UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable MaryJoan McNamara
Administrative Law Judge

In the Matter of **CERTAIN VIDEO-CAPABLE LAPTOP, DESKTOP COMPUTERS, HANDHELD COMPUTERS, TABLETS, TELEVISIONS, PROJECTORS, AND COMPONENTS AND MODULES THEREOF**	**Inv. No. 337-TA-1448**

RESPONDENTS' INITIAL INVALIDITY CONTENTIONS

TABLE OF CONTENTS

Page

I. INTRODUCTION

Pursuant to the United States International Trade Commission's Rules of Practice and Procedure, 19 C.F.R. §§ 210.27 and 210.29, and the Procedural Schedule (Order No. 8), Respondents Acer American Corporation and Acer Inc. (collectively, "Acer"), ASUSTeK Computer Inc. and ASUS Computer International (collectively, "ASUS"), and Hisense Co., Ltd. and Hisense USA Corporation (collectively, "Hisense") (collectively, "Respondents") hereby provide their initial invalidity contentions for U.S. Patent No. 9,036,701 ("the '701 Patent"), U.S. Patent No. 8,050,321 ("the '321 patent"), U.S. Patent No. 10,536,714 ("the '714 patent"), and U.S. Patent No. 11,805,267 ("the '267 patent") (collectively, "the asserted patents"). Complainants Nokia Technologies Oy and Nokia Corporation ("Nokia" or "Complainants") assert claims 1, 3-4, 6-8, 10-11, 13-15, 17-18, and 20 of the '701 patent, claims 8-11 of the '321 patent, claims 1-5, 7-12, 14-19, 21-26, and 28-30 of the '714 patent, and claims 1-6, 7-12, 13-18, 19-24, 25-30, 31-36 of the '267 patent (collectively, "the asserted claims").

These contentions are Respondents' initial responses to Nokia's contention interrogatories, including at least Interrogatory Nos. 9, 10, and 41. Respondent's responses to Nokia's burden contention interrogatories incorporate and attach these invalidity contentions in accordance with Order No. 8.

II. GENERAL RESERVATIONS

Respondents reserve the right to revise or supplement these contentions in light of party and third-party discovery, Nokia's infringement contentions, review and analysis by expert witnesses, and further investigation and discovery regarding the defenses asserted by Respondents. For example, Respondents expressly reserve the right to amend these contentions after review of Nokia's infringement contentions, after review of Nokia's validity contentions, should Nokia provide any information that it failed to provide in its disclosures, or if Nokia amends its

disclosures in any way. Because discovery is ongoing Respondents reserve the right to revise, amend, and/or supplement the information provided herein, including identifying, charting, and relying on additional references. Respondents additionally reserve their rights to revise, amend, or supplement when Nokia provides additional discovery. Further, Respondents reserve the right to revise their ultimate contentions concerning the invalidity of the asserted claims, which may change depending upon further and ongoing investigation and/or positions that Nokia or expert witnesses may take concerning claim construction, infringement, and/or invalidity issues.

Prior art not included in this disclosure, whether known or not known to Respondents, may become relevant. In particular, Respondents are currently unaware of the extent, if any, to which Nokia will contend that limitations of the asserted claims are not disclosed in the prior art identified by Respondents. To the extent that such an issue arises, Respondents reserve the right to identify other references that would anticipate and/or render obvious the allegedly missing limitations of the claims. Further, Respondents reserve the right to rely on any reference or item sought or to be sought from third parties that are solely within those third parties' possession, custody, or control, and have not yet been produced during discovery. Respondents reserve the right to rely on any reference found in the prosecution histories of the applications leading to the asserted patents or otherwise identified in connection with this action.

To the extent that the following contentions reflect constructions of claim limitations consistent with or implicit in Nokia's infringement allegations as set forth in the Complaint, no inference is intended nor should any be drawn that Respondents agree with Nokia's infringement allegations or claim interpretations, and Respondents expressly reserve the right to contest such allegations. Respondents offer such contentions in response to Nokia's infringement allegations and without prejudice to any position that Respondents may ultimately take as to any claim

construction issues. Specifically, Respondents base these supplemental invalidity contentions at least in part upon the claim scope and certain claim constructions that are implicitly or explicitly asserted by Nokia, and nothing herein should be construed or represented as evidencing any express or implied agreement with any of Nokia's claim construction or infringement positions.

Respondents intend to rely on admissions concerning the scope of the prior art relevant to the asserted patents found in, *inter alia*: the asserted patents and related patents and/or patent applications; the patent prosecution histories for the asserted patents and related patents and/or patent applications (including all prior art cited therein); any deposition testimony of the named inventors on the asserted patents and related patents and/or patent applications in this matter or any other matter; evidence and testimony relating to the level of ordinary skill in the art; and the papers filed and any evidence submitted by Nokia in connection with this matter.

Respondents' claim charts cite to particular teachings and disclosures of the prior art as applied to features of the asserted claims. However, persons having ordinary skill in the art generally may view an item of prior art in the context of other publications, literature, products, and understanding. As such, the cited portions are only examples, and Respondents reserve the right to rely on uncited portions of the prior art references and on other publications, expert testimony, and other evidence as aids in understanding and interpreting the cited portions, as providing context thereto, and as additional evidence that the prior art discloses a claim limitation or any of the asserted claims as a whole. Respondents further reserve the right to rely on uncited portions of the prior art references, other publications, and testimony, including expert testimony, to establish bases for combinations of certain cited references that render the asserted claims obvious.

The references discussed in the claim charts may disclose the elements of the asserted claims explicitly and/or inherently, and/or they may be relied upon to show the state of the art in the relevant timeframe. The suggested obviousness combinations are provided in addition to and/or in the alternative to Respondents' anticipation contentions and are not to be construed to suggest that any reference included in the combinations is not by itself anticipatory. The combinations of prior art references referred to in these supplemental invalidity contentions are exemplary. Respondents reserve the right to rely on any combination of prior art references identified in these initial contentions and final contentions to be served in accordance with Order No. 8. The rationale or motivations to combine the prior art references identified in these initial invalidity contentions are also exemplary. As discovery is ongoing, Respondents further reserve the right to amend or supplement the rationale or motivation to combine the prior art references identified in these initial contentions.

The following discussion and exhibits provide exemplary prior art citations and obviousness positions. The citations and discussion in the charts are organized by claim (and claim limitation) for convenience, but each limitation or claim section applies to the larger context of each claim, to any related dependent or independent claims, as well as all claims containing similar limitations or elements. For example, citations as to any recited limitation, step, or component in the claims apply wherever each such limitation, step, or component is repeated elsewhere in the claim or asserted patents. Where Respondents cite to a particular drawing or figure in the attached claim charts, the citation encompasses the description of the drawing or figure, as well as any text associated with the drawing or figure. Similarly, where Respondents cite to particular text concerning a drawing or figure, the citation encompasses that drawing or figure as well. Relatedly, certain portions of patent or other prior art disclosures build upon other disclosures, even if they

are referred to as a separate or alternative embodiment. Thus, Respondents' citations to structures or functions incorporate by reference all disclosures to related structures or functions, including any additional detail provided as to the operation or design of those structures or functions.

Discovery of inventors is ongoing. Respondents reserve the right to assert that the asserted claims are invalid under 35 U.S.C. § 102(f) in the event Respondents obtain additional evidence that the inventors of the asserted patents did not invent the subject matter claimed therein. Should Respondents obtain such evidence, they will provide the name of the person(s) from whom and the circumstances under which the alleged invention or any part of it was derived.

Respondents also reserve the right to challenge any of the claim terms herein under 35 U.S.C. § 112 beyond the grounds outlined in their responses to interrogatories related to invalidity, including by arguing that they are indefinite, not supported by the written description, or not enabled. Nothing stated herein shall be construed as a waiver of any argument available under 35 U.S.C. §§ 101, 102, 103, and/or 112.

III. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") at the time of the alleged invention of the asserted patents would have had a (1) Bachelor's degree in electrical engineering, computer engineering, computer science, or a comparable field of study, and (2) approximately two to three years of practical experience with video and/or image processing or coding. Additional experience can substitute for the level of education, and vice-versa.

IV. U.S. PATENT NO. 9,036,701

A. Identification of Relevant Prior Art

Respondents identify the following prior art references that anticipate and/or render obvious the asserted claims of the asserted patent. The following patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g). Respondents have identified each

prior art patent by its inventor, title, number, country of origin, date of filing, date of issue, and, where applicable, the relevant priority date, or such information may be derived from the face of the patent or document. Each prior art publication is identified by its title, date of publication, and, where feasible, author and publisher. For prior art under 35 U.S.C. § 102(b), Respondents have identified the item offered for sale or publicly used or known, the date by which the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known, to the full extent currently known.

1. Prior Art Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following prior art patent publications. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Respondents reserve the right to supplement this list as it learns in the course of discovery of other prior art patent publications that would anticipate and/or render the asserted claims obvious.

Prior Art Reference	**Inventor**
U.S. Patent No. 5,650,783	Murashita et al.
U.S. Patent No. 6,919,826	Peacock
U.S. Patent No. 7,710,296	Sze et al.
U.S. Patent No. 9,521,433	Chono et al.
U.S. Patent Appl. Publication No. 2005/0253740A1	Marpe et al.
U.S. Patent Appl. Publication No. 2007/0009047A1	Shim et al.
U.S. Patent Appl. Publication No. 2010/0098155A1	Demircin et al.
U.S. Patent Appl. Publication No. 2013/0028334A1	Bossen

Respondents' search is ongoing. Respondents reserve the right to supplement or modify this initial identification of relevant prior art in any way.

2. Prior Art Non-Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works of prior art. These publications constitute additional prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby disclose as prior art publications all references disclosed below in Section 3 (regarding on sale/public use), such as press releases, users manuals, and other related documentation about such prior art products. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the asserted claims obvious.

- Marpe et al., Fast Arithmetic Coding for CABAC JVT-C061, Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6), Mar. 2002
- Bonnie Lam, Parallel Architectures for Entropy Coding in a Dual-Standard Ultra-HD Video Encoder, Massachusetts Institute of Technology, May 2010
- Marpe et al., A Highly Efficient Multiplication-Free Binary Arithmetic Coder and its Application in Video Coding, IEEE, Nov. 2003.
- Marpe et al., Context-Based Adaptive Binary Arithmetic Coding in the H.264/AVC Video Compression Standard, IEEE Transactions on Circuits and Systems for Video Technology, Vol. 13, No. 7, Jul. 2003
- Yu et al., A High Performance CABAC Decoding Architecture, IEEE Transactions on Consumer Electronics Volume 51, Issue 4, Nov. 2005.
- Budagavi et al., Description of video coding technology proposal, JCTVC-A101, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, Apr. 2010
- Liao et al, A High Throughput VLSI Design with Hybrid Memory Architecture for H.264/AVC CABAC Decoder, May 2010

Respondents' search is ongoing. Respondents reserve the right to supplement or modify this initial identification of relevant prior art in any way.

3. Prior Art Items and/or Knowledge

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on prior art items embodying and alleged inventions or structures described in, and/or any knowledge disclosed by or referred to in, any of the prior art patents or prior art publications identified above in Sections IV.A.1 and IV.A.2. Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or other further investigation.

4. Prior Art Under 35 U.S.C. §§ 102(f) and 102(g)

Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through discovery or other further investigation.

B. Anticipation and Obviousness

Respondents contend that the prior art references identified in Respondents' contentions anticipate or render obvious the asserted claims of the '701 patent. Respondents attach Exhibits A-1 to A-11, which provide exemplary disclosures showing how the prior art anticipates and/or renders obvious the asserted claims of the '701 patent.

Prior art that anticipates and/or render obvious the asserted claims of the '701 patent are cited and described in the claim charts attached hereto as Exhibits A-1 to A-11 each of which describes anticipation and/or obviousness of one or more claims of the asserted patents by a prior art reference. These claim charts provide citations to portions of the above references, illustrating how the prior art explicitly discloses every element of the asserted claims of the '701 patent. To the extent any element is not provided by an expressly enabling disclosure by the referenced prior art, all elements of the asserted claims of the '701 patent would still be the inherent result of putting

into practice the systems and methods described by the prior art referenced herein, as set forth below.

Exhibit	Primary Reference
A-1	U.S. Patent Appl. Publication No. 2013/0028334A1 (“Bossen”)
A-2	Fast Arithmetic Coding for CABAC (“Marpe-C061”)
A-3	Parallel Architectures for Entropy Coding in a Dual-Standard Ultra-HD Video Encoder by Bonnue Lam (“Lam”)
A-4	A Highly Efficient Multiplication-Free Binary Arithmetic Coder and Its Application in Video Coding (“Marpe-2003”)
A-5	US Patent Publication No. 2005/0253740A1 (“Marpe ’740 Pub”)
A-6	Context-Based Adaptive Binary Arithmetic Coding in the H.264/AVC Video Compression Standard (“Marpe CABAC 2003”)
A-7	US Patent No. 6,919,826 (“Peacock”)
A-8	US Patent Publication No. 2007/0009047A1 (“Shim”)
A-9	A High Performance CABAC Decoding Architecture (“Yu”)
A-10	US Patent No. 5,650,783 (“Murashita”)
A-11	Additional References Chart

In addition to the discussion above, and to the extent not anticipated, the asserted claims of the ’701 patent are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. Items of prior art that render obvious the asserted claims of the ’701 patent are cited and described in the claim charts attached hereto as Exhibits A-1 to A-11. In the event a particular reference or combination of references identified in Exhibits A-1 to A-11 does not anticipate or render obvious one of the asserted claims of the ’701 patent, the reference, alone or in combination with one or more of the references identified in those exhibits or herein renders the claim obvious. The identification of certain combinations of prior art does not exclude other combinations and is without prejudice to Respondents’ right to rely on additional specific combinations as well as to detail and explain such combinations.

