’448 patent, the ’101 patent, and the ’891 patent are collectively referred to as the “Asserted Patents.”

further revision or supplementation. Consistent with the Patent Rules, Apple reserves the right to amend these contentions should Advanced Coding: (1) provide any information that it failed to properly provide in its Infringement Contentions; (2) amend its Infringement Contentions; (3) produce documents evidencing conception and reduction to practice that it failed to produce; or (4) attempt to rely upon any information during claim construction proceedings, at trial, in a hearing, or during a deposition that it failed to provide in its Infringement Contentions. Apple further reserves the right to amend these contentions in light of the Court's claim construction rulings or based on further discovery or Court rulings.

C. Ongoing Investigation

Discovery in this case is ongoing; and Apple's investigations are continuing. Apple expressly reserves the right to amend or supplement these disclosures based on additional information obtained through continued formal discovery or other means pursuant to Rule 26(e), Fed. R. Civ. P. Discovery is ongoing, and Apple has not yet completed its search for and analysis of relevant prior art and other information, some of which is in the possession of third parties.

Apple further reserves the right to revise, amend, or supplement the information provided herein, including by identifying, charting, and relying on additional information, references, systems, and devices, should Apple's further search and analysis yield such additional information, references, systems, or devices, consistent with the Third Amended Docket Control Order, Discovery Order, Local Rules of this Court, and the Federal Rules of Civil Procedure. In addition, Apple reserves the right to supplement or amend the positions taken and information disclosed in these Second Supplemental Preliminary Invalidity Contentions, including without limitation, the prior art and grounds of invalidity set forth herein under 35 U.S.C. §§ 102, 103 or 112, to consider information or defenses that may come to light because of Apple's discovery efforts; additional information obtained as to the priority date(s) of the Challenged Claims; testimony or documents

produced by a party or non-party; and positions that Advanced Coding might take or amend concerning infringement or invalidity issues. For example, Apple may seek further discovery from third parties believed to have knowledge, documentation, or corroborating evidence concerning items of prior art, including prior art listed in the Exhibits hereto. Such third parties may include, without limitation, the authors, inventors, assignees, owners, or developers of the references and technologies listed in these disclosures. Moreover, Apple reserves the right to assert invalidity under 35 U.S.C. §§ 102(c), (d), (f), or (g) to the extent that discovery or further investigation yields information forming the basis for such grounds for invalidity.

Apple further reserves the right to rely upon prior art cited in the file histories of the Asserted Patents and related U.S. and foreign patent applications as invalidating references or to show the state of the art. Apple further reserves the right to rely upon additional prior art to show the state of the art.

D. Claim Construction

Claim construction exchanges for this action have not yet occurred. Accordingly, Apple reserves the right to modify, amend, or supplement its Second Supplemental Preliminary Invalidity Contentions in accordance with claim construction rulings from this Court, claim construction positions taken by Advanced Coding, or to the extent permitted by this Court. Apple also reserves the right to modify, amend or supplement its Second Supplemental Preliminary Invalidity Contentions upon Advanced Coding's modification of its asserted claim constructions, including as adopted by Advanced Coding in its Infringement Contentions.

Apple's Second Supplemental Preliminary Invalidity Contentions do not represent its agreement or view as to the meaning of any claim term contained therein. By including prior art that anticipates or renders obvious claims based on the construction apparently applied by Advanced Coding to its claims, Apple's Second Supplemental Preliminary Invalidity Contentions

are not—and should not be interpreted as—adoptions or admissions as to the accuracy of that scope or construction. Nothing in Apple’s Second Supplemental Preliminary Invalidity Contentions should be deemed to be an admission regarding the scope of any claims or the proper construction of those claims or any terms contained therein. Nor should anything contained herein be understood or deemed to be an express or implied admission or contention regarding the proper construction of any terms in any asserted claim, or regarding the alleged infringement of that claim.

Unless otherwise stated herein, Apple takes no position on any matter of claim construction in these Second Supplemental Preliminary Invalidity Contentions. Apple reserves the right to propose any claim construction it considers appropriate and to contest any claim construction it considers inappropriate. Apple also reserves the right to argue that certain additional claim terms, phrases, and elements are indefinite, lack written description, are not patentable, are not novel or are otherwise invalid under 35 U.S.C. §§ 101 or 112.

Apple reserves the right to further supplement or modify the positions and information in these Second Supplemental Preliminary Invalidity Contentions, including without limitation, the prior art and grounds of invalidity set forth herein, after the Challenged Claims have been construed, in accordance with the Local Patent Rules and the Court’s Orders.

II. SECOND SUPPLEMENTAL PRELIMINARY INVALIDITY CONTENTIONS

A. Second Supplemental Invalidity Contentions Pursuant to the Scheduling Order

Subject to Apple’s reservation of rights herein, and regarding each asserted claim in Advanced Coding’s Infringement Contentions, Apple provides these Second Supplemental Preliminary Invalidity Contentions in accordance with the Third Amended Docket Control Order, Discovery Order, and Local Patent Rule 3-3. Attached as Exhibit G is a list identifying each item

of prior art that either anticipates or renders obvious each asserted claim and that Apple has identified to date.

Apple further reserves the right to use any portion of the patent, publication, related publications, commercial embodiments of the publication, and other evidence discovered in this litigation to demonstrate or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted. Where Apple identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure and any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well.

A person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. Apple therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions. Identified portions are exemplary only. Apple also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references.

Apple also identifies and hereby incorporates by reference as if set forth fully herein the prior art references identified as anticipating or rendering obvious Challenged Claims in any Patent

Office filing or proceeding challenging the validity of the Asserted Patents in the U.S. or anywhere in the world. Such references may be from any prior or future reissue, reexamination, or *inter partes* review (IPR) of the Asserted Patents. Further, Apple incorporates by reference all filings, prior art references identified therein, and supporting expert declarations in the Asserted Patents. Apple also incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution. Apple further relies on and incorporates by reference, as if originally set forth herein, all invalidity positions, and all associated prior art, claim charts and motivations to combined, disclosed to Advanced Coding by Apple on December 11, 2024 and February 24, 2025 in this litigation, and by present or former defendants in any lawsuits or other proceedings, including at least *Advanced Coding Techs. LLC v. Google LLC*, Case No. 2:24-cv-00353,² *Advanced Coding Techs. LLC v. LG Elecs. Inc.*, Case No. 2:22-cv-00501, *Advanced Coding Techs. LLC v. Samsung Elecs. Co., Ltd.*, Case No. 2:22-cv-00499, and *inter partes* review and/or reexamination proceedings involving one or more Asserted Patents, or by potential or actual licensees to any of the Challenged Claims. This includes Exhibits B and B-enc and Exhibits B-1 through B-28 and B1-enc through B27-enc for the '025 patent, Exhibit D-enc and Exhibits D-1-enc through D-31-enc and D-33-enc and D-34-enc for the '448 patent, Exhibits E and E-enc and Exhibits E-1 through E-29 and E1-enc through E28-enc for the '303 patent and Exhibits F and F-enc and Exhibits F-1 through F-34 and F-1-enc through F-31-enc and F-33-enc through F-34-enc for the '995 patent (including as referenced in the next section relating to motivations to combine). For example, Apple identifies and intends to rely on the prior art and invalidity arguments raised in IPR2025-

² Google served invalidity contentions on Advanced Coding on January 24, 2025. Google produced to Apple on February 27, 2025, Google's Amended Invalidity and Subject Matter Eligibility Contentions as served on Advanced Coding on February 24, 2025. Google has also moved to Amend its Invalidity Contentions on April 29, 2025.

00991 ('025), IPR2025-00983 ('303), IPR2025-00984 ('995 decoding), IPR2025-01158 ('995 encoding), IPR2025-01070 ('448), IPR2025-01103 ('101), IPR2025-01221 ('891) (collectively, "Apple IPRs"), to the extent permitted consistent with Apple's stipulations, and raised in IPR2025-00998 ('025), IPR2025-00999 ('303), IPR2025-01000 ('995), and IPR2025-01161 ('891) and subsequent petitions filed by Google LLC (collectively, "Google IPRs").³

To the extent any limitation of an Asserted Claim is deemed not to be exactly disclosed by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. Numerous prior art references, including those identified by Apple herein, reflect common knowledge and the state, scope and content of the prior art before the priority dates of the Asserted Patents. *See Graham v. John Deere Co.*, 383 U.S. 1, 35-36 (1966).

Furthermore, to the extent any limitation of an Asserted Claim is deemed to not be exactly disclosed by an item of prior art, then the claim is rendered obvious by combination of the prior art item with one or more other items of prior art identified in these disclosures. For example, Apple reserves the right to rely on any claim chart in Exhibits A-1 through F-34, B-1-enc through B-27-enc, D-1-enc through D-31-enc and D-33-enc through D-34-enc, E-1-enc through E-28-enc, and F-1-enc through F-31-enc and F-33-enc through F-34-enc, standing alone, in combination with the reference(s) in any other claim chart, in combination with any of the references listed in Exhibits A through F, B-enc, D-enc, E-enc, and F-enc, in combination with Applicant's Admitted Prior Art, and/or in view of the knowledge of a person of ordinary skill in the art. In addition, Apple reserves the right to rely on any reference listed in Exhibits A through F and B-enc, D-enc,

³ Apple reserves the right to refer to additional documents as they are filed in each IPR proceeding.

E-enc, and F-enc, in combination with the reference(s) in any claim chart in Exhibits A-1 through F-34, B-1-enc through B-27-enc, E-1-enc through E-28-enc, D-1-enc through D-31-enc, D-33-enc through D-34-enc, and F-1-enc through F-31-enc, and F-33-enc through F-34-enc, in combination with any of the other references listed in Exhibits A through F, B-enc, D-enc, E-enc and F-enc, in combination with Applicant's Admitted Prior Art, and/or in view of the knowledge of a person of ordinary skill in the art. Though these claim charts provide illustrative citations to where each element may be found in the prior art references or in their combination, the cited references may contain other disclosures of each claim element as well, and Apple reserves the right to argue any claim elements of the Challenged Claims of the Asserted Patents are disclosed in non-cited portions of these references. For at least the reasons described above and below in the examples provided as well as in the claim charts appended hereto, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references.