The U.S. Supreme Court in *KSR Int’l Co. v. Teleflex Inc*., 127 S. Ct. 1727 (2007) emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense

should not be patentable. *Id*. at 1732, 1738, 1742-1743, 1746. A patent claim may be obvious if the combination of elements was obvious to try or if there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability. *Id*. at 1740. The Court stated that courts should "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id*. at 1740-41. *KSR* does not mandate evidence of a motivation or suggestion to combine prior art references. *See TGIP, Inc. v. AT&T Corp*., 527 F. Supp. 2d 561, 580-81 (E.D. Tex. 2007). "[A] court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ" to resolve the question of obviousness. *KSR*, 127 S. Ct. at 1741.

Based on all of these considerations, as further detailed in Exhibits A-1 to A-11, persons of ordinary skill in the art would have combined the teachings of the prior art references discussed and charted in those exhibits. The combinations of these references would have rendered obvious to one of ordinary skill in the art the subject matter of the asserted claims of the '701 patent. The references identified in Exhibits A-1 to A-11 are analogous prior art to the subject matter of the asserted claims of the '701 patent and, for at least the reasons set forth below, are properly combinable. Because these prior art references exist within a single field of art, particularly one in which individuals in the field often shared and/or collaborated on their work, it would have been obvious for a person of skill in the art to look from one piece of prior art to another in order to find

any missing functionality they desired to implement. Therefore, these references provide interrelated teachings and one of ordinary skill would look to the concepts in any of these references when seeking to solve the problems purportedly addressed by the asserted patents.

Numerous prior art references, including those identified in the attached exhibits, reflect common knowledge and the state of the prior art before the earliest claimed effective filing date of the asserted patents. As it would be unduly burdensome to create detailed claim charts for all of the invalidating combinations, for at least the reasons described in these initial invalidity contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those identified in the attached exhibits, to meet the limitations of the asserted claims of the '701 patent. Respondents' inclusion of exemplary combinations, in view of the factors and exemplary motivations to combine identified herein, does not preclude Respondents from identifying other invalidating combinations and/or motivations as appropriate.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, because 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, instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court 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. Nevertheless, in addition to the information contained herein, Respondents hereby identify additional motivations and reasons to combine the cited art.

Clear and logical rationale to combine any of the references identified above with others exists from the prior art references themselves, as well as from the interrelated teachings of other prior art references, common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the existence and nature of a known need or problem, and/or knowledge possessed by a person of ordinary skill. In addition, it would have been obvious to combine the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompts variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combinations of the prior art references identified above would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Therefore, various reasons to combine the disclosed references exist. Respondents reserve the right to rely on the knowledge of those skilled in the art, the testimony of expert witnesses, and/or other prior art, to show that it would have been obvious to include the allegedly missing limitation and to explain the motivation to combine the prior art elements.

In addition, it would have been obvious to combine any of the prior art in Exhibits A-1 to A-11 because all of these references relate to methods for entropy coding data such as video data.

For example, Yu discloses a novel architecture for CABAC coding. Yu at § V. Yu also discloses that CABAC "is one of the two alternative entropy coding method specified in H.264." Yu at § I. Yu further discloses that "in CABAC arithmetic encoding implementation, two sub-engines are used: one for bins of regular coding mode as described above, and another so-called bypass coding engine for a fast encoding of bins." Yu at § II. Yu discloses that CABAC coding includes binarization, probability modeling, and binary arithmetic coding. Yu at § II. Additionally,

Yu discloses "how to efficiently organize the decoding engines for one bin to achieve high decoding speed by using characters found in CABAC." Yu at § III.B.

As another example, Peacock discloses that "when a file of symbols, such as a screen of pixel data, needs to be encoded, the file may be divided into two sets of symbols, depending on the symbol's probability of occurrence in the symbol stream." Peacock at 5:32-37. Peacock also discloses that "[d]uring encoding a symbol may be assigned a code or codeword, which is the binary representation of the symbol. The first set of symbols have a high frequency of occurrence in the file and fall above a threshold. The second set of symbols have a lower probability of occurrence and fall below the threshold." Peacock at 5:37-42. Moreover, Peacock discloses that "[a] Huffman-type algorithm may be used to assign the codewords for the first set of symbols." Peacock at 5:42-44. As disclosed by Peacock, "Huffman encoding is an entropy encoding algorithm used for lossless compression of files based on the frequency of occurrence of a symbol in the file that is being compressed." Peacock at 1:35-37.

Marpe-C061, titled "Fast Arithmetic Coding for CABAC," proposes a fast, multiplication-free binary arithmetic coding scheme for Context-based Adaptive Binary Arithmetic Coding (CABAC) in the H.264/MPEG4-AVC video coding standard, enhancing entropy coding efficiency for video data. It introduces the M coder, which uses table-based interval subdivision, a finite-state machine for probability estimation, and a bypass mode for uniform-distribution symbols (e.g., sign bits) to reduce computational complexity while maintaining compression performance. *See generally*, Marpe-C061, § 2. Consistent with goals in the art at the time, the method emphasized a significant speed-up over traditional arithmetic coding and higher throughput compared to other methodologies. *Id.*, § 3. By optimizing interval subdivision and probability updates, Marpe-C061 significantly improves the entropy coding process, enabling efficient compression of video syntax

elements like motion vectors and transform coefficients into a compact bit stream, foundational for H.264's high-performance video encoding. *Id.*, § 1.

Marpe-2003, a 2003 IEEE paper entitled, "A Highly Efficient Multiplication-Free Binary Arithmetic Coder and Its Application in Video Coding" also discusses the M coder. Marpe-2003 at 11 – 263 to 264. The M Coder is a low-complexity, multiplication-free binary arithmetic coding scheme integral to the Context-based Adaptive Binary Arithmetic Coding (CABAC) framework of H.264/MPEG4-AVC, significantly enhancing entropy coding for video data. *Id.* It employs table-driven interval subdivision with a lookup table for range updates, a finite-state machine for adaptive probability estimation, and a bypass mode for uniform symbols (e.g., sign bits) to streamline processing. Marpe-2003 at 11 –265. The M coder achieves near-identical compression efficiency to exact arithmetic coding with 2–4% bitrate savings over prior methods and a speed-up. Marpe-2003 at 11 – 266. By efficiently encoding syntax elements like motion vectors and transform coefficients into a compact bit stream, Marpe-2003 teaches entropy coding focused on optimizing video data compression. Marpe-2003 at 11 – 263-66.

Lam, the 2010 MIT Master's thesis is entitled, "Parallel Architectures for Entropy Coding in a Dual-Standard Ultra-HD Video Encoder." The paper details parallel architectures for entropy coding in a dual-standard (H.264/AVC and VC-1) video encoder optimizing compression for low-power mobile devices. Lam, §§ 2-3. For H.264, Lam implements a four-stage pipelined CABAC architecture processing six bins per cycle, using regular mode (context updates) for frequent symbols and bypass mode for uniform symbols (e.g., sign bits), achieving 4.97 G bins/s. Lam, § 5. For VC-1, it employs three parallel VLC-FLC pairs, leveraging frequency analysis of syntax elements (e.g., CBP, MV_MODE) to optimize table lookups, processing 735 M symbols/s. Lam, §§ 2-3. The thesis enhances entropy coding by exploiting parallelism and frequency-based

optimizations, producing efficient bit streams for ultra-HD video. *Id.* A POSITA would have been motivated to combine the frequency analysis of syntax element described in Lam with the other Marpe references including Marpe-C061, Marpe-2003 to achieve greater throughput and would have a reasonable expectation of success in making such combination.

Bossen discloses "arithmetic coding which adaptively estimates a probability to accurately account for the probability in a finite precision environment and limit the ratio of symbols to bits representative of the symbols." Bossen at [0002]. One arithmetic coding algorithm is Context-based Adaptive Binary Arithmetic Coding (CABAC), one of two types of entropy coding specified in H.264 standard. *Id.* at [0005]. Bossen discloses that CABAC encoding includes three stages: binarization, context modeling and binary arithmetic coding. *Id.* at [0056].

Marpe '740 Pub discloses "binarization and arithmetic coding schemes for use in video coding applications." Marpe '740 Pub at [0003]. Like Bossen, Marpe '740 Pub identifies the same three stages of CABAC encoding: binarization, context modeling, and binary arithmetic coding. *Id.* at [0113]. Marpe '740 Pub discloses a two part binarization scheme. *Id.* at Abstract. In the first part, the lesser of a data value and a predetermined cut-off value is binarized. *Id.* In the second part, if the data value is greater than the cut-off value, the difference of the two values is binarized. *Id.* This binarization scheme achieves in "[a] very effective compression of data values." *Id.*

Marpe CABAC 2003, another IEEE paper titled "Context-Based Adaptive Binary Arithmetic Coding in the H.264/AVC Video Compression Standard," discloses a "CABAC framework … includ[ing] a novel low-complexity method for binary arithmetic coding and probability estimation that is well suited for efficient hardware and software implementations." Marpe CABAC 2003 at Abstract. The CABAC framework, like other references cited herein,

includes the three stages of binarization, context modeling, and binary arithmetic coding. *Id.* at 621. Marpe CABAC 2003 teaches categorizing syntax elements into two categories. *Id.* at 627.

Shim discloses "[a]n apparatus and method for entropy encoding and decoding of video data." Shim at Abstract. More specifically, it discloses "two different entropy encoding modes and performing entropy encoding on each of [more than one] partial video data portions using the determined entropy encoding mode." *Id.* Shim discloses a CABAC unit comprising a binarizer, a context modeler, a regular coding engine, and a bypass coding engine. *Id.* at [0064]. Shim further discloses "an entropy decoding method that is predetermined according to the type of a syntax element to be decoded." *Id.* at [0062]. A POSITA would have known that certain categories of syntax elements have a high frequency of occurrence while certain other categories of syntax elements have a low frequency of occurrence. Yu at § III.B. Thus, it would have been obvious that Shim discloses entropy decoding based on a predetermined, expected frequency of occurrence of syntax elements.

Murashita discloses "[a] device for coding a series of symbols based on a multi-level arithmetic coding scheme…." Murashita at Abstract. The "coding the symbols [is] based on frequency of occurrence of the symbols…." *Id.* Murashita further discloses context update, e.g., "updating the frequency of occurrence." *Id.* The context update occurs through a comparison between a cumulative frequency and a threshold value. *See, e.g., id.* at 7:40-57. Context update only occurs when the cumulative frequency is less than the threshold value. *See, e.g., id.* at 8:35-48.

Additionally and as an example, it would have been obvious to combine Marpe CABAC 2003, Marpe '740 Pub, or Shim (collectively, the "CABAC with Bypass References") with Bossen. Each of the CABAC with Bypass References discloses a CABAC coder with two

processing paths, one with context update followed by entropy coding, the other without context update but also with entropy coding. *See, e.g.*, Marpe CABAC 2003 at Fig. 1, Marpe '740 Pub at Fig. 2, Shim at Fig. 5. Bossen teaches that, while in theory "CABAC is an efficient coding method, practical implementation of CABAC poses some technical issues, particularly when a symbol to be coded has a high probability of occurrence." Bossen at [0007]. A POSITA would have understood the importance of effective, practical implementations of a theoretical scheme and would have found Bossen's disclosure useful to improve CABAC of the CABAC with Bypass References. Further supporting a POSITA's knowledge, Dr. Marpe recognized degradation due to finite precision representation was to be avoided. *See* Marpe-2003 at 11 – 264. Thus, a POSITA would have been motivated to implement a solution such as Bossen's to address this issue. Further, Bossen identifies a bottleneck of overall system processing speed in the decoder at very high coding efficiency. *Id.* This too would have been a concern to a POSITA implementing practical video systems.

More specifically, Bossen discloses a scheme in which a probability estimate is compared to a low threshold during an initialization process. *See id.* at Figs. 6, 11. When the probability estimate is lower than the threshold, the probability estimate is updated. *Id.* at [0072], [0084]. When the probability estimate is higher than the threshold, the probability estimate is bypassed. *Id.* at [0072], [0084]; *see also id.* at Figs. 12, 19. A POSITA would have recognized that these bypass paths corresponded to, or at least could have been implemented through, the bypass paths of the CABAC with Bypass References. A POSITA therefore would have found it obvious to incorporate Bossen's advantageous scheme in any of the CABAC with Bypass References.

Bossen and the CABAC with Bypass References are based on the same or similar building blocks. For example, they are all based on MPEG and H.264. *See, e.g.*, Bossen at [0005], Shim

at [0005], Marpe '740 Pub at [0007], [0132], Marpe CABAC 2003 at 1. Moreover, Bossen's disclosure is not limited to any specific video coding standard. Bossen at [0051]. Further, they involve Golomb coding. *See, e.g.*, Bossen at [0011], Shim at [0010], Marpe '740 Pub at [0018], Marpe CABAC 2003 at 2. They use a suffix in their data structures. *See, e.g.*, Bossen at [0071]-[0076], Marpe '740 Pub at Abstract, Marpe CABAC 2003 at 4. These commonalities would have provided a POSITA a reasonable expectation of success in combining Bossen with the CABAC with Bypass References.

As a further example, Murashita also discloses context update and bypass. Murashita at 7:40-57, 8:35-48. Although Murashita is directed to a device for compressing symbols, a POSITA would have understood that symbols and video both comprise information or data, and technologies for data compression apply to both. Murashita's method bypassing context update results in a higher processing speed. *Id.* at 12:42-48. Therefore, a POSITA would have found Murashita desirable to improve the performance of video compression, where processing speed is critical due to the large amount of data to be processed. A POSITA would further have recognized that CABAC with Bypass References are based on the same idea of context update and bypass, and would have found it obvious to apply Murashita's teaching to the CABAC with Bypass References to obtain its benefits.

Respondents incorporate by reference in their entirety prior art from the prosecution histories, background sections of the asserted patents, and any deposition testimony from relevant inventors.

Respondents contend that there are no secondary considerations of non-obviousness evidencing the validity of any of the asserted claims of the '701 patent. Secondary considerations of non-obviousness, also referred to as objective indicia of non-obviousness, "can include copying,

long felt but unsolved need, failure of others, commercial success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing industry respect for the invention, awards or other industry praise for the invention, and skepticism of skilled artisans before the invention." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc*., 711 F.3d 1348, 1368 (Fed. Cir. 2013). "A nexus between the merits of the claimed invention and evidence of secondary considerations is required in order for the evidence to be given substantial weight in an obviousness decision." *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Moreover, even if a nexus exists, secondary considerations of non-obviousness "simply cannot overcome [a] strong prima facie showing of obviousness." *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008). Nokia has not established the existence of any objective indicia of non-obviousness or secondary considerations. Respondents reserve the right to supplement their contentions to respond to any such evidence should Nokia be permitted to raise them in the future. While discovery in this case is ongoing, and Respondents' investigation continues (which will include expert discovery), to the extent Nokia contends that one or more asserted claims of the '701 patent is not obvious based on secondary considerations recognized by relevant authority, Respondents contend such allegations are without merit.

If Nokia identifies any secondary considerations of non-obviousness, Respondents reserve the right to amend and/or supplement their contentions.

C. Other Invalidity Grounds

Respondents hereby identify grounds upon which the asserted claims are invalid for failure to meet the requirements of 35 U.S.C. §§ 101, 112(a), 112(b), and 112(f). These contentions shall not be construed as an admission that any claim construction advanced by Respondents in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Respondents from advancing claim construction and/or non-infringement positions in lieu of, or

in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Nokia's purported construction of the claim language or of other positions advanced by Nokia during the course of this litigation. Respondents' Invalidity Contentions under 35 U.S.C. § 101 and 112 may depend, in part, on the Court's claim construction, as well as Nokia's alleged scope of the asserted claims. Consequently, Respondents identify only the issues under 35 U.S.C. § 101 and 112 of which they are presently aware.

1. 35 U.S.C. § 112(a) – Enablement and Written Description

To comply with the enablement requirement of 35 U.S.C. § 112(a), the patent specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Courts consider multiple factors to determine whether experimentation is undue, including: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *In re Wands*, 858 F.2d 731. 737 (Fed. Cir. 1988).

To comply with the written description requirement of 35 U.S.C. § 112(a), the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention. *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997). Further, to satisfy the written description requirement, the disclosure of the patent must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention." *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). "An applicant demonstrates that he was in possession of the invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set

forth the invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). "[T]he written description inquiry looks to the four corners of the specification to discern the extent to which the inventor(s) had possession of the invention as broadly claimed. The knowledge of ordinary artisans may be used to inform what is actually in the specification, but not to teach limitations that are not in the specification, even if those limitations would be rendered obvious by the disclosure in the specification." *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1322-23 (Fed. Cir. 2017) (citations omitted). In other words, even if something reflects an obvious variation of the invention disclosed in the specification, the claims are invalid for lack of written description.

The asserted claims are invalid for failure to enable and/or provide a written description of the alleged invention as required by 35 U.S.C. § 112(a). A person skilled in the art would not be able to make and use the claimed inventions by reading the specification. For example, the '701 patent fails to sufficiently describe or enable at least the following limitations and their counterparts in analogous claims: "determining a frequency of occurrence threshold based on an expected frequency of occurrence," "determining a frequency of occurrence threshold," "expected frequency of occurrence," "categorizing a plurality of syntax elements of video content into first and second categories based on the frequency of occurrence threshold," "entropy coding," "performing binarization of the symbols," "performing binarization so as to target a predetermined probability," "based on a relationship of the frequency of occurrence of the syntax elements to a predefined threshold," "a predefined threshold," and "determining a frequency of occurrence threshold based on an expected frequency of occurrence of syntax elements in a bit stream."

The specification also fails to provide sufficient written description and fails to enable the claims as interpreted by Complainant in its purported infringement read. For example, the specification does not provide sufficient written description for performing any of the claimed

steps in a decoder. One sentence stating that the rest of the specification directed to an encoder may also apply to a decoder is not sufficient. Moreover, even if it was sufficient written description, a POSITA would be unable to practice the claims without undue experimentation. A POSITA would be left guessing as to how the entirety of the specification directed to an encoder could apply to a completely separate device.

Similarly, the specification fails to provide sufficient written description and fails to enable a frequency of occurrence threshold that is determined by a decoder. The only possible threshold mentioned in the specification is a static 50/50 threshold that is not determined in any way by the claimed decoder. Instead, it is preset and not based on an expected frequency of occurrence in a bit stream.

Respondents' contentions should not be seen as a suggestion that Respondents hereby limit their claims of indefiniteness, lack of enablement, or lack of written description to the terms identified herein. The contentions do not represent Respondents' agreement or views as to the meaning of any claim term. The contentions also do not represent Respondents' agreement or views as to the definiteness, written description support for, or enablement of any claim not specifically identified herein. Respondents reserve the right to supplement or amend these disclosures and to identify additional and/or different claim terms for construction.

1. 35 U.S.C. § 101 – Ineligible Subject Matter

Under 35 U.S.C. § 101, "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of [Title 35]." "This provision, however, contains longstanding judicial exceptions, which provide that laws of nature, natural phenomena, and abstract ideas are not eligible for patenting." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 765 (Fed. Cir. 2019). To determine if claims are patent eligible, the first step

is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). If so, the second step is to "search for an 'inventive concept'—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217–18 (internal quotation marks omitted). Under this framework, numerous cases have invalidated patents directed to video coding, encryption, and/or data manipulation. *See, e.g.*, *Realtime Data LLC v. Array Networks Inc.*, No. 2021-2251, 2023 WL 4924814 (Fed. Cir. Aug. 2, 2023), *cert. denied sub nom. Realtime Data LLC v. Fortinet, Inc.*, No. 23-498, 2024 WL 72018 (U.S. Jan. 8, 2024); *Hawk Tech. Sys., LLC v. Castle Retail, LLC*, 60 F.4th 1349 (Fed. Cir. 2023); *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1315 (Fed. Cir. 2021); *Sensormatic Elecs., LLC v. Wyze Labs, Inc.*, No. 2020-2320, 2021 WL 2944838, at *3 (Fed. Cir. July 14, 2021); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161 (Fed. Cir. 2018); *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322 (Fed. Cir. 2017); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014); *see also In re Gitlin*, 775 F. App'x 689 (Fed. Cir. 2019).

The asserted claims of the '701 patent are directed to an abstract idea under the first step of the two-step *Alice* analysis. Specifically, the claims are directed to the patent-ineligible abstract idea of determining whether to context update an element based on how often it occurs. While the asserted claims generally use the "frequency of occurrence threshold" to selectively subject coding symbols to context updates, that is an inherently abstract procedure for data transformation. The claims invoke nothing more than generic computer components to perform the data-transformation steps, confirming the claims are directed to the abstract idea itself. *See, e.g.*, Cl. 8 ("An apparatus comprising at least one processor and at least one memory including computer program code . . .

."), 15 (". . . the computer-executable program code instructions comprising program code instructions to . . . .").

The asserted claims of the '701 patent also fail the second step of the *Alice* analysis because they do not recite any "additional features" capable of rendering the abstract idea into patent-eligible subject matter. Importantly, the '701 patent acknowledges that conventional video coding systems could already perform the relevant steps of video encoding/decoding, with the alleged exception of categorizing syntax elements and selectively subjecting corresponding coding symbols to context updates. '701 patent, 3:5-46. There is nothing inventive about categorizing syntax elements and selectively subjecting corresponding coding symbols to context updates. The '701 patent does not teach a technical solution to analyze or transform data. *See, e.g.*,'701 patent at 9:31-50, 10:4-8 (describing a categorizer and entropy coding engine without any specificity). The claims merely recite conventional functions performed by generic computing equipment, used in conventional ways. *See, e.g.*, '701 patent, Cl. 1, 8, 15. Using conventional components to increase the speed or efficiency of a process does not confer patent eligibility on an otherwise abstract idea. Nor does the '701 patent teach how to achieve any benefits, beyond directing a skilled artisan to apply well-known techniques. The use of standard video encoder or decoder components to implement the abstract idea does not add anything significant to the abstract idea. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." *BSG Tech. LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290–91 (Fed. Cir. 2018) (patent directed to "system and method for indexing data" directed to patent-ineligible abstract idea and lacked inventive concept).

2. 35 U.S.C. § 112(b) – Indefiniteness

The claims of a patent must "particularly point out and distinctly claim the subject matter which the applicant regards as his invention." 35 U.S.C. § 112(b). A claim is invalid as indefinite if it is not sufficiently precise to permit a potential competitor to determine whether or not it is infringing. *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470 (Fed. Cir. 1993). Specifically, "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig, Instruments, Inc.*, 572 U.S. 891, 901 (2014). Furthermore, when a claim includes a term of degree, the patent "must provide 'some standard of measuring that degree' such that the claim language provides 'enough certainty to one of skill in the art when read in context of the invention.'" *GE Lighting Solutions, LLC v. Lights of Am., Inc.*, 663 Fed. Appx. 938, 940 (Fed. Cir. 2016); *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). For terms of degree, "the patent must provide that additional information in the form of 'objective boundaries.'" *Id.* And the Federal Circuit's "case law is clear that the objective boundaries requirement applies to terms of degree." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018).

Under this standard, a person skilled in the art would not be able to determine the scope of the invention because of the indefiniteness of at least the following terms: "determining a frequency of occurrence threshold based on an expected frequency of occurrence," "determining a frequency of occurrence threshold," "expected frequency of occurrence," "symbols that correspond to the first category of syntax elements," "symbols that correspond to the second category of syntax elements," "syntax elements which occur less than the frequency of occurrence are categorized into the first category," "entropy coding," "syntax elements," and "based on a relationship of the frequency of occurrence of the syntax elements to a predefined threshold." The

claims of the '701 patent are also indefinite because it fails to describe how "syntax elements" that occur at same frequency as the frequency of occurrence threshold are categorized.

The contentions do not represent Respondents' agreement or views as to the meaning of any claim term. The contentions also do not represent Respondents' agreement or views as to the definiteness, written description support for, or enablement of any claim not specifically identified herein. Respondents reserve the right to supplement or amend these disclosures and to identify additional and/or different claim terms for construction.

3. Invalid Certificate of Correction

The certificate of correction issued on April 5, 2016 is invalid and the Asserted Claims are either invalid or cannot be asserted based on the certificate of correction. As issued to each independent claim, the result of the certificate of correction is that (1) the corrected claims are broader than the original claims; and (2) the presence of the clerical or typographical error, or how to correct that error, is not clearly evident to one of skill in the art. First, the claims as amended via the certificate of correction cover a different claim scope than the original issued claims. The elements that occur at a greater frequency are context updated before entropy coding. In the claims after the certificate of correction, the opposite occurs. Second, the presence of the error is not clearly evident to one of skill in the art. The words "first" and "second" are spelled correctly and read logically in the context of the original claims. Accordingly, the certificate of correction presents a substantive change in claim scope and a re-issue application would be required to change the claims.

In Respondents' contentions, the language of the claims includes the language corrected in the certificate of correction. This is not an admission that such language is correct. Respondents reserve the right to amend their contentions once the language of the invalid certificate of correction is no longer applied to the Asserted Claims.

V. U.S. PATENT NO. 8,050,321

A. Identification of Relevant Prior Art

Respondents identify the following prior art references that anticipate and/or render obvious the asserted claims of the asserted patent. The following patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g). Respondents have identified each prior art patent by its inventor, title, number, country of origin, date of filing, date of issue, and, where applicable, the relevant priority date, or such information may be derived from the face of the patent. Each prior art publication is identified by its title, date of publication, and, where feasible, author and publisher. For prior art under 35 U.S.C. § 102(b), Respondents have identified the item offered for sale or publicly used or known, the date by which the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known, to the full extent currently known.

Based on the information reasonably available to Respondents, the priority date for the ’321 patent is January 25, 2006, the filing date of application no. 11/338,934, the filing date of the application, which became the ’321 patent. The applicant added matter to the 11/338,934 that was not in any parent application. Nokia therefore bears the burden of showing on a claim-by-claim basis that it is entitled to a priority date earlier than January 25, 2006. If Nokia contends or demonstrates that any of the asserted claims of the ’321 patent are entitled to a priority date before January 25, 2006, then Respondents reserve the right to identify additional prior art references which anticipate or make obvious the asserted claims of the ’321 patent.

1. Prior Art Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following prior art patent publications. These patent publications constitute prior

art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Respondents reserve the right to supplement this list as it learns in the course of discovery of other prior art patent publications that would anticipate and/or render the asserted claims obvious.