B. Motivation to Combine

In *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) (“*KSR*”), the U.S. Supreme Court held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, Apple believes that no showing of an express motivation to combine prior art is required to combine the references disclosed in Exhibits A-1 through F-34, B-1-enc through B-27-enc, D-1-enc through D-31-enc, D-33-enc through D-34-enc, E-1-enc through E-28-enc, and F-1-enc through F-31-enc, and F-33-enc through F-34-enc, or Exhibits A through F and A-enc, B-enc, D-enc and F-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference as each combination of art would have no unexpected results, and at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S.Ct.

at 1739-40 (rejecting the Federal Circuit’s “rigid” application of the teaching, suggestion, or motivation to combine test, and instead espousing an “expansive and flexible” approach).

The Supreme Court in *KSR* held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton” and “in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *Id.* at 1742. “In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim.” *Id.* at 1741-42. “Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 1742. In particular, the Supreme Court emphasized the principle that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 1739. A key inquiry is whether the “improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. In *In re Inland Steel Co.*, 265 F.3d 1354 (Fed. Cir. 2001), the Federal Circuit allowed two references to be combined as invalidating art when “[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well.” *Id.* at 1362.

Although Apple contends that no specific showing of motivation to combine is necessary for the references cited in the attached Exhibits, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, Apple hereby preliminarily identifies

specific motivations and reasons to combine the cited art. One or more combinations of the prior art references identified herein would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified herein because there were only a finite number of predictable solutions or because known work in one field of endeavor prompted variations based on predictable design incentives or market forces either in the same field or a different one. In addition, the combination of prior art references identified herein would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes the interrelated teachings of multiple prior art references; the effects of demands known to the community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the Challenged Claims; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. The claimed subject matter required nothing more than combining prior art elements according to known methods to yield predictable results. One of ordinary skill in the art would have been motivated to combine the prior art, in that it required only simple substitutions of one known element for another to obtain predictable results. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Exhibits A-1 through F-34, B-1-enc through B-27-enc, D-1-enc through D-31-enc, D-33-enc through D-34-enc, E-1-enc through E-28-enc, F-1-enc through F-31-enc, F-33-enc through F-34-enc, and/or Exhibits A through F, B-enc, D-enc, E-enc and F-enc, as illustrated in the Exhibits or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. The reasons or motivation to combine the prior art would include, for example, the fact that the prior art for the Challenged Claims is in the same field, and one of ordinary skill in the art implementing a device, system, or method in accordance with the Challenged Claims would have been motivated to investigate the various related existing devices, systems, methods, publications or patents identified in these contentions to address the particular needs. Indeed, the claimed subject matter required nothing more than combining prior art elements according to known methods to yield predictable results. One of ordinary skill in the art would have been motivated to combine the prior art, in that it required only simple substitutions of one known element for another to obtain predictable results. Moreover, these references cross-reference and discuss one another, illustrating the close technical relationship among them.

To the extent any piece of prior art refers to or discusses other pieces of prior art, either expressly or inherently, it would have been obvious to combine those pieces of prior art for that reason. In addition, design incentives and other market forces would have prompted those combinations and modifications. Furthermore, prior art references may arise from common assignees or multiple companies operating within the relevant subject matter. The motivation to combine references includes the common objectives and subject matter of the identified references.

Accordingly, the teachings of the individual prior art references, combined with the industry knowledge of a person of ordinary skill in the art at the time of the alleged invention of the Asserted Patents, would render obvious the Challenged Claims.

1. The '025 Patent:

A POSITA would have been motivated to combine any of the systems that use known mathematical techniques such as Polyharmonic Local Cosine Transform (PHLCT) and/or Poisson's Equation for signal and/or estimation included in Exhibits B-1 through B-28, B-1-enc through B-27-enc, and/or Exhibits B and B-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with video coding systems. A POSITA would have been motivated to combine the teachings of these references because the importance of removing or avoiding discontinuities at block boundaries was recognized, e.g., Sekiguchi at ¶15 (“when coding is carried out with a high compression ratio, a satisfactory rendition of the residual signal is not possible and the discontinuous boundaries are sometimes apparent and perceived as distortion”), and the techniques to estimate signals and/or motion between boundaries were known, e.g., Saito at 4 (“Want to improve the quality of images (e.g., less blocking artifacts / visible discontinuities between blocks) reconstructed from the low bit rate JPEG files.”), Lee 725 at ¶60 (“the present invention performs motion determination on a block-by-block basis during inter-screen encoding of a video, but does not obtain a motion vector as in the prior art, but only determines motion using pixel values at block boundaries, thereby obtaining a motion vector”); *id.* at Abstract, ¶¶ 26, 28, 31, 49. Additional references demonstrating well-known techniques for removing or avoiding discontinuities at block boundaries and estimating signals between boundaries include Nogaki, Averbuch, Braverman, Orchard, Zhao-Saito-Yamatani. The combination would apply known techniques in order to yield predictable results. The combination

would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine MPEG-4 1999, H.263 1999, and H.264 2003 standards for encoding and decoding video bitstreams included in Exhibits B-1 through B-28, B-1-enc through B-27-enc, and/or Exhibits B and B-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with references that do not identify these video coding standards because these were well-known codec functionalities. A POSITA would have understood that these standards provide known techniques—not necessarily expressly present in all other references—such as quantizing, variable length encoding, multiplexing, and motion compensation, and would have made the coding systems compatible with large numbers of other products. The combination would apply known techniques in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine known decoding techniques included in Exhibits B-1 through B-28, B-1-enc through B-27-enc, and/or Exhibits B and B-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known encoders, and vice versa, in order to ensure the encoding and decoding processes mirror each other. A POSITA would have understood that, in order to ensure there is proper error tracking between the encoder and decoder, they must both be capable of performing the same error concealment operations. For example, Girod explains that, in order to perform error tracking, “the coder has to know the decoder’s concealment technique” and that error tracking “does not require any modifications of the bit stream syntax of the motion-compensated hybrid coder” and “is

therefore fully compatible with standards such as ... H.263.” Girod, 9; *see also* Wada, 2 (“The same error concealment as is performed at the receiver is carried out in the local-decoded frame stored.”). The combination would apply known techniques in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine known mathematical methods to estimate signals between boundaries (such as when applied to motion compensation) included in Exhibits B-1 through B-28, B-1-enc through B-27-enc, and/or Exhibits B and B-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, to known motion compensation techniques taught by references in Exhibits B-1 through B-28, B-1-enc through B-27-enc, and/or Exhibits B and B-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference. A POSITA would have been motivated to combine the teachings of these references for efficient transmission of high-fidelity media that mitigates blocking artifacts and/or visible discontinuities. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

2. The '303 Patent:

A POSITA would have been motivated to combine coding, transmitting, receiving, decoding, and reconstructing basic video images representing low-quality video that can be reconstructed into high-quality video by coding, transmitting, receiving, decoding, and reconstructing enhancement video images with the basic video images included in Exhibits E-1 through E-29, E-1-enc through E-28-enc and/or Exhibits E and E-enc, or the Apple IPRs or Google

IPRs, or other references and exhibits incorporated herein by reference, with other video coding systems. A POSITA would have understood that the systems and methods for applying encoding, decoding and reconstruction of scalable video to achieve the best-possible tradeoff between performance, latency, and visual quality were intended to be incorporated into additional codecs and systems, which Demircin acknowledges. Demircin, [0023] (“consumer applications require transmission of audio and video at high bit rates, and require a low end-to-end delay (low latency). Transmission of both stored and live video may be required.”); [0035] (“Scalable Video Coding (SVC) is an extension of the H.264/MPEG AVC video codec. H.264/MPEG AVC and SVC are international video coding standards jointly developed by ITU and ISO. SVC supports scalability in the spatial, temporal and SNR (signal-to-noise ratio) dimensions. SVC supports coarse-grained SNR scalability (CGS) by coding the video data as a layered structure. SVC supports medium grain scalability (MGS) by coding the video data with quality identifiers within enhancement layers. A base layer provides a minimum level of video quality, and may provide compatibility with H.264/AVC.”). Given that this processing was well-known codec functionality (including processing and decoding of scalable video in response to available performance, latency, and visual quality) used for reconstructing a video stream in various visual qualities, (*see, e.g.*, Demircin, Choi, Cilli, Kesaniemi, Kimoto, Rossato, Ryu, Senbel, Su, Tillman, and Wada) a POSITA would have been motivated to combine the teachings of these references. The combination would apply known techniques to applying decoding and reconstruction of scalable video, to codecs, systems, and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine known decoding techniques included in Exhibits E-1 through E-29, E-1-enc through E-28-enc and/or Exhibits E and E-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known encoders, and vice versa, in order to ensure the encoding and decoding processes mirror each other. A POSITA would have understood that, in order to ensure there is proper error tracking between the encoder and decoder, they must both be capable of performing the same error concealment operations. For example, Girod explains that, in order to perform error tracking, “the coder has to know the decoder’s concealment technique” and that error tracking “does not require any modifications of the bit stream syntax of the motion-compensated hybrid coder” and “is therefore fully compatible with standards such as ... H.263.” Girod, 9; *see also* Wada, 2 (“The same error concealment as is performed at the receiver is carried out in the local-decoded frame stored.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine the use of Groups of Pictures (GOPs) consisting of an intra-coded picture and a plurality of inter-prediction coded pictures included in Exhibits E-1 through E-29, E-1-enc through E-28-enc, and/or Exhibits E and E-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with other video coding systems. Setting hierarchical pictures into GOPs was well known and used as early as 1993, having been described in MPEG standards as well as in various patents. And it was well known that this was applicable to hierarchical coding methods including MPEG and H.264, which included GOPs. *See, e.g.,* Kimoto, [0038]. A POSITA would have understood that prioritizing

the transmission of base layer (or lower layer) data over the enhancement layer (or upper layer) data, and the synthesis of lower and upper layer data later in time were well known. *See, e.g.,* Kimoto, [0040]-[0041], [0067]; Demircin, [0129]-[0132]. Using GOPs would have also aided in the ability of a viewer to perform random access viewing of the synthesized data. GOPs were designed for random access, and a POSITA trying to reconstruct a video for subsequent (and non-real-time) viewing would have recognized the advantages of GOP for implementing random access in video playback. Moreover, organizing pictures in the lower and upper layer data into GOPs would aid Kimoto in decoding a video stream by allowing it to recognize sets of pictures that can be decoded without reference to any other pictures in the stream, and would increase the efficiency and reliability of the picture alignment between the upper layer data and the corresponding lower layer data during reproduction, and would beneficially reduce the size of the video stream, particularly since the inter-prediction coded pictures typically undergo greater compression and include less data than the intra-coded picture. Such a combination would have predictable results. According to MPEG1, a GOP may be of any length. The length of the GOP is flexible and may be tailored to an application. GOP length can be selected based on the compression rate, the desired video quality, the bandwidth for transmission, the decoding time and resources, etc. The shorter the GOP, the fewer inter-prediction coded pictures, which usually means higher bitrate. The longer the GOP, the more inter-prediction coded pictures, which usually means higher compression. Therefore, the size and structure of the GOP is adaptable based on various implementation scenarios. Applications requiring random access, fast-forward playback, or fast and normal reverse playback may use relatively short groups of pictures. Groups of pictures may also be started at scene cuts or other cases where motion compensation is ineffective. The

combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

3. The '995 Patent:

A POSITA would have been motivated to combine known use of a video stream with a higher spatial resolution in an enhancement layer included in Exhibits F-1 through F-34, F-1-enc through F-31-enc, F-33-enc to F-34-enc, and/or Exhibits F and F-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known coding systems. For example, such an enhancement layer would allow support of display devices that can render video at higher resolutions than the video coded in a base layer. Segall, 1 (“[t]he resolution diversity of current display devices motivates the need for spatial scalability.”). A POSITA would have understood that, as “larger format, high definition displays are becoming common in consumer applications, with displays containing over two million pixels readily available,” the provision of coded video streams at a lower resolution in the base layer as well as a higher-resolution stream in an enhancement layer would have allowed for support of a broader range of display devices through “resolution diversity.” *Id.* A POSITA would have understood this allows for bit rate adaptation. *Id.* A POSITA would have understood that implementing this functionality is straightforward, as the decoder of a higher-definition display could switch from decoding a lower-layer stream to a higher-layer stream at a higher spatial resolution when the transmission rate of a streaming video program increases sufficiently to allow the decoder to successfully receive and decode the additional video data in the second enhancement layer. *Id.* For example, a POSITA would have understood that standard scalable coding techniques “support[ed] multilayer scenarios including special multiple spatial scalability layers and the mixing of spatial scalability layers with other layers that provide temporal or quality scalability.” *Id.*, 3. In this regard, a POSITA would have been motivated to multiplex/demultiplex base and enhancement

layer streams to support transmission of the respective streams over a communication channel, while also facilitating synchronization of the streams by reference to common timing information in the multiplexed signal. A demultiplexer at the decoder also would have been obvious to separate the streams for processing of each layer by respective portions of the decoding device. *See, e.g.*, Lu, 1 (describing how MPEG standards “define[] a multiple multiplexed structure for combining elementary streams, including coded audio, video and other data streams, and specifies means of representing the timing information needed to replay synchronized sequences in real-time”); Kim, [0079] (“demultiplexing unit 1010 separates a bitstream for each layer from an input scalable bitstream and outputs a base layer bitstream and an enhancement layer bitstream”), FIG. 10. Multiplexing/demultiplexing the layered streams in the combination also would have been obvious as a predictable application of known techniques to yield predictable results for which a POSITA would have had a reasonable expectation of success, especially since multiplexing and demultiplexing layered bitstreams was commonly performed before the ’995 Patent. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine upsampling and interpolation techniques included in Exhibits F-1 through F-34, F-1-enc through F-31-enc, F-33-enc through F-34-enc, and/or Exhibits F and F-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known coding systems that select between reference pictures included in Exhibits F-1 through F-34, F-1-enc through F-31-enc, F-33-enc through F-34-enc, and/or Exhibits F and F-enc, or the Apple IPRs or Google IPRs, or other

references and exhibits incorporated herein by reference. Upsampling and interpolation are basic video processing techniques that a POSITA would have understood are generally applicable to video coding systems. *See, e.g.,* Martins. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine known decoding techniques included in Exhibits F-1 through F-34, F-1-enc through F-31-enc, F-33-enc through F-34-enc, and/or Exhibits F and F-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known encoders, and vice versa, in order to ensure the encoding and decoding processes mirror each other. A POSITA would have understood that, in order to ensure there is proper error tracking between the encoder and decoder, they must both be capable of performing the same error concealment operations. For example, Girod explains that, in order to perform error tracking, “the coder has to know the decoder’s concealment technique” and that error tracking “does not require any modifications of the bit stream syntax of the motion-compensated hybrid coder” and “is therefore fully compatible with standards such as ... H.263.” Girod, 9; *see also* Wada, 2 (“The same error concealment as is performed at the receiver is carried out in the local-decoded frame stored.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

As confirmed by the examiner during the prosecution of the '995 Patent, the Challenged Claims of the '995 Patent recite well-known components and techniques such as “the use of super-resolution processors in scalable video coding systems” (*see, e.g.*, 10/25/2016 Non-Final Rejection at 8, 14, 18, 20 (citing Ong)), “the use of resolution converters for multi-resolution encoding and decoding to enhance current and reference frames” (*see, e.g.*, 10/25/2016 Non-Final Rejection at 6, 9, 15 (citing Holcomb); 5/17/2017 Final Rejection at 4, 7, 10-11, 16 (same); 10/4/2017 Non-Final Rejection at 7, 11, 14, 20 (same); 5/23/2017 Final Rejection at 5, 9, 13, 18 (same)) and “to implement resampling of pixels” (*see, e.g.*, 5/23/2017 Final Rejection at 5, 9, 13, 18 (citing Holcomb)), “enlarging a set of decoded pictures with a second resolution higher than the standard resolution” (*see, e.g.*, 5/17/2017 Final Rejection at 5, 8, 12, 16-17 (citing Suzuki); 10/4/2017 Non-Final Rejection at 8, 11, 15, 20 (same) and “enlarging a set of decoded pictures with a second resolution higher than the standard resolution and implementing an interpolation of pixels” (*see, e.g.*, 5/23/2017 Final Rejection at 6, 10, 14, 19 (citing Barkley)).

4. The '101 Patent:

A POSITA would have been motivated to combine any of the references that describe transferring digital content between a media server and a separate network storage device described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known content delivery network (CDN) arrangements. A POSITA would have understood that distributed storage of digital content among various network devices, rather than on a single network device like a media server, advantageously improves the resiliency of the CDN and frees up space on the media server to store select digital content closer to users, i.e., at the edge of the network. *See, e.g.*, Gunsaleen [0017] (“[Media server] Environment 10 includes a media server 12 that has access to digital media assets stored in online storage 14” and “can also access digital media assets stored in tertiary

storage 16.”); Risan, 7:14–27 (“Network 200 includes a web server 250 and content server 251 which are communicatively coupled to Internet 201 [C]omputers and servers of network 200 are well suited to be communicatively coupled in various implementations.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

Moreover, a POSITA would have been motivated to combine any of the references that describe communication between a media server and a requesting client device such that the client device can retrieve requested content directly from a distributed network storage device storing the content described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known content delivery systems. *See, e.g.*, Niell [0051] (“It is therefore possible for a user of the system to use the PDA 205 to cause a media file stored on the media server 203 to be played either on the server 203 or via any number of devices within direct or indirect communication range of the media server 203”); Fransdonk [0256] (“[T]he content provider 16 transmits the encrypted content to a content distributor 20, for storage on the local content server 40. Alternatively, the content provider 16 may . . . distribute the encrypted content directly to a content destination 22.”). A POSITA would have recognized that this would advantageously streamline content retrieval and minimize any latency due to greater network traffic through the media server. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to

try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine references that teach a media server sending information identifying a network storage device storing requested content and related data about the content to the requesting client device described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known content delivery systems. A POSITA would have understood that such a combination would advantageously allow a client device to retrieve the content directly from the network storage device. *See, e.g.,* Maeda at [0049] (“[T]he recording controller 32 outputs management information The management information includes identification information, source information, and the use limit information for each content recorded on the hard disk 81 The source information represents an apparatus from which the content can be retrieved.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have also been motivated to combine references that disclose restoring digital content held in a network storage device to the media server’s storage described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known content delivery systems. A POSITA would have understood that such a combination would advantageously improve retrieval of certain digital content by allowing the system to dynamically access data, e.g., to account for higher demand in one location and allowing additional resources to host and access material. *See, e.g.,* Gunsaleen

[0019] (“Media server 12 can also automatically purge less popular assets from the disk storage 14 to make room for those assets in demand. Thus, in this scheme, more popular assets will end up on disk storage 14, while less popular assets will remain in tertiary storage 16.”). For example, a POSITA would have understood that storing frequently requested content at the media server, with which the client device maintains a direct communication link, obviates the need to transfer requested content over multiple links to reach the client from a network storage device. *See, e.g.,* Gunsaleen [0019]. Moreover, the media server would not need to separately provide information identifying a network storage device storing the requested content to enable the user’s retrieval of the content. Thus, returning select digital content from a network storage device to the media server also advantageously reduces the network traffic needed to effectuate content delivery. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have further been motivated to combine references that disclose enforcing restrictions on transferring certain digital content from the media server to distributed network storage described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known content delivery systems. *See, e.g.,* Yoo [0069] (“If a match does not exist, the control unit 202 displays a warning message instead of reproducing the data of the recording medium 10 (S45). In this case, the warning message can include a sentence or icon indicating that the user’s command is not executable.”); Kim, 10:29–56 (“The RI [Rights Issuer] 20 checks whether it can transmit the RO [Rights Object] that the first device 10 has requested to transfer to the second device 11. If the

RO cannot be transmitted to the second device 11, the RI 20 determines that transfer of the RO cannot be successfully performed (step S26) and transmits a ROAP trigger to the first device 10 (step S27) . . . includ[ing] information indicating that the RO of the first device 10 cannot be transferred to the second device 11.”). For example, a POSITA would have understood that certain digital contents may be subject to digital rights restrictions that prohibit the content from being stored on certain devices. *See, e.g.*, Yoo [0125] (“Since data reproduction is restricted in a disapproved geographical region but is allowed in an approved geographical region . . . it is able to prevent data from being distributed to a place not specified by a copyright proprietor. Hence, a right of the copyright proprietor can be protected.”). Attempting to transfer such content from one digital content store to a restricted device may result in loss of the content if a network failure occurs during transfer. Thus, restrictions for transferring content to distributed network storage advantageously protects digital content licensors’ rights and protects the CDN from loss of data. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success..