Prior Art Reference	**Inventor**
U.S. Patent No. 4,390,966	Kawashima et al.
U.S. Patent No. 5,122,875	Raychaudhuri et al.
U.S. Patent No. 5,144,426	Tanaka et al.
U.S. Patent No. 5,148,272	Acampora et al.
U.S. Patent No. 5,461,420	Yonemitsu et al.
U.S. Patent No. 5,543,847	Kato
U.S. Patent No. 5,642,460	Shimoda
U.S. Patent No. 5,680,322	Shinoda
U.S. Patent No. 5,699,474	Suzuki et al.
U.S. Patent No. 5,699,476	Van Der Meer
U.S. Patent No. 5,774,593	Zick et al.
U.S. Patent No. 5,786,858	Yagasaki et al.
U.S. Patent No. 5,838,265	Adolph
U.S. Patent No. 5,852,630	Langberg et al.
U.S. Patent No. 5,877,812	Krause et al.
U.S. Patent No. 5,949,953	Shirakawa et al.
U.S. Patent No. 5,956,741	Jones
U.S. Patent No. 6,058,240	McLaren
U.S. Patent No. 6,072,831	Chen
U.S. Patent No. 6,094,456	Ueda
U.S. Patent No. 6,108,382	Gringeri et al.
U.S. Patent No. 6,122,317	Hanami et al.
U.S. Patent No. 6,233,356	Haskell et al.
U.S. Patent No. 6,266,158	Hata et al.
U.S. Patent No. 6,307,886	Westermann
U.S. Patent No. 6,310,897	Watanabe et al.
U.S. Patent No. 6,314,139	Koto et al.
U.S. Patent No. 6,337,881	Chaddha
U.S. Patent No. 6,359,911	Movshovich et al.
U.S. Patent No. 6,363,208	Nitta et al.
U.S. Patent No. 6,414,991	Yagasaki et al.

U.S. Patent No. 6,427,150	Oashi et al.
U.S. Patent No. 6,483,875	Hasebe et al.
U.S. Patent No. 6,496,980	Tillman et al.
U.S. Patent No. 6,510,553	Hazra
U.S. Patent No. 6,614,936	Wu et al.
U.S. Patent No. 6,639,943	Radha et al.
U.S. Patent No. 6,658,199	Hallberg
U.S. Patent No. 6,754,271	Gordon et al.
U.S. Patent No. 6,754,905	Gordon et al.
U.S. Patent No. 6,907,073	Sawhney et al.
U.S. Patent No. 6,909,743	Ward et al.
U.S. Patent No. 6,912,351	Kim
U.S. Patent No. 6,920,178	Curet et al.
U.S. Patent No. 6,940,904	Chen et al.
U.S. Patent No. 6,973,130	Wee et al.
U.S. Patent No. 7,263,720	Lapstun
U.S. Patent No. 7,103,669	Apostolopoulos
U.S. Patent Appl. Publication No. 2001/0024472	Sporer et al.
U.S. Patent Appl. Publication No. 2001/0040700	Hannuksela et al.
U.S. Patent Appl. Publication No. 2001/0041055	Kawamura et al.
U.S. Patent Appl. Publication No. 2002/0051621	Cuccia
U.S. Patent Appl. Publication No. 2002/0071485	Caglar et al.
U.S. Patent Appl. Publication No. 2002/0097800	Ramanzin
U.S. Patent Appl. Publication No. 2003/0039308	Wu et al.
U.S. Patent Appl. Publication No. 2003/0063806	Kim et al.
Chinese Patent Appl. Publication No. CN 1173783	Naimpally et al.
European Patent Appl. Publication No. EP 0798932	Naimpally et al.
European Patent Appl. Publication No. EP 0898427	Sekiguchi et al.
European Patent Appl. Publication No. EP 0966161	Nagumo et al.
European Patent Appl. Publication No. EP 1005232	Wang et al.

Japanese Patent Appl. Publication No. 4-348690	Tanaka et al.
Japanese Patent Appl. Publication No. 8-265694	Matsuno et al.
Japanese Patent Appl. Publication No. 10-271511	Hata et al.
Japanese Patent Appl. Publication No. 11-177987	Yoneda et al.
Japanese Patent Appl. Publication No. 11-275576	Bun
Japanese Patent Appl. Publication No. 2000-59783	Tawara et al.
Japanese Patent Appl. Publication No. 10-70725 (JP3158064)	Katada et al.
Russian Patent Appl. Publication No. 2123769	Oda
Russian Patent Appl. Publication No. 2137197	Rakhovskij et al.
International Patent Appl. Publication No. WO 00/22820	Pejhan et al.
International Patent Appl. Publication No. WO 00/67469	Hannuksela
International Patent Appl. Publication No. WO 01/47283	Wan et al.
International Patent Appl. Publication No. WO 01/80567	Ueda et al.
International Patent Appl. Publication No. WO 01/84850	Bruls et al.
International Patent Appl. Publication No. WO 02/054776	Karczewicz et al.

2. Prior Art Non-Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works of prior art. These publications constitute additional prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby disclose as prior art publications all references disclosed below in Section 3 (regarding on sale/public use), such as press releases, users manuals, and other related documentation about such

prior art products. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the asserted claims obvious.

- Lee et al., H.263-Based SNR Scalable Video Codec, Multimedia Dept. Electronics and Telecomm. Research Institute.
- Fernando, et al., Scene Adaptive Video Encoding for MPEG and H.263+ Video, IEEE Transactions on Consumer Electronics
- Lee, et al., Motion-Compensated Layered Video Coding for Playback Scalability, IEEE Transactions on Circuits and Systems for Video Technology.
- Apostolopoulos, John, Error-Resilient Video Compression Via Multiple State Streams, International Workshop on Very Low Bitrate Video Coding (VLBV'99), Kyoto, Japan, Oct. 1999.
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- Mitchell, Joan, et al., MPEG Video Compression Standard
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- Bjontegaard, ITU-Telecommunications Standardization Union, H.26L Test Model Long Term No. 8 (TML-8) Draft, Document VCEG-N10.
- ITU-Telecommunications Standardization Union, Draft for "H.263++" Annexes U, V, and W to Recommendation H.263 (Nov. 2000).
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- Okubo, Proposed Amendments to the Common Text ITU-T Recommendation H.262 | ISO/IEC 13818-2 (version decided by SG15 on 28 May 1996); International Telecommunication Union Telecommunication Standardization Sector Study Period 1993 – 1996; Source: Rapporteur for Q.2/15 (Sakae Okubo).
- Agreed Corrigenda (Corrigendum 1 and Corrigendum 2) to H.262 | ISO/IEC 13818-2, ITU - Telecommunication Standardization Sector, Study Group 15; Geneva, 27 May - 7 June 1996; Temporary Document 35-E (PLEN).
- ITU-T Recommendation H.263: Video coding for low bit rate communication (Feb. 1998).
- Wenger, Stephan, et al.; On Picture, GOP, and Sequence Headers; ITU - Telecommunications Standardization Sector Study Group 16 Question 6 Video Coding Experts Group (VCEG); 13th Meeting: Austin, Texas, USA, 2-4 April, 2001; Document: VCEG-M74.
- Suzuki, Teruhiko, et al.; Tool to support random access; ITU - Telecommunications Standardization Sector Study Group 16 Question 6 Video Coding Experts Group (VCEG); 15th Meeting: Pattaya, Thailand, 4-6 Dec., 2001; Document: VCEG-O53r2.
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- International Standard ISO/IEC 11172-2 - Information technology - Coding of moving pictures and associated audio for digital storage media at up to about I,5 Mbit/s – Part 2: Video.Prior Art Items and/or Knowledge
- ISO/IEC TR 11172-5 (1st ed.) Information technology – coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 5: Software simulation
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- Lee, Ruby, Real-Time Software MPEG Video Decoder on Multimedia-Enhanced PA 7100LC Processors, Hewlett-Packard Journal, April. 1995.
- Patel, Ketan, Performance of a Software MPEG Video Decoder, MULTIMEDIA '93: Proceedings of the first ACM international conference on Multimedia September 1993, September 1, 1993.

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on prior art items embodying and alleged inventions or structures described in, and/or any knowledge disclosed by or referred to in, any of the prior art patents or prior art publications identified above in Sections V.A.1 and V.A.2. Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or other further investigation.

3. Prior Art Under 35 U.S.C. §§ 102(f) and 102(g)

Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through discovery or other further investigation.

B. Anticipation and Obviousness

Respondents contend that the prior art references identified in Respondents' contentions anticipate or render obvious the asserted claims of the '321 patent. Respondents attach Exhibits B-1 to B-12, which provide exemplary disclosures showing how the prior art anticipates and/or renders obvious the asserted claims of the '321 patent.

Prior art that anticipates and/or render obvious the asserted claims of the '321 patent are cited and described in the claim charts attached hereto as Exhibits B-1 to B-12, each of which describes anticipation and/or obviousness of one or more claims of the asserted patents by a prior art reference. These claim charts provide citations to portions of the above references, illustrating how the prior art explicitly discloses every element of the asserted claims of the '321 patent. To the extent any element is not provided by an expressly enabling disclosure by the referenced prior art, all elements of the asserted claims of the '321 patent would still be the inherent result of putting into practice the systems and methods described by the prior art referenced herein, as set forth below.

Exhibit	Primary Reference
B-1	U.S. Patent No. 5,543,847 ("Kato")
B-2	U.S. Patent No. 5,956,741 ("Jones")
B-3	U.S. Patent App. Pub. No. 2003/0039308 ("Wu")
B-4	U.S. Patent No. 6,909,743 ("Ward")
B-5	U.S. Patent No. 6,912,352 ("Kim")
B-6	U.S. Patent No. 6,920,178 ("Curet")
B-7	Wiegand, Thomas; Text of Committee Draft of Joint Video Specification (ITU-T Rec. H.264 | ISO/IEC 14496-10 AVC); Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG; 3rd Meeting: Fairfax, Virginia, USA, 6-10 May, 2002; Document JVT-C167 ("JVT-C167")
B-8	International Standard ISO/IEC 11172-2 - Information technology - Coding of moving pictures and associated audio for digital storage media at up to about I,5 Mbit/s – Part 2: Video ("MPEG-1")
B-9	ITU-T Recommendation H.262 / International Standard ISO/IEC 13818-2, Information Technology – Generic Coding

	of Moving Pictures and Associated Audio Information: Video (Feb. 17, 2000) ("H.262/MPEG-2")
B-10	ITU-T Recommendation H.264 Advanced Video Coding for Generic Audiovisual Services (03/2005) ("H.264 (03/2005)") / ITU-T Recommendation H.264 Advanced Video Coding for Generic Audiovisual Services (05/2003) ("H.264 (05/2003)")
B-11	Secondary References
B-12 B-13	U.S. Patent No. 6,658,199 ("Hollberg") U.S. Patent No. 6,414,991 ("Yagasaki")

In addition to the discussion above, and to the extent not anticipated, the asserted claims of the '321 patent are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. Items of prior art that render obvious the asserted claims of the '321 patent are cited and described in the claim charts attached hereto as Exhibits B-1 to B-12. Respondents also identify secondary references and obviousness combinations in Exhibit B-12. In the event a particular reference or combination of references identified in Exhibits B-1 to B-12 does not anticipate or render obvious one of the asserted claims of the '321 patent, the reference, alone or in combination with one or more of the references identified in those exhibits or in Exhibit B-12 renders the claim obvious. For clarity, if a primary reference chart indicates that a limitation may be disclosed in Exhibit B-12, the limitation would also have been obvious in view of a combination with another primary reference that discloses the limitation. The identification of certain combinations of prior art does not exclude other combinations and is without prejudice to Respondents' right to rely on additional specific combinations as well as to detail and explain such combinations.

The U.S. Supreme Court in *KSR Int'l Co. v. Teleflex Inc*., 127 S. Ct. 1727 (2007) emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense should not be patentable. *Id*. at 1732, 1738, 1742-1743, 1746. A patent claim may be obvious if the combination of elements was obvious to try or if there existed at the time of the invention a

known problem for which there was an obvious solution encompassed by the patent's claims. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability. *Id*. at 1740. The Court stated that courts should "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id*. at 1740-41. *KSR* does not mandate evidence of a motivation or suggestion to combine prior art references. *See TGIP, Inc. v. AT&T Corp*., 527 F. Supp. 2d 561, 580-81 (E.D. Tex. 2007). "[A] court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ" to resolve the question of obviousness. *KSR*, 127 S. Ct. at 1741.

Based on all of these considerations, as further detailed in Exhibits B-1 to B-12, persons of ordinary skill in the art would have combined the teachings of the prior art references discussed and charted in those exhibits. The combinations of these references would have rendered obvious to one of ordinary skill in the art the subject matter of the asserted claims of the '321 patent. The references identified in Exhibits B-1 to B-12 are analogous prior art to the subject matter of the asserted claims of the '321 patent and, for at least the reasons set forth below, are properly combinable. Because these prior art references exist within a single field of art, particularly one in which individuals in the field often shared and/or collaborated on their work, it would have been obvious for a person of skill in the art to look from one piece of prior art to another in order to find any missing functionality they desired to implement. Therefore, these references provide

interrelated teachings and one of ordinary skill would look to the concepts in any of these references when seeking to solve the problems purportedly addressed by the asserted patents.

Numerous prior art references, including those identified in the attached exhibits, reflect common knowledge and the state of the prior art before the earliest claimed effective filing date of the asserted patents. As it would be unduly burdensome to create detailed claim charts for all of the invalidating combinations, for at least the reasons described in these initial invalidity contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those identified in the attached exhibits, to meet the limitations of the asserted claims of the '321 patent. Respondents' inclusion of exemplary combinations, in view of the factors and exemplary motivations to combine identified herein, does not preclude Respondents from identifying other invalidating combinations and/or motivations as appropriate.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, because 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, instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court 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. Nevertheless, in addition to the information contained herein, Respondents hereby identify additional motivations and reasons to combine the cited art.