A POSITA would have been motivated to combine references that describe providing a user with a list of digital contents available through the CDN described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known CDN systems. A POSITA would have understood that this advantageously permits users to browse through available content on their display to identify and select desired content. *See, e.g.*, AbiEzzi [0006] (“The media server keeps track of the titles loaded in the jukebox and generates and caches a directory of the titles stored in the

jukebox that can be presented to a user for the user to navigate the titles and select a title for viewing on a display device.”); Risan, 30:39–58 (“[W]eb server 250 transmits to client computer system 210 a media content play list together with the unique user ID associated with the logged-in user.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine references that disclose arranging the digital content in a tree structure described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known CDN systems to advantageously provide additional context to users deciding which content to request. *See, e.g.*, AbiEzzi [0022] (“[T]he media server 100 . . . uses the downloaded information to build a user-friendly directory 116 of the titles loaded in the DVD jukebox 80”); Yoo [0037] (“[I]n a file structure according to the present invention, at least one BDMV directory exists below one root directory. An index file (“index”) and an object file (“MovieObject”) as general file (higher file) information to secure interactivity with a user exist within the BDMV directory.”). Presenting digital content in an intuitive and informative manner advantageously improves the user experience with the CDN. *See, e.g.*, AbiEzzi [0020]–[0021] (describing an “enhanced home automation experience” wherein “the media server 100 enables the contents of the jukebox 80 to be selected and viewed on display devices”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to

try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine references that disclose indicating where the content is stored in the CDN described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known CDN systems to advantageously facilitate seamless retrieval of requested content. *See, e.g.*, Maeda at [0049] (“[T]he recording controller 32 outputs management information The management information includes identification information, source information The source information represents an apparatus from which the content can be retrieved.”). Identifying to a requesting device a location where requested digital content is stored in the CDN advantageously simplifies retrieval by enabling the device to retrieve the content directly from its stored location. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have further been motivated to combine references that teach the media server device is a media player described in Exhibits C-1 through C-13 and/or Exhibit C, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known CDN systems to advantageously minimize the number of devices needed to effectuate the CDN. *See, e.g.*, Niell [0052] (“It is therefore possible for a user of the system to use the PDA 205 to cause a media file stored on the media server 203 to be played either on the server 203 or via any number of devices within direct or indirect communication range of the media server

203.”). A POSITA would have understood that implementing media server functionality into a media player advantageously obviates the need for a separate device to operate the media server. Moreover, because media players are operated by users, a media player with media server functionality leverages the benefits of edge networking in the CDN by moving some CDN computing functions closer to users. *See, e.g.*, Niell [0006] (“[T]he present invention . . . requires less hardware, whilst increasing the connectability and ease of use of the system.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

5. The '891 Patent:

A POSITA would have been motivated to combine any of the references that disclose symbol judging techniques described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications. A POSITA would have understood that, in order to discern transmitted data in a received signal, a receiver must estimate the data values represented by the sequence of symbols in the signal. *See, e.g.*, Murakami [0034] (“[A] transmit frame as shown in FIG. 3, comprising . . . one pilot symbol P, three consecutive modulation method information symbols MX, three consecutive error correction method information symbols CX, 128 data symbols DATA, a pilot symbol P, data symbols DATA . . .”), Fig. 3; Moon [0065]–[0066] (“A despreader 812 despreads the received data symbols with the orthogonal codes used by the transmitter, multiplexes the despread modulated symbols, and serially outputs the multiplexed symbols.... A demodulator 814 demodulates the modulated symbols output from the despreader 812 by a demodulation technique corresponding

to the modulation technique used by the transmitter, and outputs coded bits.”). A POSITA would have understood that digital data is transmitted over an analog physical channel, and that data bits are mapped to the sequence of symbols in the carrier signal for transmission and likewise demapped into a bit string upon reception. *See, e.g.*, Moon [0066]. Thus, a POSITA would have been motivated to implement symbol judging in a digital communications receiver to advantageously receive and process digital data transmitted over a physical modality. The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine any of the references that disclose including redundant bits in a transmitted bit string in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications to advantageously maintain the fidelity of the transmitted message. *See, e.g.*, Moon [0014] (“The ‘systematic bits’ refer to actual information bits to be transmitted, while the ‘parity bits’ refer to a signal used to help a receiver correct a possible transmission error.”); Kyung [0051] (“In accordance with a third aspect of the present invention, there is provided a channel decoding apparatus using a parallel concatenated low-density parity check (LDPC) code having information bits and first and second parity bits corresponding to the information bits.”); Jarvinen [0002] (“In speech coding systems prior known to a person skilled in the art, major part of the bits comprising speech information are protected using an error correction code.”). A POSITA would have known that transmitting messages over physical channels introduces the risk of distorting transmitted

messages, and that physical channels are vulnerable to perturbations caused by uncontrollable factors including environmental effects, interference from other channels, and the channel's own tolerances to perturbations. *See, e.g.*, Kyung [0006] (“During data transmission, inevitable errors caused by noise, interference, and fading occur according to channel conditions, thereby causing information loss.”); Jarvinen [0002] (“While transferring information, such as speech or data, using transfer connections subject to transmission errors, the information to be transferred is in general protected using an error correction algorithm.”). The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have further been motivated to combine any of the references that disclose distinguishing a portion of the transmitted bit string as protected by error correction code described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications to advantageously limit the error code's effect on coding and transmission rates. *See, e.g.*, Jarvinen [0002] (“In speech coding systems prior known to a person skilled in the art, major part of the bits comprising speech information are protected using an error correction code.”). A POSITA would have understood that, to maximize data throughput, for example in large data transmissions, error detection and correction codes may be focused on protecting the data most critical to preserving the original message. *See, e.g.*, Jarvinen [0011] (“When more data transfer errors occur, the error correction is focused . . . more on the speech parameter bits most important for speech quality and intelligibility.”); Kyung [0039]

("[A]n increase in number of error bits decreases information throughput or increases decoding complexity undesirably."). Thus, a POSITA would have been motivated to include redundant bits in the transmitted bit string and further distinguish portions of the transmitted bit string that are most critical to maintaining the fidelity of the message as protected by such error correction bits. The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine judging communication channel quality described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications. As discussed above in relation to error correction in digital communications, it was well-known that transmitting messages over physical channels introduces distortion. *See, e.g.,* Kyung [0006]; Jarvinen [0002]. A POSITA would have understood that judging channel quality advantageously enables the receiver to anticipate errors in received messages and execute a process for rectifying the errors, *e.g.,* a bad frame masking process. *See, e.g.,* Jarvinen [0001] ("The present invention relates to an information coding method utilizing focused error correction and/or error detection, in which method the quality of the data transfer connection is used for selecting the coding mode for the data transfer connection."); Walton-515 [0176] ("RX spatial processor 660 performs matched filtering of the N_R received symbol streams with N_R matched filters and provides N_D recovered symbol streams."). The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination

would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have further been motivated to combine error rectifying teachings, such as destroying, replacing, or attenuating incorrect data described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications. *See, e.g.*, Jarvinen [0063] (“If CRC checking block 224 detects an error among the CRC-protected speech parameter bits, it activates bad frame indication signal 226, in which case frame 230 in question is not used for speech synthesizing. Instead . . . bad frame substituting unit 229 generates an estimate and transfers it to speech decoder 232.”); Moon [0009] (“In this technique, a receiver combines the retransmitted packet with the initially transmitted packet that is previously stored in a buffer thereof by a predetermined method.”). A POSITA would have understood that transforming a message received through a channel with poor communication quality would advantageously minimize the distortion perceived by the user, and improve overall user experience. The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine any of the references that disclose executing the error correction process automatically according to a predetermined condition of the communication channel quality in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications to advantageously

operationalize the error correction process. *See, e.g.*, Jarvinen [0052] (“[T]he quality of an information transfer connection is detected . . . and the detection result which gives the lower quality is used for selecting the focusing mode according to the present method.”). The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to adjust a predetermined condition for error correction based on external information. *See, e.g.*, Jarvinen [0051]–[0053] (“[T]he number of received, subsequent bad frames has been designated as P.... Depending on the substituting procedure, P is then no longer directly the number of subsequent rejected frames, but it describes more generally how difficult the substituting of each rejected speech frame has been estimated to be in the rejected frames substituting procedure.”). For example, a POSITA would have understood that allowing the input of external information to adjust a predetermined condition for error correction would advantageously allow the system to adapt, *e.g.*, to a user’s desires or to the state of the system. The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine judging communication channel quality based on the number of redundant bits with predetermined values as described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in

digital communications. A POSITA would have understood that using known redundant bit values to judge communication quality advantageously improves the efficiency and accuracy of complementary error correction schemes. *See, e.g.*, Kyung [0039] (“[C]odes having high error correcting capability should be used in order to increase efficiency of the ARQ scheme. In this case, in order to correct errors with fewer retransmissions, codes having powerful error correcting capability are needed.”). For example, evaluating redundant bit values to discern a channel quality metric enables correcting errors with fewer retransmissions in an Automatic Repeat Request (ARR) scheme. The combination of these references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine implementing communication quality judging and error correction techniques in a computer program described in Exhibits A-1 through A-7 and/or Exhibit A, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known techniques for error detection and correction in digital communications. Implementing processes in a software program was well-known in the art and yields modular solutions that are more easily scaled than hardware solutions. *See, e.g.*, Dill at 42:34–37 (“The foregoing described CTCM encoder and decoder embodiments may either be implemented in circuitry or in software, i.e. programmed into a microcontroller, for example.”); Walton-733 [0161] (“The data transmission techniques described herein may be implemented by various means. For example, these techniques may be implemented in hardware, software, or a combination thereof.”). A POSITA would have yielded a modular error correction solution that can be implemented in various digital communications systems. The combination of these

references would apply known techniques to digital communication systems that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

6. The '448 Patent:

A POSITA would have been motivated to combine known use of a video stream with a higher spatial resolution in an enhancement layer included in Exhibits D-1-enc through D-31-enc, D-33-enc and D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known coding systems. For example, such an enhancement layer would allow support of display devices that can render video at higher resolutions than the video coded in a base layer. Segall, 1 (“[t]he resolution diversity of current display devices motivates the need for spatial scalability.”). A POSITA would have understood that, as “larger format, high definition displays are becoming common in consumer applications, with displays containing over two million pixels readily available,” the provision of coded video streams at a lower resolution in the base layer as well as a higher-resolution stream in an enhancement layer would have allowed for support of a broader range of display devices through “resolution diversity.” *Id.* A POSITA would have understood this allows for bit rate adaptation. *Id.* A POSITA would have understood that implementing this functionality is straightforward, as the decoder of a higher-definition display could switch from decoding a lower-layer stream to a higher-layer stream at a higher spatial resolution when the transmission rate of a streaming video program increases sufficiently to allow the decoder to successfully receive and decode the additional video data in the second enhancement layer. *Id.* For example, a POSITA would have understood that standard scalable coding techniques “support[ed] multilayer scenarios including special multiple spatial scalability layers and the mixing of spatial scalability layers with

other layers that provide temporal or quality scalability.” *Id.*, 3. In this regard, a POSITA would have been motivated to multiplex/demultiplex base and enhancement layer streams to support transmission of the respective streams over a communication channel, while also facilitating synchronization of the streams by reference to common timing information in the multiplexed signal. A demultiplexer at the decoder also would have been obvious to separate the streams for processing of each layer by respective portions of the decoding device. *See, e.g.*, Lu, 1 (describing how MPEG standards “define[] a multiple multiplexed structure for combining elementary streams, including coded audio, video and other data streams, and specifies means of representing the timing information needed to replay synchronized sequences in real-time”); Kim, [0079] (“demultiplexing unit 1010 separates a bitstream for each layer from an input scalable bitstream and outputs a base layer bitstream and an enhancement layer bitstream”), FIG. 10. Multiplexing/demultiplexing the layered streams in the combination also would have been obvious as a predictable application of known techniques to yield predictable results for which a POSITA would have had a reasonable expectation of success, especially since multiplexing and demultiplexing layered bitstreams was commonly performed before the ’448 Patent. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine upsampling and interpolation techniques included in Exhibits D-1-enc through D-31-enc, D-33-enc through D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known coding systems that select between reference pictures included in

Exhibits D-1-enc through D-31-enc, D-33-enc through D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference,. Upsampling and interpolation are basic video processing techniques that a POSITA would have understood are generally applicable to video coding systems. *See, e.g.*, Martins. The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

A POSITA would have been motivated to combine in multiple configurations the various scaling techniques including upsampling, interpolation, downscaling and decimation techniques included in Exhibits D-1-enc through D-31-enc, D-33-enc through D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known coding systems that select between reference pictures included in Exhibits D-1-enc through D-31-enc, D-33-enc through D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference,. In order to address multiple design parameters including bitrate, image fidelity, memory, computational intensity and power consumption, a POSITA would have found it obvious to try design choices from a finite number of identified, predictable solutions to in order meet various design parameters depending on use case.

A POSITA would have been motivated to combine known decoding techniques included in Exhibits D-1-enc through D-31-enc, D-33-enc through D-34-enc, and/or Exhibit D-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, with known encoders, and vice versa, in order to ensure the encoding and decoding processes

mirror each other. A POSITA would have understood that, in order to ensure there is proper error tracking between the encoder and decoder, they must both be capable of performing the same error concealment operations. For example, Girod explains that, in order to perform error tracking, “the coder has to know the decoder’s concealment technique” and that error tracking “does not require any modifications of the bit stream syntax of the motion-compensated hybrid coder” and “is therefore fully compatible with standards such as ... H.263.” Girod, 9; *see also* Wada, 2 (“The same error concealment as is performed at the receiver is carried out in the local-decoded frame stored.”). The combination of these references would apply known techniques to codec systems and methods that were ready for improvement, in order to yield predictable results. The combination would further be obvious to try, because it would involve simple design choices from a finite number of identified, predictable solutions, with a reasonable expectation of success.

As confirmed by the examiner during the prosecution of the ’448 Patent, the Challenged Claims of the ’448 Patent recite well-known components and techniques such as “resolution conversion to create a set of resolution converted enlarged decoded pictures with a resolution higher than the standard resolution” (*see, e.g.*, 5/15/2014 Non-Final Rejection at 6 (citing US Pat. 6,580,754 (“Wan”))), “use of super-resolution processors in scalable video coding systems” (*see, e.g.*, 5/15/2014 Non-Final Rejection at 7 (citing Ong)), and “the use of resolution converters for multi-resolution encoding and decoding to enhance current and reference frames” (*see, e.g.*, 5/15/2014 Non-Final Rejection at 8 (citing Holcomb)).

* * *

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary

skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different teachings of the prior art.

Apple reserves the right to rely on one or more references identified in Exhibits A-1 through F-34, B1-enc through B-27-enc, D-1-enc through D-31-enc, D33-enc through D-34-enc, E1-enc through E28-enc, and F1-enc through F-31-enc, and F-33-enc through F-34-enc, and/or Exhibits A through F, B-enc, D-enc, E-enc and/or F-enc, or the Apple IPRs or Google IPRs, or other references and exhibits incorporated herein by reference, as further evidence of obviousness under 35 U.S.C. § 103, as background references demonstrating the state of the art, or for any other purpose. Based on further investigation and discovery, based on positions that Advanced Coding may take regarding the scope of the Challenged Claims, and/or based on the Court's claim construction, Apple reserves the right to amend and/or supplement these contentions and to rely on these references to prove the invalidity of the Challenged Claims in a manner consistent with this Court's Rules and with the Federal Rules of Civil Procedure.

C. Additional Prior Art Offered For Sale and/or Publicly Used or Known or That May Lead to Discovery of Additional Prior Art

Apple contends that the Challenged Claims are invalid as anticipated and/or obvious in view of public knowledge and uses and/or offers for sale of products and services under 35 U.S.C. §§ 102(a) and/or (b). For example, Apple's Second Supplemental Preliminary Invalidity Contentions and accompanying document production reference or describe products and/or systems that were on sale or otherwise publicly available before the alleged priority date of the Asserted Patents. Apple has not had the opportunity to take discovery on any of the systems and does not have sufficient information to provide invalidity charts for all of the systems. Based on the information presently available, Apple identifies the following prior art systems that may

anticipate and/or render obvious the Challenged Claims of the Asserted Patents or lead to the discovery of additional prior art that anticipates or renders obvious the Challenged Claims of the

Asserted Patents:

Name of System	Date of Sale/Offer for Sale/Public Use/Known by Others
RealPlayer	1997
FFmpeg	2000
Adobe Flash Player	2002
Apple iPhone	2007
Apple TV	2007
HTC Touch Cruise Phone	2008
HTC Touch Dual Phone	2007
Adobe Flash Player 9	2007
Qualcomm MSM7200 Chipset Solution	2007
Horizon Semiconductor Hz7220 System-On-a-Chip Solution	2007
Xbox Media Center (XBMC) / Kodi	2002
VideoLAN Client (VLC)	2001
Sony Playstation	1994
Sony Playstation 2	2000
Sony Playstation Portable (PSP)	2004
Microsoft Xbox	2001
Microsoft Xbox 360	2005
Roku Photo Bridge HD 1000 Product ("Roku Product")	2003
Roku Photo Bridge HD 1000 System ("Roku System")	2003
MPEG-2 SA VI Decoder, Hyundai Electronics	1995
VidyoRoom	2008
VidyoPortal	2008
VidyoDesktop	2008
Cisco Webex Platform ("Webex")	2007
Polycom HDX4000 ("Polycom HDX4000")	2007
RADVISION Interactive Video Platform	2006
Click to Meet™	2006
SCOPIA™	2006
NVIDIA GeForce 8600	2007
Radeon XI 000-series	2005
ATI Technologies Unified Video Decoder	2008
STI7200	2007
Microsoft Windows Vista	2006
Broadcom BCM7411	2004
Conexant CX2418X	2004

Honeywell HRDPX1 6 Performance Series Digital Video Recorder (“HRDPX 16 H.264 DVR”)	2011
J. River Media Center Convergence Software	2005
Xbox Media Center	2004
HP MediaSmart Server	2007
TwonkyMedia UPnP-MediaServer	2006
Pioneer PRO-1150HD; PRO-950HD	2007
TVersity Media Server 0.6	2005
PS3 Media Server	2007
Windows Media Connect	2004
Apple iBook G3 with AirPort card	1999
Apple Powerbook G4 with Airport	2003
NetGear MA521 Wireless PC Card	2003
Linksys WAP11 Wireless Access Point	2001
Sony Ericsson Z1010	2003
Nokia 7600	2003
Siemens U15	2003
Compaq iPaq with PC card expansion pack	2001
Sierra Wireless AirCard 300	2001
Lucent Technology - Orinoco Silver 802.11b WiFi PCMCIA	2001
Inspiron Dell 7000 PC	2001

Some of these systems are included in Exhibits A-1 through F-34, B1-enc through B-27-enc, D-1-enc through D-31-enc, D33-enc through D-34-enc, E1-enc through E28-enc, and F1-enc through F-31-enc, and F-33-enc through F-34-enc, but Apple does not currently have sufficient information to provide charts for all of these systems. In addition to adding new products as the basis for prior art as additional discovery is obtained, Apple also may rely on other documents or things that have not yet been located to support its contentions regarding such device(s) or product(s) that are referenced in the charts.

In addition, to the extent that the Asserted Patents are not entitled to a priority date that is before the earliest sale date of an Accused Product, then that product is prior art that invalidates the Challenged Claims if and to the same extent that the Accused Product is found to infringe.

As discovery is ongoing, Apple continues to investigate these items and reserves the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

III. INVALIDITY UNDER 35 U.S.C. § 112

Pursuant to the Scheduling Order, Apple contends that the Challenged Claims of the Asserted Patents are invalid under 35 U.S.C. § 112 because (1) the claims are indefinite, (2) the claims lack adequate written description; and/or (3) the claims are not enabled. Apple's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the Asserted Patents, or that any of the claims of the Asserted Patents are not anticipated or rendered obvious by prior art.

The following contentions, made pursuant to the Scheduling Order, are subject to revision and amendment pursuant to Rule 26(e), Fed. R. Civ. P., and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. Apple offers these contentions in response to Advanced Coding's apparent interpretation of the Challenged Claims and Advanced Coding's Infringement Contentions, which remain insufficient under the Patent Rules, including for failure to provide a "chart identifying specifically where each element of each asserted claim is found within each Accused Instrumentality," as required by Local Patent Rule 3-1(c).