Clear and logical rationale to combine any of the references identified above with others exists from the prior art references themselves, as well as from the interrelated teachings of other prior art references, common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the existence and nature of a known need or problem, and/or knowledge possessed by a person of ordinary skill. In addition, it would have been obvious to combine the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompts variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combinations of the prior art references identified above would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Therefore, various reasons to combine the disclosed references exist. Respondents reserve the right to rely on the knowledge of those skilled in the art, the testimony of expert witnesses, and/or other prior art, to show that it would have been obvious to include the allegedly missing limitation and to explain the motivation to combine the prior art elements.

In addition, it would have been obvious to combine any of the prior art in Exhibits B-1 to B-12 because all of these references relate to methods for grouping and numbering image frames.

For example, H.262/MPEG-2 discloses: "Group of picture header is an optional header that can be used immediately before a coded I-frame to indicate to the decoder if the first consecutive B-pictures immediately following the coded I-frame can be reconstructed properly in the case of a random access. In effect, if the preceding reference frame is not available, those B-pictures, if any, cannot be reconstructed properly unless they only use backward prediction or intra coding. This is more precisely defined in the clause describing closed_gop and broken_link."

H.262/MPEG-2, at 13. H262/MPEG-2 further discloses: “Random access is an essential feature for video on a storage medium. It requires that any picture can be accessed and decoded in a limited amount of time. It implies the existence of access points in the bitstream – that is segments of information that are identifiable and can be decoded without reference to other segments of data. In this Specification access points are provided by sequence_header() and this is then followed by intra information (picture data that can be decoded without access to previously decoded pictures).” H.262/MPEG-2, at 145.

As another example, Jones discloses: “A group of pictures (GOP) can start with B pictures that are predicted from a P picture in a previous GOP. This is called an ‘open GOP’. FIG. 41 illustrates this. Pictures 17 and 18 are B pictures at the start of the second GOP. If the GOP is ‘open’ then the encoder may have encoded these two pictures using predictions from the P picture 16 and also the I picture 19. Alternatively, the encoder could have restricted itself to using predictions from only the I picture 19. In this case the second GOP is a ‘closed GOP.[’]” Jones, 152:15-24.

As another example, Kim discloses: “The bit stream generated and transmitted to the recording/reproducing unit 140 as described above has a logical structure as shown in, e.g., FIG. 5A. As shown therein, each P-picture frame P1, P2, P3 has a current address CAD indicating the current address of the P-picture, and an I-picture reference address IAD indicating the address of the corresponding (or previous) I-frame. If image signals are obtained from more than one camera, the bit streams generated and transmitted to the recording/reproduction unit 140 can have a logical structure as shown in, e.g., FIG. 5B. In addition to the shown in FIG. 5A, the data stream of FIG. 5B includes a camera (channel) ID code CHID indicating the identification code of each camera or a signal source.” Kim, 4:46-58. Figure 4 in Kim discloses two paths for decoding an image in

response to a user requesting playback. A POSITA would have understood that Kim's Figure 4 process is applied, or would have found it obvious to apply Kim's Figure 4 process, to each image frame in a video sequence, including the sequence in Kim's Figure 5A. Specifically, a POSITA would have been motivated to apply Kim's Figure 4 process to Kim's Figure 5A video data rather than a single image so that Kim's Figure 4 process could be applied to more types of input data. For example, Kim discloses that the flowchart in Figure 4 depicts a reproducing method for a data structure, such as shown in Figure 6. Kim, 6:8-10. Kim further discloses that Figure 6 shows an example of a data structure of the bitstream shown in Figure 5A. Kim, 4:59-60. A POSITA would have understood that the decoding steps in Figure 4 can be repeated for each image in an independent sequence shown in Figure 5A. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1330 (Fed. Cir. 2009) (finding that a POSITA's common sense taught repeating an element existing in the prior art until success was achieved); *see also B/E Aerospace, Inc. v. C&D Zodiac,Inc.*, 962 F.3d 1373, 1380-81 (Fed. Cir. 2020) (same). Moreover, decoding video sequences including closed GOPs was well known at the relevant time. A POSITA would have found this combination to be no more than applying prior art elements (Kim's Figure 4 process to Kim's Figure5A data structure) according to their known functions to achieve predictable results. Alternatively, even without applying Figure 4's process to all of the pictures of an independent sequence in Figure 5A, a POSITA would have understood that Figure 4's process applies to an independent sequence consisting of a P-picture and a corresponding I-picture.

As another example, JVT-C167 discloses, "independent group of pictures (independent GOP): A group of pictures that can be decoded independently from previous or later pictures. The start of an independent GOP is explicitly signalled." JVT-C167, at 3. JVT-C167 also discloses "An instantaneous decoder refresh picture (IDER picture) implies that all pictures in the multi-

picture buffer are marked as "unused" except the current picture. Moreover, the maximum long-term index is reset to zero. An IDER picture contains only I or SI slices, and IDER slice type shall be used for all slices of an IDER picture. The picture starts an independent group of pictures (independent GOP) that lasts until the next IDER picture." JVT-C167, at 24.

As another example, MPEG-1 discloses, "A group of pictures is a series of one or more coded pictures intended to assist random access into the sequence. In the stored bitstream, the first coded picture in a group of pictures is an I-Picture. The order of the pictures in the coded stream is the order in which the decoder processes them in normal playback. In particular, adjacent B-Pictures in the coded stream are in display order. The last coded picture, in display order, of a group of pictures is either an I-Picture or a P-Picture." MPEG-1 § 2.4. MPEG-1 further discloses: "The Temporal Reference is a ten-bit number which can be used to define the order in which the pictures must be displayed. It may be useful since pictures are not transmitted in display order, but rather in the order which the decoder needs to decode them. The first picture, in display order, in each group must have Temporal Reference equal to zero. This is incremented by one for each picture in the group." MPEG-1 § D.5.3.2.

As another example, Hanami discloses, "The GOP layer includes a GOP 1140 including a plurality of pictures 1130. The pictures 1130 included in the GOP 1140 include at least one I picture and zero or a plurality of P or B pictures. A GOP header 1145 storing a GOP start code and information such as a flag indicating that this GOP 1140 requires no reference from image data of a preceding GOP is arranged at the head of the GOP 1140." Hanami at 4:64-5:3. An exemplary structure of the coded bitstream including the GOP layer is shown in Fig. 87. Hanami at 4:1-10, Fig. 87.

As another example, Kato relates to "a picture encoding and decoding method and apparatus and a picture recording medium in which random accessing may be made to any GOP." Kato at Col. 2:39-49. Specifically, Kato discusses including an indication in a GOP, such that "when encoding a P-picture belonging to a GOP, it can be recognized whether or not random accessing may be had to such GOP." *Id.*; *see also id.* at Col. 7:52-63. "If random accessing is found to be possible from the random accessibility indicating flag S26, it is found that, in the case of the GOP constructions as shown in X, Y and Z in FIGS. 5 and 6, prediction from the pictures belonging to past GOPs is not made." *See* Col. 8:21-34.

As another example, Yonemitsu discloses picture coding in relation to MPEG standards involving I-pictures, B-picture, and P-pictures organized in a "Group of Pictures (GOP)." Yonemitsu at 1:13-19, 12:64-13:26. A temporal reference signal "is a signal associated with each input picture and indicates the order in which the pictures in a Group of Pictures (GOP) are to be displayed." *Id.* at 13:21-24. "The temporal__reference field is a 10-bit field, the contents of which indicate the display order." *Id.* at 17:33-37. "A picture counter is incremented by one for each input picture to provide the temporal__reference. The temporal__reference counter is reset to zero for the first picture of each group of pictures, or if it reaches 1024." *Id.* at 17:37-41.

A POSITA would have understood that both Kato and Yonemitsu relate to the same field: encoding and decoding video sequences using specific "Groups of Pictures" as subsets within the video sequences. Kato at Col. 2:39-49; Yonemitsu at 1:13-19, 12:64-13:26. Kato teaches a method of improving decoding by allowing random accessing to GOPs. Kato at Col. 2:39-49; Col. 7:52-63. "If random accessing is found to be possible from the random accessibility indicating flag S26, it is found that, in the case of the GOP constructions as shown in X, Y and Z in FIGS. 5 and 6, prediction from the pictures belonging to past GOPs is not made." *See* Col. 8:21-34. Yonemitsu

teaches that decoding using GOPs can be performed utilizing a temporal reference signal that organizes the display order of the image frames in the GOP. Yonemitsu at 13:21-24. "The temporal__reference counter is reset to zero for the first picture of each group of pictures, or if it reaches 1024." *Id.* at 17:37-41. A POSITA would have been motivated to combine Kato's teaching of allowing random accessing to a GOP with Yonemitsu's teaching of organizing the GOP with a temporal reference signal in order to better control the display order. Implementing the functionality of Yonemitsu regarding display order into the decoding system of Kato would ensure that the proper display order of the image frames of the GOP would be maintained.

As another example, Ward relates to "communications systems generally and, more particularly, . . . to a method for splicing or concatenating information streams in a substantially seamless manner." Ward at 1:13-16. Specifically, Ward notes that "video information may be spliced together in a relatively seamless manner by defining "in-points" and "out-points" for each stream that are indicative of, respectively, appropriate stream entry and exit points." *Id.* at 1:55-58. Ward also comments that transition clip between the in-points and out-points is "encoded as a closed GOP structure" and that it is desirable for it to have "no external frame dependencies." *Id.* at 12:66-13:33.

As another example, Curet relates to "a method switching the video component(s) of a first digital, audio-visual program onto the video component(s) of a second digital, audio-visual program." Curet at 1:9-12. Curet discusses using a GOP which "consists of a sequence of pictures of which the first is an I picture, the second a B picture, the third a P picture, the fourth a B picture, etc. [wherein each picture] constitutes a forward reference in the order of presentation." *Id.* at 10:26-37.

As another example, H.264 discloses: "coded video sequence: A sequence of access units that consists, in decoding order, of an IDR access unit followed by zero or more non-IDR access units including all subsequent access units up to but not including any subsequent IDR access unit." H.264 (03/2005), at 6; H.264 (05/2003), at 2.

As another example, Hallberg discloses a method and a system "of creating a trick play video display from a group of MPEG video transport frames." Hallberg at 3:40-58; *see also id.* at 5:40-56 (describing "[t]he data compression techniques of MPEG…"). Further, Hallberg includes MPEG's provision of a closed GOP. *Id.* at 2:43-44. And a POSITA would have been familiar with Hallberg's temporal reference from, e.g., MPEG-1 and Yonemitsu. *See* MPEG-1 § D.5.3.2; Yonemitsu at 13:21-24, 17:33-37.

As another example, Yagasaki discloses "an image encoder, an image encoding method, an image decoder, an image decoding method, and distribution media suitable for use, for example, in the case where dynamic image data is recorded on storage media…." Yagasaki at 1:12-18. It references the MPEG standard as "a representative high-efficient dynamic image encoding system." *Id.* at 1:35-38. Like other references, Yagasaki references closed_gop in MPEG. *Id.* at Fig. 26, 28:6-9, 28:47-29:11.

Respondents incorporate by reference in their entirety prior art from the prosecution histories, background sections of the asserted patents, and any deposition testimony from relevant inventors. Respondents further incorporate in their entirety the Petitions submitted in IPR2024-00691. Respondents expect to rely on the testimony of one or more expert witnesses and documents referenced by those expert witnesses in support of these contentions and incorporate those forthcoming expert reports as if fully set forth herein.

Secondary considerations of non-obviousness, also referred to as objective indicia of non-obviousness, "can include copying, long felt but unsolved need, failure of others, commercial success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing industry respect for the invention, awards or other industry praise for the invention, and skepticism of skilled artisans before the invention." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc*., 711 F.3d 1348, 1368 (Fed. Cir. 2013). "A nexus between the merits of the claimed invention and evidence of secondary considerations is required in order for the evidence to be given substantial weight in an obviousness decision." *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Moreover, even if a nexus exists, secondary considerations of non-obviousness "simply cannot overcome [a] strong prima facie showing of obviousness." *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008).

Nokia has not established the existence of any objective indicia of non-obviousness or secondary considerations. Respondents reserve the right to supplement their contentions to respond to any such evidence should Nokia be permitted to raise them in the future. While discovery in this case is ongoing, and Respondents' investigation continues (which will include expert discovery), to the extent Nokia contends that one or more asserted claims of the '321 patent is not obvious based on secondary considerations recognized by relevant authority Respondents contend such allegations are without merit.

If Nokia identifies any additional secondary considerations of non-obviousness, Respondents reserve the right to amend and/or supplement their contentions.

C. Other Invalidity Grounds

Respondents hereby identify grounds upon which the asserted claims are invalid for failure to meet the requirements of 35 U.S.C. §§ 101, 112(a), 112(b), and 112(f). These contentions shall not be construed as an admission that any claim construction advanced by Respondents in this case

is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Respondents from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Nokia's purported construction of the claim language or of other positions advanced by Nokia during the course of this litigation. Respondents' Invalidity Contentions under 35 U.S.C. § 101 or 112 may depend, in part, on the Court's claim construction, as well as Nokia's alleged scope of the asserted claims. Consequently, Respondents identify only the issues under 35 U.S.C. § 101 or 112 of which they are presently aware.