A. The '025 Patent

The Challenged Claims of the '025 Patent fail to satisfy the requirements of 35 U.S.C. § 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “a combine program code to combine the first predictive picture and the decoded residual picture to generate a decoded moving-picture signal” (claim 7)
- “a first subtractor to produce a first residual picture from a difference between the picture to be coded and the first predictive picture” (claim 1)
- “a combiner to combine the first predictive picture and the decoded residual picture to generate a decoded moving-picture signal” (claim 6)
- “a decoding controller to receive decoding control data for decoding control from the parameter data and control the selector to switch the predictive picture to be supplied to the combiner between the first and second predictive pictures according to the decoding control data” (claims 6, 8)
- “a motion compensator to specify a corresponding rectangular zone in the reference picture based on the motion-vector data, thus generating a second predictive picture” (claim 6)
- “a motion compensation program code to specify a corresponding rectangular zone in the reference picture based on the motion-vector data, thus generating a second predictive picture” (claim 8)
- “a zone-border motion compensator to define a boundary condition of a border that corresponds to the border motion vector data, from the reference picture based on the border motion-vector data, and generate an estimated video signal in each rectangular zone in the picture to be coded, that satisfies Poisson’s Equation, thus producing [a first/the] predictive picture” (claims 1, 6)
- “a zone-border motion compensation program code to define a boundary condition of a border that corresponds to the border motion vector data, from the reference picture based on the border motion-vector data, and generate an estimated video signal in each rectangular zone in the picture to be coded, that satisfies Poisson’s Equation, thus producing the predictive picture” (claims 4, 7)
- “defining a boundary condition of a border that corresponds to the border motion vector data, from the reference picture based on the border motion-vector data, and generating an estimated video signal in each rectangular zone in the picture to be coded, that satisfies Poisson’s Equation, thus producing a predictive picture” (claims 6, 7, 9, 10)
- “a zone-border motion estimator to obtain a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones, find a border, of the reference picture, having a boundary condition that matches the boundary condition, by motion-vector search in the reference picture, and generate border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claim 1)
- “a zone-border motion estimation program code to obtain a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones, find a border, of the reference

picture, having a boundary condition that matches the boundary condition, by motion-vector search in the reference picture, and generate border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claim 4)

- “an entropy decoder to perform entropy decoding to the data thus demultiplexed to generate, at least, motion-vector data, the post-quantization data, the border motion-vector data and parameter data required for constructing a specific syntax structure” (claim 6)
- “an entropy decoding program code to perform entropy decoding to the data thus demultiplexed to generate, at least, the post-quantization data, the border motion-vector data and parameter data required for constructing a specific syntax structure” (claim 7)
- “an entropy coding program code to perform entropy coding, at least, to the post-quantization data and the border motion-vector data, thus generating coded bit strings” (claim 4)
- “entropy encoder to perform entropy encoding, at least, to the post-quantization data and the border motion-vector data, thus generating coded bitstreams” (claim 3)
- “performing entropy decoding to the data thus demultiplexed to generate, at least, the post-quantization data, the border motion-vector data and parameter data required for constructing a specific syntax structure” (claim 10)
- “an inverse-orthogonal transform program code to perform inverse-orthogonal transform to the post-quantization orthogonal transform coefficients data to produce a decoded residual picture of one video area” (claim 7)
- “an inverse-orthogonal transform program code to perform inverse-orthogonal transform to the post-inverse-quantization data, thus producing a decoded residual picture” (claim 4)
- “an inverse-orthogonal transformer to perform inverse-orthogonal transform to the post-quantization orthogonal transform coefficients data to produce a decoded residual picture of one video area” (claim 6)
- “an inverse-orthogonal transformer to perform inverse-orthogonal transform to the post-inverse-quantization data, thus producing a decoded residual picture” (claim 1)
- “performing inverse-orthogonal transform to the post-quantization orthogonal transform coefficients data to produce a decoded residual picture of one video area” (claim 10)
- “performing inverse-orthogonal transform to the post-inverse-quantization data, thus producing a decoded residual picture” (claim 9)
- “an orthogonal transformer to perform orthogonal transform to the first residual picture, thus generating orthogonal-transform coefficients data” (claim 1)

- “an orthogonal transform program code to perform orthogonal transform to the first residual picture, thus generating orthogonal-transform coefficients data” (claim 4)
- “performing orthogonal transform to the first residual picture, thus generating orthogonal-transform coefficients data” (claim 9)
- “an inverse-quantizer to perform inverse-quantization to the post-quantization data to generate post-quantization orthogonal transform coefficients data” (claim 6)
- “an inverse-quantizer to perform inverse-quantization to the post-quantization data based on a specific quantization parameter, thus generating post-inverse-quantization data” (claim 1)
- “an inverse-quantization program code to perform inverse-quantization to the post-quantization data based on a specific quantization parameter, thus generating post-inverse-quantization data” (claim 4)
- “an inverse-quantization program code to perform inverse-quantization to the post-quantization data to generate post-quantization orthogonal transform coefficients data” (claim 7)
- “performing inverse-quantization to the post-quantization data based on a specific quantization parameter, thus generating post-inverse-quantization data” (claim 9)
- “performing inverse-quantization to the post-quantization data to generate post-quantization orthogonal transform coefficients data” (claim 10)
- “a quantizer to perform quantization to the orthogonal-transform coefficients data based on a specific quantization parameter, thus generating post-quantization data” (claim 1)
- “a quantization program code to perform quantization to the orthogonal-transform coefficients data based on a specific quantization parameter, thus generating post-quantization data” (claim 4)
- “performing quantization to the orthogonal-transform coefficients data based on a specific quantization parameter, thus generating post-quantization data” (claim 9)
- “find[ing] a border, of the reference picture, having a boundary condition that matches the boundary condition, by motion-vector search in the reference picture” (claims 1, 4, 6, 7, 9, 10)
- “[generate/generating] [the] border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claims 1, 4, 6, 7, 9, 10)
- “obtain[ing] a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones” (claims 1, 4, 6, 7, 9, 10)
- “the coded bitstream obtained by producing and encoding a residual picture that is a residual signal between a picture to be coded that is an input moving-picture video

signal to be subjected to coding and a predictive picture produced from a reference picture that is a local decoded video signal for each of a plurality of rectangular zones” (claims 6, 7, 10)

- “produc[ing] and encod[ing] a residual picture that is a residual signal between a picture to be coded that is an input moving-picture video signal to be subjected to coding and a predictive picture produced from a reference picture that is a local decoded video signal for each of a plurality of rectangular zones” (claim 1, 4, 9)
- “a multiplexer to multiplex the coded bitstreams based on a specific syntax structure” (claim 3)
- “multiplex program code to multiplex the coded bit strings based on a specific syntax structure, thus generating a coded bitstream” (claim 4)

The Challenged Claims of the '025 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “a combiner to combine the first predictive picture and the decoded residual picture to generate a decoded moving-picture signal” (claim 6)
- “a first subtractor to produce a first residual picture from a difference between the picture to be coded and the first predictive picture” (claim 1)
- “a decoding controller to receive decoding control data for decoding control from the parameter data and control the selector to switch the predictive picture to be supplied to the combiner between the first and second predictive pictures according to the decoding control data” (claims 6, 8)
- “a motion compensator to specify a corresponding rectangular zone in the reference picture based on the motion-vector data, thus generating a second predictive picture” (claim 6)
- “a selector to select either the first predictive picture or the second predictive picture and supply the predictive picture thus selected to the combiner” (claim 6)
- “a zone-border motion compensator to define a boundary condition of a border that corresponds to the border motion vector data, from the reference picture based on the border motion-vector data, and generate an estimated video signal in each rectangular zone in the picture to be coded, that satisfies Poisson’s Equation, thus producing [a first/the] predictive picture” (claims 1, 6)
- “a zone-border motion estimator to obtain a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones, find a border, of the reference picture, having a boundary condition that matches the boundary condition, by motion-vector search in the reference picture, and generate border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claim 1)

- “a zone-border motion estimation program code to obtain a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones, find a border, of the reference picture, having a boundary condition that matches the boundary condition, by motion-vector search in the reference picture, and generate border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claim 4)
- “an entropy decoder to perform entropy decoding to the data thus demultiplexed to generate, at least, motion-vector data, the post-quantization data, the border motion-vector data and parameter data required for constructing a specific syntax structure” (claim 6)
- “entropy encoder to perform entropy encoding, at least, to the post-quantization data and the border motion-vector data, thus generating coded bitstreams” (claim 3)
- “an inverse-orthogonal transformer to perform inverse-orthogonal transform to the post-quantization orthogonal transform coefficients data to produce a decoded residual picture of one video area” (claim 6)
- “an inverse-orthogonal transformer to perform inverse-orthogonal transform to the post-inverse-quantization data, thus producing a decoded residual picture” (claim 1)
- “an orthogonal transformer to perform orthogonal transform to the first residual picture, thus generating orthogonal-transform coefficients data” (claim 1)
- “an inverse-quantizer to perform inverse-quantization to the post-quantization data to generate post-quantization orthogonal transform coefficients data” (claim 6)
- “an inverse-quantizer to perform inverse-quantization to the post-quantization data based on a specific quantization parameter, thus generating post-inverse-quantization data” (claim 1)
- “a quantizer to perform quantization to the orthogonal-transform coefficients data based on a specific quantization parameter, thus generating post-quantization data” (claim 1)
- “specific syntax structure” (claims 3, 4, 6, 7, 10)
- “the input signal being obtained by multiplexing a coded bitstream obtained by predictive coding, border motion-vector data and post-quantization data obtained by quantization in the predictive coding” (claims 6, 7, 10)
- “a multiplexer to multiplex the coded bitstreams based on a specific syntax structure” (claim 3)
- “a demultiplexer to demultiplex coded data from an input signal based on a specific syntax structure” (claim 6)
- “[generate/generating] [the] border motion-vector data that is data on a motion vector from a border of the rectangular zone in the picture to be coded to the border of the reference picture thus found” (claims 1, 4, 6, 7, 9, 10)

- “obtain[ing] a boundary condition of each of a plurality of borders between the rectangular zones and another plurality of rectangular zones adjacent to the rectangular zones” (claims 1, 4, 6, 7, 9, 10)
- “the entropy decoding program code further generates motion-vector data” (claim 8)

B. The ’303 Patent

The Challenged Claims of the ’303 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “[first/second] processor” (claims 1, 2)
- “a [first/second] memory unit having instructions stored which, when executed by the [first/second] processor, cause the [first/second] processor to perform operations” (claims 1, 2)
- “receiving [the] basic video image coding data” (claims 1, 2)
- “a supplementary hierarchical picture [whose/having] coding order and display order [that] are earlier by a factor of [a/the] group of pictures [including an intra coded picture and a plurality of inter prediction coded pictures] than those of a basic hierarchical picture” (claims 1, 2)
- “acquiring basic video image coding data received before supplementary video image coding data that has been received at the moment” (claim 1)
- “acquiring basic video image coding data received before supplementary video image coding data that is currently received” (claim 2)
- “controlling the transmission of the supplementary video image coding data according to the transmission rate” (claims 1, 2)

The Challenged Claims of the ’303 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “receiving [the] basic video image coding data” (claims 1, 2)
- “a supplementary hierarchical picture” (claims 1, 2)
- “a basic hierarchical picture” (claims 1, 2)
- “acquiring basic video image coding data received before supplementary video image coding data that has been received at the moment” (claim 1)
- “acquiring basic video image coding data received before supplementary video image coding data that is currently received” (claim 2)
- “reconstructing video image coding data from the basic video image coding data and the supplementary video image coding data” (claims 1, 2)