1. 35 U.S.C. § 101 – Ineligible Subject Matter

Under 35 U.S.C. § 101, "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of [Title 35]." "This provision, however, contains longstanding judicial exceptions, which provide that laws of nature, natural phenomena, and abstract ideas are not eligible for patenting." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 765 (Fed. Cir. 2019). To determine if claims are patent eligible, the first step is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). If so, the second step is to "search for an 'inventive concept'—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217–18 (internal quotation marks omitted). Under this framework, numerous cases have invalidated patents directed to video coding, encryption, and/or data manipulation. *See, e.g.*, *Realtime Data LLC v. Array Networks Inc.*, No. 2021-2251, 2023 WL 4924814 (Fed. Cir. Aug. 2, 2023), *cert. denied sub nom. Realtime Data LLC v. Fortinet, Inc.*, No. 23-498, 2024 WL 72018 (U.S. Jan. 8, 2024); *Hawk Tech. Sys., LLC v. Castle Retail, LLC*, 60 F.4th 1349 (Fed. Cir. 2023);

PersonalWeb Techs. LLC v. Google LLC, 8 F.4th 1310, 1315 (Fed. Cir. 2021); *Sensormatic Elecs., LLC v. Wyze Labs, Inc.*, No. 2020-2320, 2021 WL 2944838, at *3 (Fed. Cir. July 14, 2021); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161 (Fed. Cir. 2018); *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322 (Fed. Cir. 2017); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014); *see also In re Gitlin*, 775 F. App'x 689 (Fed. Cir. 2019).

The asserted claims of the '321 patent are directed to an abstract idea under the first step of the two-step *Alice* analysis. Specifically, the claims are directed to the patent-ineligible abstract idea of using an indication to track video frames. The addition of an "indication" or a numbering scheme to manage data is an abstract idea. While the asserted claims generally use the "indication" to limit prediction to those frames in the same GOP, that is merely abstract data management. The claims invoke nothing more than generic computer components to perform the data-management steps, confirming the claims are directed to the abstract idea itself. *See, e.g.*, Cl. 10 ("A video decoder comprising at least one processor and at least one memory including computer code . . . ."), 11 (". . . the computer program product comprising: a computer program code for . . . .").

The asserted claims of the '321 patent also fail the second step of the Alice analysis because they do not recite an "inventive concept" capable of rendering the abstract idea into patent-eligible subject matter. Importantly, the '321 patent acknowledges that conventional video coding systems could already perform the relevant steps of video encoding/decoding, with the exception of the use of an "indication" to track frames in a "group of pictures" ("GOP"). '321 patent, 2:34-37, 3:37-48, 4:8-35. There is nothing inventive about the "indication" itself, such as a particular way to generate that indication. Moreover, the '321 patent explains that for pre-existing video systems, "an I-frame typically initiates a video sequence defined as a [GOP], the P-frames of which can only be

determined on the basis of the I-frame and the previous P-frames of the GOP in question," confirming that the data-management functions of the claims do not supply an inventive concept (which they could not do anyway, as data-management functions are themselves an abstract idea). '321 patent, 2:34–37. The claims merely recite conventional functions performed by generic computing equipment, used in conventional ways. See, e.g., '321 patent, Cl. 10, 11. Using conventional components to increase the speed or efficiency of a process does not confer patent eligibility on an otherwise abstract idea. The use of a standard video encoder or decoder components to implement the abstract idea does not add anything significant to the abstract idea. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." BSG Tech. LLC v. Buyseasons, Inc., 899 F.3d 1281, 1290–91 (Fed. Cir. 2018) (patent directed to "system and method for indexing data" directed to patent-ineligible abstract idea and lacked inventive concept).

2. 35 U.S.C. § 112(a) – Enablement and Written Description

To comply with the enablement requirement of 35 U.S.C. § 112(a), the patent specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Courts consider multiple factors to determine whether experimentation is undue, including: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *In re Wands*, 858 F.2d 731. 737 (Fed. Cir. 1988).

To comply with the written description requirement of 35 U.S.C. § 112(a), the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly

conclude that the inventor invented the claimed invention. *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997). Further, to satisfy the written description requirement, the disclosure of the patent must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention." *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). "An applicant demonstrates that he was in possession of the invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). "[T]he written description inquiry looks to the four corners of the specification to discern the extent to which the inventor(s) had possession of the invention as broadly claimed. The knowledge of ordinary artisans may be used to inform what is actually in the specification, but not to teach limitations that are not in the specification, even if those limitations would be rendered obvious by the disclosure in the specification." *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1322-23 (Fed. Cir. 2017) (citations omitted). In other words, even if something reflects an obvious variation of the invention disclosed in the specification, the claims are invalid for lack of written description.

The asserted claims are invalid for failure to enable and/or provide a written description of the alleged invention as required by 35 U.S.C. § 112(a). A person skilled in the art would not be able to make and use the claimed inventions by reading the specification. For example, the '321 patent fails to sufficiently describe or enable at least the following limitations and their counterparts in analogous claims: "decoding identifier values for image frames according to a numbering scheme," "reset[ing] the identifier value for the indicated first image frame of the independent sequence," and "whereby the video sequence is decoded without prediction from any image frame decoded prior to said first image frame."

The specification also fails to provide sufficient written description and fails to enable the claims as interpreted by Complainant in its purported infringement read. For example, the specification does not provide sufficient written description for performing any of the claimed steps in a decoder. One sentence stating that the rest of the specification directed to an encoder may also apply to a decoder is not sufficient. Moreover, even if it was sufficient written description, a POSITA would be unable to practice the claims without undue experimentation. A POSITA would be left guessing as to how the entirety of the specification directed to an encoder could apply to a completely separate device.

3. 35 U.S.C. § 112(b) – Indefiniteness

The claims of a patent must "particularly point out and distinctly claim the subject matter which the applicant regards as his invention." 35 U.S.C. § 112(b). A claim is invalid as indefinite if it is not sufficiently precise to permit a potential competitor to determine whether or not it is infringing. *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470 (Fed. Cir. 1993). Specifically, "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig, Instruments, Inc.*, 572 U.S. 891, 901 (2014). Furthermore, when a claim includes a term of degree, the patent "must provide 'some standard of measuring that degree' such that the claim language provides 'enough certainty to one of skill in the art when read in context of the invention.'" *GE Lighting Solutions, LLC v. Lights of Am., Inc.*, 663 Fed. Appx. 938, 940 (Fed. Cir. 2016); *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). For terms of degree, "the patent must provide that additional information in the form of 'objective boundaries.'" *Id.* And the Federal Circuit's "case law is clear that the objective boundaries requirement applies to terms of degree." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018).

Under this standard, a person skilled in the art would not be able to determine the scope of the invention because of the indefiniteness of at least the following terms: "start[ing] the decoding of the video sequence from said first image frame of the independent sequence" and "decoding identifier values for image frames according to a numbering scheme."

For example, each of the independent claims 8, 10, and 11 include the limitation "start[ing] the decoding of the video sequence from said first image frame of the independent sequence." However, the same claims specify that there can be more than one independent sequence in each video sequence, such that there can be more than one "first image frame." Since the claims do not specify how to select the specific "first image frame" that is referenced in the above-identified limitation. As such, the identified limitation is indefinite.

The contentions do not represent Respondents' agreement or views as to the meaning of any claim term. The contentions also do not represent Respondents' agreement or views as to the definiteness, written description support for, or enablement of any claim not specifically identified herein. Respondents reserve the right to supplement or amend these disclosures and to identify additional and/or different claim terms for construction.

VI. U.S. PATENT NO. 10,536,714

A. Identification of Relevant Prior Art

Respondents identify the following prior art references that anticipate and/or render obvious the asserted claims of the asserted patent. The following patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g). Respondents have identified each prior art patent by its inventor, title, number, country of origin, date of filing, date of issue, and, where applicable, the relevant priority date, or such information may be derived from the face of the patent. Each prior art publication is identified by its title, date of publication, and, where feasible, author and publisher. For prior art under 35 U.S.C. § 102(b), Respondents have identified

the item offered for sale or publicly used or known, the date by which the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known, to the full extent currently known.

Based on the information reasonably available to Respondents, the priority date for the '714 patent is November 1, 2012, the filing date of application No. 13/666,680, the earliest filed application to which the '714 patent claims priority as a continuation. Nokia bears the burden of showing on a claim-by-claim basis that it is entitled to a priority date earlier than November 1, 2012, including the filing date and description of the alleged inventions claimed in the '714 patent in any earlier provisional application. Nokia has not done so, including in any of its interrogatory responses served to date. If Nokia contends or demonstrates that any of the asserted claims of the '714 patent are entitled to a priority date before November 1, 2012, then Respondents reserve the right to identify additional prior art references which anticipate or make obvious the asserted claims of the '714 patent.

1. Prior Art Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following prior art patent publications. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Respondents reserve the right to supplement this list as it learns in the course of discovery of other prior art patent publications that would anticipate and/or render the asserted claims obvious.

Prior Art	Author
U.S. Patent No. 8,824,558	Lin et al.
U.S. Patent No. 8,953,689	Sugio et al.
U.S. Patent No. 8,989,271	Sugio et al.

U.S. Patent No. 9,066,110	Zhou
U.S. Patent No. 9,161,036	Sugio et al.
U.S. Patent No. 9,165,379	Lim et al.
U.S. Patent No. 9,204,162	Lee
U.S. Patent No. 9,300,963	Lin, et al.
U.S. Patent No. 9,300,978	Hallapuro et al.
U.S. Patent No. 9,307,239	Lin et al.
U.S. Patent No. 9,313,494	Zheng et al.
U.S. Patent No. 9,544,611	Oh et al.
U.S. Patent No. 9,565,447	Lee et al.
U.S. Patent No. 9,866,859	Zhou
U.S. Patent No. 9,094,689	Yu et al.
U.S. Patent No. 9,918,101	Park et al.
U.S. Patent No. 9,924,193	Schwarz
US Patent No. 9,992,511	Bici
U.S. Patent No. 10,063,876	Lin et al.
U.S. Patent No. 10,887,585	Sugio et al.
U.S. Patent No. 11,218,708	Sugio et al.
U.S. Patent No. 11,973,949	Su et al.
U.S. Patent Appl. Publication No. 2004/0234144	Sugimoto et al.
U.S. Patent Appl. Publication No. 2007/0189389	Boisson et al.
U.S. Patent Appl. Publication No. 2008/0159401	Lee et al.
U.S. Patent Appl. Publication No. 2008/0095408	Yokohota et al.
U.S. Patent Appl. Publication No. 2008/0232642	Chang
U.S. Patent Appl. Publication No. 2010/0220790	Jeon et al.
U.S. Patent Appl. Publication No. 2011/0013697	Choi et al.
U.S. Patent Appl. Publication No. 2011/0170602	Lee et al.
U.S. Patent Appl. Publication No. 2011/0176013	Robertson
U.S. Patent Appl. Publication No. 2011/0176612	Tsai et al.
U.S. Patent Appl. Publication No. 2011/0176615	Lee et al.
U.S. Patent Appl. Publication No. 2011/0182362	Kim et al.

U.S. Patent Appl. Publication No. 2011/0194608	Rusert et al.
U.S. Patent Appl. Publication No. 2011/0194609	Rusert et al.
U.S. Patent Appl. Publication No. 2011/0249721	Karczewicz
U.S. Patent Appl. Publication No. 2012/0008676	Lee et al.
U.S. Patent Appl. Publication No. 2012/0128067	Liu
U.S. Patent Appl. Publication No. 2012/0134415	Lin
U.S. Patent Appl. Publication No. 2012/0134416	Lin
U.S. Patent Appl. Publication No. 2012/0230408	Zhou
U.S. Patent Appl. Publication No. 2012/0257678	Zhou
U.S. Patent Appl. Publication No. 2012/0269270	Chen
U.S. Patent Appl. Publication No. 2012/0300846	Sugio
U.S. Patent Appl. Publication No. 2012/0307905	Kim et al.
U.S. Patent Appl. Publication No. 2012/0320984	Zhou
U.S. Patent Appl. Publication No. 2012/0320969	Zheng et al.
U.S. Patent Appl. Publication No. 2013/0003850	Sugio
U.S. Patent Appl. Publication No. 2013/0004092	Sasai
U.S. Patent Appl. Publication No. 2013/0022127	Park et al.
U.S. Patent Appl. Publication No. 2013/0077691	Zheng et al.
U.S. Patent Appl. Publication No. 2013/0070855	Zheng
U.S. Patent Appl. Publication No. 2013/0083853	Coban
U.S. Patent Appl. Publication No. 2013/0156335	Lim
U.S. Patent Appl. Publication No. 2014/0092981	Lin
U.S. Patent Appl. Publication No. 2013/0272404	Park et al.

U.S. Patent Appl. Publication No. 2013/0272408	Chen
U.S. Patent Appl. Publication No. 2014/0140408	Lee et al.
U.S. Patent Appl. Publication No. 2015/0163508	Bici et al.
U.S. Patent Appl. Publication No. 2018/0156335	Lim
U.S. Provisional Patent Appl. No. 61/491,381	Sugio
U.S. Provisional Patent Appl. No. 61/301,649	Rusert
U.S. Provisional Patent Appl. No. 61/500,903	Lin
EP2924996	Lee et al.
EP3833025	Schwarz et al.
EP2568706	Younghee et al.
EP3958564	Mi et al.
CN101271580	Chang
CN101605255	Lai
CN101860754	Dai
CN1757238	Boisson
Japanese Patent Appl. Publication No. 2004-032300	Nakayama
Int'l Patent Appl. Publication No. WO 2010/146314	Stephane et al.
Int'l Patent Appl. Publication No. WO 2011/062392	Kim et al.
Int'l Patent Appl. Publication No. WO 2011/074874	Park et al.
Int'l Patent Appl. Publication No. WO 2011/099463	格温埃利·布瓦松多米尼克·托罗爱德华·弗朗索瓦
Int'l Patent Appl. Publication No. WO 2011/115659	Zheng et al.
Int'l Patent Appl. Publication No. WO 2011/126345	Kim

2. Prior Art Non-Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works of prior art. These publications constitute additional prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are

included on the face of those documents. In addition to the references listed below, Respondents hereby disclose as prior art publications all references disclosed below in Section 3 (regarding on sale/public use), such as press releases, users manuals, and other related documentation about such prior art products. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the asserted claims obvious.

- Sargolzai, M.H., et al., Low cost Error Tolerant Motion Estimation for H.264/AVC Standard" School of Electrical and Computer Engineering.
- Liu, Shan; Method and syntax for partial CU merge; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 5th Meeting: Geneva, CH, 16-23 March, 2011; Document: JCTVC-E085.
- Fukushima, Shigeru; Unified motion vector removal process for AMVP; 1Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 5th Meeting: Geneva, CH, 16-23 March, 2011; Document: JCTVC-E095.
- Zhou, Minhua, et al.; A study on HM3.0 parsing throughput issue; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 6th Meeting: Torino, IT, 14-22 July, 2011; Document: JCTVC-F068.
- Zhou, Minhua Parallelized merge/skip mode for HEVC; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 6th Meeting: Torino, IT, 14-22 July, 2011; Document: JCTVC-F069.
- Zhang, Ximin; CE9: 4.4 Method for improving partial CU merge by merging inter NxN partitions; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 6th Meeting: Torino, IT, 14-22 July, 2011; Document: JCTVC-F071.
- Wiegand, Tomas, et al.; “WD3: Working Draft 3 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 5th Meeting; Geneva, CH, Mar. 16-23, 2011; Document JCTVC-E603.
- Bici, O. et al., Non - CE13: Simplification of merge mode , Joint Collaborative Team on Video Coding (ICT-VC) of ITU - T SG16 WP3 and ISO/EC JTC1/SC29/WG11, 7th Meeting: Geneva, CH, Nov. 21-30, 2011, Document JCTVC - G593 (and corresponding attachments).
- Bross, B. et al., Core Experiment 9: MV Coding and Skip / Merge Operations, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F909r1.

- Bross, Benjamin, et al.; " WD4: Working Draft 4 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 6th Meeting; Torino, IT; Jul. 14-22, 2011; Document JCTVC-F803 d6.
- Bross, Benjamin, et al.; " WD4: Working Draft 4 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 6th Meeting; Torino, IT; Jul. 14-22, 2011; Document JCTVC-F803 d1 v3.
- Yeo, Chuohao, et al.; "Simplified AMVP candidate derivation for Inter and Merge modes"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 5th Meeting: Geneva, CH, 16-23 March, 2011; JCTVC-E101.
- Fujibayashi, Akira et al.; "CE9 3.2d Simplified Motion vector prediction"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 4th Meeting: Daegu, Korea, 20-28 January, 2011; JCTVC-D231.
- Zhou, Minhua et al.; "CE9: Simplified AMVP design (SP06S1, SP06S2)"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 6th Meeting: Torino, IT, 14-22 July, 2011; Document: JCTVC-F088.
- J.-L. Lin , Y.-W. Chen , Y.-W. Huang , S. Lei ; " CE9 : Results of Experiment ROB04": JCT-VC Doc. JCTVC-F052, Turin; Jul. 2011 (and corresponding attachments).
- Zheng, Yunfei; Unified Motion Vector Predictor Selection for Merge and AMVP; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 5th Meeting: Geneva, 16-23 March, 2011; Document JVT-E396.
- Bross, B. et al., CE9: Summary Report of Core Experiment on MV Coding and Skip/Merge Operations, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F029r1.
- Jeon , Y. et al . , On MVP list pruning process , Joint Collaborative Team on Video Coding (JCT - VC) of ITU - T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul . 14-22 , 2011 , Document JCTVC-F105 (and thres1-10).
- Zheng, Y. et al., CE9: Unified Merge and AMVP candidates selection (UNI03), Joint Collaborative Team on Video Coding (ICT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F297r1.
- Zheng, Y, et al.; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 6th Meeting: Torino, IT, 14-22 July, 2011; Document: JCTVC-F302.
- Fukushima, Shigeru. et al., Merge based mvd transmission, Joint Collaborative Team on Video Coding (ICT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F373.
- Nakamura, H. et al., Unification of derivation process for merge mode and MVP, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC

JTC1/SC29/WG11, 6th Meeting; Torino, IT, Jul. 14-22, 2011; Document JCTVC-F419 and corresponding attachments.

- Zheng, Y. et al., Merge Candidate Selection in 2NxN, Nx2N, and NxN Mode, Joint Collaborative Team on Video Coding (ICT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F302 and corresponding attachments.
- Bici, Oguz, et al.; CE9: Results of SP experiments on simplification of merge process; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 8th Meeting: San José, CA, USA, 1–10 February, 2012; Document: JCTVC-H0252.
- Karam, Lina, *Lossless Coding,* Handbook of Image and Video Processing, Second Edition (2005)
- Wei-Chen, Jian, Introduction to H.264 advanced video coding, Proceedings of the 2006 Asia and South Pacific Design Automation Conference vol. 2006 (2006).
- Won, Kwanghyun, *Motion Vector Coding Using Decoder-Side Estimation Of Motion Vector*, 2009 IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB) (2009)
- Gweon, Ryeong-Hee, *Non-Fixed Quantization Considering Entropy Encoding in HEVC*, Journal of Broadcast Engineering, The Korean Institute of Broadcast and Media Engineers (2011)
- Sullivan, Gary, *The H.264/AVC Advanced Video Coding Standard: Overview and Introduction to the Fidelity Range Extensions*, SPIE Conference on Applications of Digital Image Processing XXVII (2004)
- Sullivan, Gary, *Meeting report of the third meeting of the Joint Collaborative Team on Video Coding* (JCT-VC), Guangzhou, CN, 7–15 October, 2010 (Document: JCTVC-C400)
- Sullivan, Gary, *Meeting report of the sixth meeting of the Joint Collaborative Team on Video Coding* (JCT-VC), Torino, IT, 14–22 July 2011 (Document: JCTVC-F800)
- Sullivan, Gary, *Recent Developments in Standardization of High Efficiency Video Coding (HEVC)*, Proceedings Volume 7798, Applications of Digital Image Processing XXXIII; 77980V (2010).

Each of the preceding prior art references were public available before the earliest priority date of the ’714 patent. For example, Nakamura, Wiegand, and Bross are all JCT-VT documents that were available to the public as part of the H.265 standardization process. Each of these references was available to the public before the priority date of the ’714 patent, and members of the interested public were aware of how to easily find these documents.

3. Prior Art Items and/or Knowledge

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on prior art items embodying and alleged inventions or structures described in, and/or any knowledge disclosed by or referred to in, any of the prior art patents or prior art publications identified above in Sections VI.A.1 and VI.A.2. Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or other further investigation.

4. Prior Art Under 35 U.S.C. §§ 102(f) and 102(g)

Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through discovery or other further investigation.

B. Anticipation and Obviousness

Respondents contend that the prior art references identified in Respondents' contentions anticipate or render obvious the asserted claims of the '714 patent. Respondents attach Exhibits D-1 to D-13, which provide exemplary disclosures showing how the prior art anticipates and/or renders obvious the asserted claims of the '714 patent.

Prior art that anticipates and/or render obvious the asserted claims of the '714 patent are cited and described in the claim charts attached hereto as Exhibits D-1 to D-13, each of which describes anticipation and/or obviousness of one or more claims of the asserted patents by a prior art reference. These claim charts provide citations to portions of the above references, illustrating how the prior art explicitly discloses every element of the asserted claims of the '714 patent. To the extent any element is not provided by an expressly enabling disclosure by the referenced prior art, all elements of the asserted claims of the '714 patent would still be the inherent result of putting

into practice the systems and methods described by the prior art referenced herein, as set forth below.

Exhibit	Primary Reference
D-1	U.S. Patent No. 9,313,494 ("Zheng"); U.S. Provisional Application No. 61/499,112, U.S. Provisional Application No. 61/543,043, and U.S. Provisional Application No. 61/543,059
D-2	U.S. Patent No. 10,063,876 ("Lin") alone or in combination with U.S. Patent Application Publication No. 2011/0194609 ("Rusert")
D-3	U.S. Patent Application Publication No. 2011/0176612 ("Tsai")
D-4	U.S. Patent Application Publication No. 2011/0194609 ("Rusert") alone or in combination with U.S. Patent Application Publication No. 2011/0249721 ("Karczewicz") and/or U.S. Patent No. 10,063,876 ("Lin")
D-5	U.S. Patent Application Publication No. 2013/0272404 ("Park")
D-6	Bross, Benjamin, et al.; "WD4: Working Draft 4 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 6th Meeting; Torino, IT; Jul. 14-22, 2011; Document JCTVC-F803d. ("Bross")
D-7	Nakamura, H. et al., Unification of derivation process for merge mode and MVP, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting; Torino, IT, Jul. 14-22, 2011; Document JCTVC-F419; URL: http://wftp3.itu.int/AV-ARCH/JCTVC-SITE/2011_07_F_Torino/. ("JCTVC-F419") alone or in combination with Bross, Benjamin, et al.; "WD4: Working Draft 4 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 6th Meeting; Torino, IT; Jul. 14-22, 2011; Document JCTVC-F803d. ("Bross") and/or Wiegand, Tomas, et al.; "WD3: Working Draft 3 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 5th Meeting; Geneva, CH, Mar. 16-23, 2011; Document JCTVC-E603. ("Wiegand")
D-8	Wiegand, Tomas, et al.; "WD3: Working Draft 3 of High-Efficiency Video Coding"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 5th Meeting; Geneva, CH, Mar. 16-23, 2011; Document JCTVC-E603. ("Wiegand")

Exhibit	Primary Reference
D-9	Zheng, Y. et al., Merge Candidate Selection in 2NxN, Nx2N, and NxN Mode, Joint Collaborative Team on Video Coding (ICT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, IT, Jul. 14-22, 2011; Document JCTVC-F302. ("JCTVC-F302")
D-10	Secondary References
D-11	Yeo, Chuohao, et al.; "Simplified AMVP candidate derivation for Inter and Merge modes"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 5th Meeting: Geneva, CH, 16-23 March, 2011; JCTVC-E101. ("JCTVC-E101")
D-12	Fujibayashi, Akira et al.; "CE9 3.2d Simplified Motion vector prediction"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 4th Meeting: Daegu, Korea, 20-28 January, 2011; JCTVC-D231. ("JCTVC-D231")
D-13	Int'l Patent Appl. Publication No. WO 2010/1464314 to Stephane et al. ("Stephane")

In addition to the discussion above, and to the extent not anticipated, the asserted claims of the '714 patent are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. Items of prior art that render obvious the asserted claims of the '714 patent are cited and described in the claim charts attached hereto as Exhibits D-1 to D-13. Respondents also identify secondary references and obviousness combinations in Exhibit D-13. In the event a particular reference or combination of references identified in Exhibits D-1 to D-9 and D11 to D13, do not anticipate or render obvious one of the asserted claims of the '714 patent, the reference, alone or in combination with one or more of the references identified in those exhibits or in Exhibit D-10 renders the claim obvious. For clarity, if a primary reference chart indicates that a limitation may be disclosed in Exhibit D-10, the limitation would also have been obvious in view of a combination with another primary reference that discloses the limitation. The identification of certain combinations of prior art does not exclude other combinations and is

without prejudice to Respondents' right to rely on additional specific combinations as well as to detail and explain such combinations.

The U.S. Supreme Court in *KSR Int'l Co. v. Teleflex Inc*., 127 S. Ct. 1727 (2007) emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense should not be patentable. *Id*. at 1732, 1738, 1742-1743, 1746. A patent claim may be obvious if the combination of elements was obvious to try or if there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability. *Id*. at 1740. The Court stated that courts should "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id*. at 1740-41. *KSR* does not mandate evidence of a motivation or suggestion to combine prior art references. *See TGIP, Inc. v. AT&T Corp*., 527 F. Supp. 2d 561, 580-81 (E.D. Tex. 2007). "[A] court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ" to resolve the question of obviousness. *KSR*, 127 S. Ct. at 1741.

Based on all of these considerations, as further detailed in Exhibits D-1 to D-13, persons of ordinary skill in the art would have combined the teachings of the prior art references discussed and charted in those exhibits. The combinations of these references would have rendered obvious to one of ordinary skill in the art the subject matter of the asserted claims of the '714 patent. The references identified in Exhibits D-1 to D-13 are analogous prior art to the subject matter of the

asserted claims of the ’714 patent and, for at least the reasons set forth below, are properly combinable. Because these prior art references exist within a single field of art, particularly one in which individuals in the field often shared and/or collaborated on their work, it would have been obvious for a person of skill in the art to look from one piece of prior art to another in order to find any missing functionality they desired to implement. Therefore, these references provide interrelated teachings and one of ordinary skill would look to the concepts in any of these references when seeking to solve the problems purportedly addressed by the asserted patents.

Numerous prior art references, including those identified in the attached exhibits, reflect common knowledge and the state of the prior art before the earliest claimed effective filing date of the asserted patents. As it would be unduly burdensome to create detailed claim charts for all of the invalidating combinations, for at least the reasons described in these initial invalidity contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those identified in the attached exhibits, to meet the limitations of the asserted claims of the ’714 patent. Respondents’ inclusion of exemplary combinations, in view of the factors and exemplary motivations to combine identified herein, does not preclude Respondents from identifying other invalidating combinations and/or motivations as appropriate.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, because 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, instead espousing an “expansive and flexible” approach). Indeed, the Supreme Court 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. Nevertheless, in addition to the information contained herein, Respondents hereby identify additional motivations and reasons to combine the cited art.

Clear and logical rationale to combine any of the references identified above with others exists from the prior art references themselves, as well as from the interrelated teachings of other prior art references, common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the existence and nature of a known need or problem, and/or knowledge possessed by a person of ordinary skill. In addition, it would have been obvious to combine the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompts variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combinations of the prior art references identified above would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Therefore, various reasons to combine the disclosed references exist. Respondents reserve the right to rely on the knowledge of those skilled in the art, the testimony of expert witnesses, and/or other prior art, to show that it would have been obvious to include the allegedly missing limitation and to explain the motivation to combine the prior art elements.