- “receiving supplementary video image coding data including a supplementary hierarchical picture [whose/having] coding order and display order [that] are earlier by a factor of [a/the] group of pictures [including an intra coded picture and a plurality of inter prediction coded pictures] than those of a basic hierarchical picture included in the basic video image coding data[, a basic hierarchy and a supplementary hierarchy being set in units of the group of pictures]” (claims 1, 2)

C. The '995 Patent

The Challenged Claims of the '995 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “a demultiplexer configured to work on a sequence of input encoded bits to implement a process for a prescribed demultiplexing to output at least a first and a second sequence of encoded bits” (claim 2)
- “a step of implementing a process for a prescribed demultiplexing on a sequence of input encoded bits, outputting at least a first and a second sequence of encoded bits” (claims 3, 4)
- “a high resolution as a second resolution higher than the standard resolution” (claims 2, 3, 4)
- “a first super-resolution enlarger configured to acquire the sequence of decoded pictures created with a standard resolution at the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with a first enlargement to create a sequence of super-resolution enlarged decoded pictures with a first resolution higher than a standard resolution” (claim 2)
- “a second super-resolution enlarger configured to acquire the set of decoded pictures with the standard resolution from the first encoder to work on the sequence of decoded pictures to implement an interpolation of pixels with a second enlargement to create a set of super-resolution enlarged decoded pictures with a second resolution higher than the standard resolution” (claim 1)
- “acquiring the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding, working on the sequence of decoded pictures to implement an interpolation of pixels with a first enlargement, creating a sequence of super-resolution enlarged decoded pictures with a first resolution higher than the standard resolution” (claims 3, 4)
- “acquiring the set of decoded pictures with the standard resolution to work on the sequence of decoded pictures to implement an interpolation of pixels with a second enlargement to create a set of super-resolution enlarged decoded pictures with a second resolution higher than the standard resolution” (claims 8, 9)
- “a first resolution converter configured to acquire the sequence of super-resolution enlarged decoded pictures created at the first super-resolution enlarger to work on the sequence of super-resolution enlarged decoded pictures to implement a

process for a prescribed resolution conversion to create a sequence of super-resolution decoded pictures with a standard resolution” (claim 2)

- “a second resolution converter configured to work on the set of super-resolution enlarged decoded pictures to implement a process for a second resolution conversion to create a set of super-resolution enlarged and converted decoded pictures with a standard resolution” (claim 1)
- “acquiring the sequence of super-resolution enlarged decoded pictures created through the process for the prescribed super-resolution enlargement working on the sequence of super-resolution enlarged decoded pictures to implement a process for a first resolution conversion, creating a sequence of super-resolution decoded pictures with a standard resolution” (claims 3, 4)
- “working on the set of super-resolution enlarged decoded pictures to implement process for a second resolution conversion to create a set of super-resolution enlarged and converted decoded pictures with a standard resolution” (claims 8, 9)
- “a second decoder configured to acquire the second sequence of encoded bits obtained with a standard resolution at the demultiplexer as a set of decoding targets, the sequence of decoded pictures created with the standard resolution at the first decoder as a set of first reference pictures, and the sequence of super-resolution decoded pictures created with the standard resolution at the first resolution converter as a set of second reference pictures” (claim 2)
- “a second encoder configured to: have the set of super-resolution enlarged and converted pictures from the first resolution converter as a set of encoding target pictures, the set of decoded pictures from the first encoder as a set of first reference pictures, and the set of super-resolution enlarged and converted decoded pictures from the second resolution converter as a set of second reference pictures” (claim 1)
- “a second resolution converter configured to acquire the sequence of decoded pictures with the standard resolution from the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement to create a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution” (claim 2)
- “select[] one of the set of first reference pictures and the set of second reference pictures based on reference picture selection information to implement a combination of processes for a prescribed prediction and a prescribed second decoding being a decoding with an extension of the standard resolution, to create a sequence of super-resolution pictures decoded with the standard resolution based on the set of decoding targets and the set of selected reference pictures” (claims 2, 3, 4)
- “select[] one of the set of first reference pictures and the set of second reference pictures to create reference picture selection information to identify the set of selected reference pictures to implement a second process for encoding to create a second sequence of encoded bits based on the set of encoding target pictures and the set of selected reference pictures” (claim 1, 8, 9)

- “acquiring the second sequence of encoded bits obtained with a standard resolution through the process for the prescribed demultiplexing as a set of decoding targets, the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding as a set of first reference pictures, and the sequence of super-resolution decoded pictures created with the standard resolution through the process for the prescribed resolution conversion as a set of second reference pictures” (claims 3, 4)
- “having the set of super-resolution enlarged and converted pictures as a set of encoding target pictures, the set of decoded pictures as a set of first reference pictures, and the set of super-resolution enlarged and converted decoded pictures as a set of second reference pictures” (claims 8, 9)
- “acquiring the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding working on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement, creating a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution” (claims 3, 4)
- “an extension of the standard resolution” (claims 2, 3, 4)
- “recording medium storing a moving picture [decoding/encoding] program comprising a non-transitory computer-readable medium configured to have a computer execute” (claims 4, 9)

The Challenged Claims of the '995 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “a high resolution as a second resolution higher than the standard resolution” (claims 2, 3, 4)
- “a first super-resolution enlarger configured to acquire the sequence of decoded pictures created with a standard resolution at the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with a first enlargement to create a sequence of super-resolution enlarged decoded pictures with a first resolution higher than a standard resolution” (claim 2)
- “a second super-resolution enlarger configured to acquire the set of decoded pictures with the standard resolution from the first encoder to work on the sequence of decoded pictures to implement an interpolation of pixels with a second enlargement to create a set of super-resolution enlarged decoded pictures with a second resolution higher than the standard resolution” (claim 1)
- “acquiring the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding, working on the sequence of decoded pictures to implement an interpolation of pixels with a first enlargement, creating a sequence of super-resolution enlarged decoded pictures with a first resolution higher than the standard resolution” (claims 3, 4)

- “acquiring the set of decoded pictures with the standard resolution to work on the sequence of decoded pictures to implement an interpolation of pixels with a second enlargement to create a set of super-resolution enlarged decoded pictures with a second resolution higher than the standard resolution” (claims 8, 9)
- “a first resolution converter configured to acquire the sequence of super-resolution enlarged decoded pictures created at the first super-resolution enlarger to work on the sequence of super-resolution enlarged decoded pictures to implement a process for a prescribed resolution conversion to create a sequence of super-resolution decoded pictures with a standard resolution” (claim 2)
- “a second resolution converter configured to work on the set of super-resolution enlarged decoded pictures to implement a process for a second resolution conversion to create a set of super-resolution enlarged and converted decoded pictures with a standard resolution” (claim 1)
- “acquiring the sequence of super-resolution enlarged decoded pictures created through the process for the prescribed super-resolution enlargement working on the sequence of super-resolution enlarged decoded pictures to implement a process for a first resolution conversion, creating a sequence of super-resolution decoded pictures with a standard resolution” (claims 3, 4)
- “working on the set of super-resolution enlarged decoded pictures to implement process for a second resolution conversion to create a set of super-resolution enlarged and converted decoded pictures with a standard resolution” (claims 8, 9)
- “a second decoder configured to acquire the second sequence of encoded bits obtained with a standard resolution at the demultiplexer as a set of decoding targets, the sequence of decoded pictures created with the standard resolution at the first decoder as a set of first reference pictures, and the sequence of super-resolution decoded pictures created with the standard resolution at the first resolution converter as a set of second reference pictures” (claim 2)
- “a second encoder configured to: have the set of super-resolution enlarged and converted pictures from the first resolution converter as a set of encoding target pictures, the set of decoded pictures from the first encoder as a set of first reference pictures, and the set of super-resolution enlarged and converted decoded pictures from the second resolution converter as a set of second reference pictures” (claim 1)
- “a second resolution converter configured to acquire the sequence of decoded pictures with the standard resolution from the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement to create a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution” (claim 2)
- “select[] one of the set of first reference pictures and the set of second reference pictures based on reference picture selection information to implement a combination of processes for a prescribed prediction and a prescribed second decoding being a decoding with an extension of the standard resolution, to create a

sequence of super-resolution pictures decoded with the standard resolution based on the set of decoding targets and the set of selected reference pictures” (claims 2, 3, 4)

- “select[] one of the set of first reference pictures and the set of second reference pictures to create reference picture selection information to identify the set of selected reference pictures to implement a second process for encoding to create a second sequence of encoded bits based on the set of encoding target pictures and the set of selected reference pictures” (claim 1, 8, 9)
- “acquiring the second sequence of encoded bits obtained with a standard resolution through the process for the prescribed demultiplexing as a set of decoding targets, the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding as a set of first reference pictures, and the sequence of super-resolution decoded pictures created with the standard resolution through the process for the prescribed resolution conversion as a set of second reference pictures” (claims 3, 4)
- “having the set of super-resolution enlarged and converted pictures as a set of encoding target pictures, the set of decoded pictures as a set of first reference pictures, and the set of super-resolution enlarged and converted decoded pictures as a set of second reference pictures” (claims 8,9)
- “acquiring the sequence of decoded pictures created with the standard resolution through the process for the prescribed first decoding working on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement, creating a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution” (claims 3, 4)
- “an extension of the standard resolution” (claims 2, 3, 4)
- “recording medium storing a moving picture [decoding/encoding] program comprising a non-transitory computer-readable medium configured to have a computer execute” (claims 4, 9)
- “the standard resolution of the second sequence of encoded bits is the same as the standard resolution of the super-resolution decoded pictures” (claim 4)
- “the set of [encoding/decoding] target pictures, the set of first reference pictures, and the set of second reference pictures have the same value in spatial resolution” (claims 1, 2, 3, 4, 8, 9)
- “a first super-resolution enlarger configured to work on the subsequence of the sequence of moving pictures with the standard resolution to implement an interpolation of pixels with a first enlargement to create a set of super-resolution enlarged pictures with a first resolution higher than the standard resolution” (claim 1)
- “implementing an interpolation of pixels with a first enlargement on the sequence of moving pictures with the standard resolution, creating a set of super-resolution enlarged pictures with a first resolution higher than a standard resolution” (claims 8, 9)

D. The '101 Patent

The Challenged Claims of the '101 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “said transfer control unit does not transfer, from the internal storage device to the network storage device, the digital contents that cannot be recovered if a network failure occurs during the transferring of the digital contents from the internal storage device to the network storage device” (claim 1)
- “wherein the digital contents that cannot be recovered if a network failure occurs during the transferring of the digital contents are not transferred from the internal storage device to the network storage device” (claim 7)
- “stream-delivering corresponding data” (claims 1, 7);
- “digital contents to be stream-delivered” (claims 1, 7);
- “corresponding data in corresponding digital contents” (claims 1, 7).
- “wherein said digital contents data transmission processing unit transmits the corresponding data and information for identifying the network storage device to the network player, and causes the network storage device to directly transmit the corresponding data to the network player” (claim 3)

The Challenged Claims of the '101 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “a transfer control unit adapted to transfer and store part of held digital contents in the internal storage device to a network storage device” (claim 1);
- “a list information transmission unit adapted to respond to a list presentation request for the held digital contents of the server device for media from the network player by transmitting list information to the network player” (claim 1);
- “a search unit adapted to respond to a data transmission request for the held digital contents from the network player by searching for a location where the held digital contents are currently stored” (claim 1);
- “a digital contents data transmission processing unit adapted to allow the corresponding data in held digital contents to be stream-delivered from the network storage device to the network player, if the result of search shows the network storage device” (claim 1);
- “a return control unit adapted to cause the digital contents corresponding to a predetermined condition among the digital contents which have been transferred to the network storage device to be returned from the network storage device to the internal storage device” (claim 4);

- “wherein the list information maintains a tree structure of the digital contents in the internal storage device before transferring the digital contents to the network storage device” (claims 1, 7)
- “stream-delivering corresponding data” (claims 1, 7);
- “digital contents to be stream-delivered” (claims 1, 7);
- “corresponding data” (claims 1–3, 7);
- “the corresponding data” (claims 1–3, 7);
- “corresponding data in corresponding digital contents” (claims 1, 7);
- “held digital contents” (claims 1, 7);
- “directly transmit the corresponding data” (claim 3).

E. The '891 Patent

The Challenged Claims of the '891 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value” (claims 1, 8, 9);
- “multilevel symbols” (claims 1, 8, 9);
- “redundant bits having the predetermined value” (claims 1, 8, 9);
- “redundant bits missing the predetermined value” (claims 1, 8, 9);
- “externally obtaining a parameter” (claim 2).
- “replacing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, with previous data represented by a symbol previously obtained by the symbol judging means” (claim 4);
- “an attenuating process of changing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, to a data equivalent in which the variable represented by the data is attenuated” (claim 6)

The Challenged Claims of the '891 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “a symbol judging means for obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal” (claim 1);

- “a communication quality judging means for judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged by the symbol judging means” (claim 1);
- “a data changing means for, if the communication quality judged by the communication quality judging means does not satisfy a predetermined condition, making a predetermined change to the data to be transmitted represented by the symbol used in the judgment” (claim 1);
- “at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value” (claims 1, 8, 9);
- “the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value among the redundant bits contained in the symbol that contains a bit belonging to the protected portion” (claims 1, 8, 9);
- “a sequence of multilevel symbols” (claims 1, 8, 9);
- “a predetermined change to the data to be transmitted represented by the symbol used in the judgment” (claims 1, 8, 9);
- “the bit string constituting data to be transmitted represented by the sequence of symbols” (claims 1, 8, 9);
- “redundant bits having the predetermined value” (claims 1, 8, 9);
- “redundant bits missing the predetermined value” (claims 1, 8, 9);
- “means for externally obtaining a parameter that defines at least a portion of the condition” (claim 2);
- “a process of substantially destroying the data to be transmitted” (claim 3);
- “changing the data . . . to a data equivalent” (claim 6).
- “replacing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, with previous data represented by a symbol previously obtained by the symbol judging means” (claim 4)

F. The '448 Patent

The Challenged Claims of the '448 Patent fail to satisfy the requirements of 35 U.S.C. § 112, ¶ 1 based on a lack of written description support and/or enablement of the following terms:

- “a second super-resolution enlarger configured to acquire the set of decoded pictures from the first encoder to implement thereon a process for a second super-resolution enlargement to create a set of super-resolution enlarged decoded pictures with a resolution higher than the standard resolution” (claims 1, 3)
- “a third encoder configured to have the set of super-resolution enlarged pictures from the first super-resolution enlarger as a set of encoding target pictures,

employing the set of super-resolution enlarged decoded pictures from the second super-resolution enlarger and the set of resolution converted enlarged decoded pictures from the third resolution converter as sets of reference pictures, to implement thereon a third combination of processes for a prediction and an encoding to create a third sequence of encoded bits” (claim 1)

- “a third encoder configured to have the set of super-resolution enlarged pictures from the first super-resolution enlarger as a set of encoding target pictures, employing the set of resolution converted enlarged decoded pictures from the [third/second] resolution converter as a set of reference pictures, to implement thereon a third combination of processes for a prediction and an encoding to create a third sequence of encoded bits” (claims 2-3)
- “a third resolution converter configured to acquire the set of decoded pictures from the first encoder to implement thereon a process for a third resolution conversion to create a set of resolution converted enlarged decoded pictures with a resolution higher than the standard resolution” (claims 1, 2)
- “third encoder controls a selection of a set of reference pictures and creates a set of data on the selection of the set of reference pictures to identify a selected set of reference pictures during the process for prediction of the third combination” (claims 1, 2, 3)
- “recording medium storing a moving picture [decoding/encoding] program comprising a non-transitory computer-readable medium configured to have a computer execute” (claims 4, 9)

The Challenged Claims of the '448 Patent fail to satisfy the requirements of 35 U.S.C.

§ 112, ¶ 2 because the following terms are indefinite:

- “a second super-resolution enlarger configured to acquire the set of decoded pictures from the first encoder to implement thereon a process for a second super-resolution enlargement to create a set of super-resolution enlarged decoded pictures with a resolution higher than the standard resolution” (claims 1, 3)
-
- “a third encoder configured to have the set of super-resolution enlarged pictures from the first super-resolution enlarger as a set of encoding target pictures, employing the set of super-resolution enlarged decoded pictures from the second super-resolution enlarger and the set of resolution converted enlarged decoded pictures from the third resolution converter as sets of reference pictures, to implement thereon a third combination of processes for a prediction and an encoding to create a third sequence of encoded bits” (claim 1)
- “a third encoder configured to have the set of super-resolution enlarged pictures from the first super-resolution enlarger as a set of encoding target pictures, employing the set of resolution converted enlarged decoded pictures from the [third/second] resolution converter as a set of reference pictures, to implement

thereon a third combination of processes for a prediction and an encoding to create a third sequence of encoded bits” (claims 2-3)

- “a third resolution converter configured to acquire the set of decoded pictures from the first encoder to implement thereon a process for a third resolution conversion to create a set of resolution converted enlarged decoded pictures with a resolution higher than the standard resolution” (claims 1, 2)
- “third encoder controls a selection of a set of reference pictures and creates a set of data on the selection of the set of reference pictures to identify a selected set of reference pictures during the process for prediction of the third combination” (claims 1, 2, 3)
- “a spatial resolution of the set of super-resolution enlarged pictures, that of the set of super-resolution enlarged decoded pictures, and that of the set of resolution converted enlarged decoded pictures are made equal” (claim 1)
- “a spatial resolution of the set of super-resolution enlarged pictures, and that of the set of resolution converted enlarged decoded pictures are made equal” (claim 2)
- “a spatial resolution of the set of super-resolution enlarged pictures, and that of the set of super-resolution enlarged decoded pictures are made equal” (claim 3)
- “a first super-resolution enlarger configured to work on the sequence of moving pictures with the standard resolution to implement a process for a first super-resolution enlargement to create a set of super-resolution enlarged pictures with a resolution higher than the standard resolution” (claims 1, 2, 3)
- “implement thereon a process for a second super-resolution enlargement to create a set of super-resolution enlarged decoded pictures with a resolution higher than the standard resolution” (claims 1, 3)

IV. DOCUMENT PRODUCTION ACCOMPANYING INVALIDITY CONTENTIONS

As required by P.R. 3-4(a), Apple has produced documents labeled APL-ADVCDG_00000001 through APL-ADVCDG_00497782, and has made source code available for inspection, as documentation sufficient to show the operation of any aspects or elements of an Accused Instrumentality identified by Advanced Coding in its P.R. 3-1(c) charts, to the extent such documents are within Apple’s possession, custody, or control.

Pursuant to P.R. 3-4(b), Apple has produced each item of prior art identified pursuant to P.R. 3-3(a) which does not appear in the file history of the Asserted Patents—those items of prior art are Bates numbered as APL-ADVCDG_00526275 through APL-ADVCDG_00542065.

Subject to all reservation of rights and objections set forth herein, and/or after Advanced Coding's identification of all accused devices with specificity, Apple further reserves the right to supplement its document production pursuant to the Scheduling Order and Federal Rules of Civil Procedure.

Dated: July 3, 2025

Steven Pepe (NY Bar No. 2810430)
Kevin J. Post (NY Bar No. 4382214)
Alexander E. Middleton (NY Bar No. 4797114)
Lance W. Shapiro (NY Bar No. 5397955)

ROPES & GRAY LLP

1211 Avenue of the Americas
New York, NY 10036-8704
Telephone: (212) 596-9000
Facsimile: (212) 596-9090
steven.pepe@ropesgray.com
kevin.post@ropesgray.com
alexander.middleton@ropesgray.com
lance.shapiro@ropesgray.com

Kathryn C. Thornton (DC Bar No. 198591)
Ryan C. Brunner (DC Bar No. 241467)

ROPES & GRAY LLP

2099 Pennsylvania Avenue, NW
Washington, DC 20006-6807
Telephone: (202) 508-4600
Facsimile: (202) 508-4650
kathryn.thornton@ropesgray.com
ryan.brunner@ropesgray.com

Respectfully submitted,

/s/ Kevin J. Post

Melissa R. Smith
GILLAM & SMITH, LLP
TX State Bar No. 24001351
303 S. Washington Avenue
Marshall, Texas 75670
Telephone: (903) 934-8450
Facsimile: (903) 934-9257
melissa@gillamsmithlaw.com

James R. Batchelder (CA Bar No. 136347)
Shong Yin (CA Bar No. 319566)

ROPES & GRAY LLP

1900 University Ave., Sixth Floor
East Palo Alto, CA 94303-2284
Telephone: (650) 617-4000
Facsimile: (650) 617-4090
james.batchelder@ropesgray.com
shong.yin@ropesgray.com

Attorneys for Defendant Apple Inc.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that, on July 3, 2025, I caused to be served all counsel of record who are deemed to have consented to electronic service with a copy of this document.

/s/ Roberto Gonzalez
Roberto Gonzalez