In addition, it would have been obvious to combine any of the prior art in Exhibits D-1 to D-13 because all of these references relate to devices and methods for comparing motion information for generating candidate lists.

For example, Wiegand discloses: "Derivation process for luma motion vectors for merge mode" and "[d]erivation process for spatial merging candidates" where it is described that "[i]f one of the following conditions is true, the availableFlagN is set equal to 0, both components mvLXN are set equal to 0, refIdxLXN and predFlagLX[xN, yN] of the prediction unit covering luma location (xN, yN) are assigned respectively to mvLXN, refIdxLXN and predFlagLXN. The prediction unit covering luma location (xN, yN) is not available or PredMode is MODE_INTRA. PartMode of the current prediction unit is PART_2NxN and PartIdx is equal to 1 and the prediction units covering luma location (xP, yP – 1) (PartIdx = 0) and luma location (xN, yN) (Cand. N) have identical motion parameters." Wiegand, 8.4.2.1.1; 8.4.2.1.2. "The derivation process for merging candidates from neighboring prediction unit partitions in subclause 8.4.2.1.4 is invoked with luma location (xP, yP), the width and the height of the prediction unit nPSW and nPSH and the partition index PartIdx as inputs and the output is assigned to the availability flags availableFlagN, the motion vectors mvL0N and mvL1N, the reference indices refIdxL0N and refIdxL1N and the prediction list utilization flags predFlagL0N and predFlagL1N with N being replaced by A, B, C or D." *Id*. at 8.4.2.1.1.

As another example, Bross discloses: "[d]erivation process for luma motion vectors for merge mode." Bross at 8.4.2.1.1. "The derivation process for merging candidates from neighboring prediction unit partitions in subclause 8.4.2.1.2 is invoked with luma location (xP, yP), the width and the height of the prediction unit nPSW and nPSH and the partition index PartIdx as inputs and the output is assigned to the availability flags availableFlagN, the reference indices refIdxL0N and refIdxL1N, the prediction list utilization flags predFlagL0N and predFlagL1N and the motion vectors mvL0N and mvL1N with N being replaced by A0, A1, B0, B1 or B2." *Id*.

As another example, Lee discloses: "A method and apparatus for encoding and decoding a motion vector of a current block." Lee at Abstract. "Referring to FIG. 10A, in a method of predicting a motion vector, one of motion vectors of previously encoded blocks adjacent to a current block may be used as a motion vector predictor of the current block." *Id.* at [0113]. "In FIG. 12, it is assumed that there are three elements MVP1, MVP2, and MVP3 in group C and a motion vector of a current block is MV. Since a motion vector predictor candidate that is most similar to a motion vector of a current block is used to predict the motion vector of the current block, MVP3 that is most similar to MV is used to predict the motion vector of the current block." *Id.* at [0162].

As another example, Tsai discloses: "a motion prediction method." Tsai at Abstract. "In this embodiment, motion vectors of four candidate units A, B, C, and D of the current frame 502 can be taken as candidates for determining the MVP of the current unit 512." *Id*. at [0028]. "After a plurality of motion vectors corresponding to a current unit 512 is determined to be included in the candidate set, at least one motion vector is adaptively selected from the candidate set for motion prediction of the current unit 512." *Id*. at [0030].

Further, Wiegand is an "Output Document of [the Joint Collaborative Team on Video Coding] JCT-VC" and provides "Working Draft 3 of High-Efficiency Video Coding." *Wiegand* at 1. Wiegand discloses "the ITU-T Video Coding Experts Group (VCEG) and the ISO/IEC Moving Picture Experts Group (MPEG) formed a Joint Collaborative Team on Video Coding (JCT-VC) in 2010 for development of a new Recommendation | International Standard." *Id.* at 13. Based on the disclosure of Wiegand, the ongoing development of High-Efficiency Video Coding and the relevant prior art, it would be obvious to a POSITA to combine Wiegand with references relating

to devices and methods for encoding and decoding, including other references relating to the development of High-Efficiency Video Coding.

For example, Lin discloses "[a] method and apparatus [to] derive a motion vector predictor (MVP) for a current block in an Inter, Merge, or Skip mode," and discloses "determin[ing] redundant MVP candidates according to a non-MV-value based criterion." *Lin* at Abstract. Lin discloses "High-Efficiency Video Coding (HEVC) is a new international video coding standard that is being developed by the Joint Collaborative Team on Video Coding (JCT-VC)." *Id.* at 1:40-42. Lin further discloses "[t]o further increase the coding efficiency of motion vector coding in HEVC, the motion vector competition (MVC) based scheme is applied to select one motion vector predictor (MVP) among a given MVP candidate set which includes spatial and temporal MVPs," and that "[t]here are three inter-prediction modes including Inter, Skip, and Merge in the HEVC test model version 3.0 (HM-3.0)." *Id.* at 1:54-60. Based on the disclosure of Lin, the ongoing development of the HEVC and the relevant prior art, it would be obvious to a POSITA to combine Lin with references relating to devices and methods for encoding and decoding, including other references relating to the development of HEVC.

In another example, Zheng discloses "techniques for determining a merge candidate set in a merge mode motion vector prediction process." *Zheng* at 3:39-41. Zheng further discloses "a new video coding standard, namely High-Efficiency Video Coding (HEVC), being developed by the Joint Collaboration Team on Video Coding (JCT-VC) of ITU-T Video Coding Experts Group (VCEG) and ISO/IEC Motion Picture Experts Group (MPEG)." *Id.* at 3:48-52. Zheng further discloses "[c]urrent proposals for the HEVC standard implement techniques to avoid using redundant merge candidates for PUs of the same CU. *Id.* at 8:26-28. In at least one example Zheng "proposes to remove the comparison checking operation during generation of a merge candidate

set, thus making merge candidate generation parallelization friendly." *Id.* at 9:19-22. Based on the disclosure of Zheng, the ongoing development of the HEVC and the relevant prior art, it would be obvious to a POSITA to combine Zheng with references relating to devices and methods for encoding and decoding, including other references relating to the development of HEVC.

Sugio discloses "a moving picture coding method and a moving picture decoding method." *Sugio* at 1:15-16. In the body of the specification, Sugio explicitly refers to "ITU-T Recommendation H.264, "Advanced video coding for generic audiovisual services", March, 2010," and "JCT-VC, "WD3: Working Draft 3 of High-Efficiency Video Coding", JCTVC-E603, March 2011." *Id.* at 1:47-50. Based on the disclosure of Sugio, the ongoing development of High-Efficiency Video Coding and the relevant prior art, it would be obvious to a POSITA to combine Sugio with references relating to devices and methods for encoding and decoding, including other references relating to the development of High-Efficiency Video Coding.

Lin '963 discloses "[a] method and apparatus for deriving a motion vector predictor (MVP)." Lin '963 at Abstract. Lin '963 acknowledges that "High-Efficiency Video Coding (HEVC) is a new international video coding standard that is being developed by the Joint Collaborative Team on Video Coding (JCT-VC)." *Id.* at 2:55-57. Lin '963 further discloses that "HEVC adopts the MVP technique to increase the coding efficiency of motion vector coding, where the motion vector competition (MVC) based scheme is applied to select one motion vector predictor (MVP) among a given candidate set of MVPs." Based on the disclosure of Lin '963, the ongoing development of High-Efficiency Video Coding and the relevant prior art, it would be obvious to a POSITA to combine Lin '963 with references relating to devices and methods for encoding and decoding, including other references relating to the development of High-Efficiency Video Coding.

Zhou discloses "inter-prediction candidate index coding independent of the construction of the corresponding inter-prediction candidate list, i.e., a merging candidate list or an advanced motion vector predictor list." *Zhou* at Abstract. *Zhou* similarly acknowledges "[t]he Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T WP3/16 and ISO/IEC JTC 1/SC 29/WG 11 is currently developing the next-generation video coding standard referred to as High Efficiency Video Coding (HEVC)." *Id.* at 1:36-39. Zhou discloses that "[s]everal coding efficiency enhancement tools are proposed in HEVC, among them a merge mode designed to reduce coding overhead by allowing an inter-predicted prediction unit (PU) to inherit motion data, i.e., motion vectors, prediction direction, and reference picture indices, from a position selected from neighboring motion data positions in the same picture and a temporal motion data position derived based on a co-located block of the same size as the PU in a reference picture, referred to as the co-located PU." *Id.* at 1:42-51. Based on the disclosure of Zhou, the ongoing development of High-Efficiency Video Coding and the relevant prior art, it would be obvious to a POSITA to combine Zhou with references relating to devices and methods for encoding and decoding, including other references relating to the development of High-Efficiency Video Coding.

Park discloses that "since a neighboring motion vector candidate group is limited to neighboring partitions having the same reference picture list and the same reference picture as those of the current partition, the probability that an available neighboring motion vector can be acquired decreases." Park at paragraph [0004]. Park further discloses "[i]n addition, complexity of a process of selecting a neighboring motion vector to be used for motion vector prediction increases as the number of candidates increase, and thus a method for efficiently perform the selection process is needed." *Id.* at paragraph [0005]. Based on the recognition for the need to efficiently perform the selection process described in Park and the relevant prior art, it would be

obvious to a POSITA to combine Park with references relating to devices and methods for encoding and decoding, including other references relating to the development of High-Efficiency Video Coding.

Further, U.S. Patent Publication No. 2012/008676 to Lee discloses a video coding method using data unit merging, where a current prediction unit (PU) can share motion information (motion vectors and reference indices) with its neighbors to improve compression. It shows considering the five spatial neighbor locations for potential merge candidates: left, above, above-left, above-right, and below-left. The reference also describes selecting candidates for a merge list, checking their availability (e.g., ensuring they are inter-coded), and ultimately choosing one candidate from the group of motion vector candidates for prediction.

Moreover, it shows selecting a left candidate (L), upper candidate (A) and a corner candidate (C) from a left candidate group located on the left side of the current unit, upper candidate group located on the upper side of the current unit and from the corner group located on the corner sides of the current unit. This selection is based on comparing the motion information of the candidates and they have the same motion information then one of them is excluded from the group of merging candidates (inferring this as the determining subset of spatial MVP candidate pairs and reducing the number of comparisons).

Further, discloses JCTVC-F088 discloses "a simplification method which can reduce the hardware implementation cost of the AMVP list construction by almost half without harming the coding efficiency." JCTVC-F088, pg. 1. JCTVC-F088 suggest the following changes to spatial MVP scaling: (1) "MVPs of same reference frame (vec1 and vec2) are scanned together, followed by the MVP scanning of different reference frames (vec3, vec4)[]" and (2) "MVPs of same reference frame (vec1 and vec2) are scanned together, followed by the MVP scanning of different

reference frames (vec3, vec4).” *Id.*, pg. 3. *See also id.*, pg. 3-4, 6 (detailing the proposed algorithm and complexity analysis).

As a further example, and as discussed in Respondents’ invalidity charts, Nakamura, Bross, and Wiegand are JCTVC documents relating to the same field of encoding and decoding of video signals. (Nakamura Abstract). In particular, Nakamura is a proposal for the H.265 standard for "simplify[ing] the derivation process for merge mode and MVP" in Wiegand (Nakamura p.2), e.g., for the motivation of “increas[ing] coding efficiency” by “reduc[ing] the number of candidates in the spatial derivation process[.]” The improvements made to Wiegand by Nakamura were incorporated into the JCTVC WD4, Bross.

Nakamura specifically discloses the "Derivation Process of merge mode and MVP in WD3" in Figure 1 of the document, and notes changes to the process such as having the "number of candidates [is] reduced in the spatial derivation process to reduce the number of times of comparison in the removal process."

A POSITA would have been motivated to apply Nakamura’s teachings to the draft HEVC standard (Bross) because the express purpose of the proposal by Nakamura was for inclusion into the standard. Bross (also WD4) was the resulting draft of the standard at the conclusion of the 6th meeting where Nakamura was proposed. Bross “[i]ncorporated spatial merge candidate positions unification” from Nakamura (Abstract). There was clear motivation to apply Nakamura to Bross because Nakamura was created for the express purpose of being incorporated into Bross.

As a further example, and as discussed in Respondents’ invalidity charts, Rusert teaches all limitations of the independent claims. Rusert uses H.264 terminology and teaches the blocks that serve as PUs in H.264. To the extent the claims require H.265 PUs, those were well-known

and, for example, taught by Karczewicz. A POSITA would have been motivated to apply Rusert's teachings to H.265 PUs and related concepts.

Rusert explains that, while its examples were "given in the context of H.264/AVC, the principles disclosed herein can also be applied to … other coding standard[s], and indeed any coding system which uses predicted motion vectors." Ex-1004, ¶116. Karczewicz teaches the concept of PUs in H.265, which was emerging as the successor standard to H.264—both were drafted by ITU-T—sharing the same concepts of block-based video encoding with predicted motion vectors. Karczewicz, ¶32, ¶¶35-37, ¶66, ¶71. Karczewicz teaches H.265 concepts including PUs. Therefore, this combination provides express motivation to apply Rusert's teachings to other standards including H.265, as taught by Karczewicz.

The combination of Rusert and Karczewicz would have combined prior art elements according to known methods to yield predictable results, e.g., combining Rusert's teachings for generating/de-duplicating MVP candidate lists with H.265 concepts, including PUs and related information for motion vectors. In Rusert's H.264 examples, motion vectors and motion prediction operate on blocks. Rusert, ¶¶2-5, ¶36, ¶43. As Karczewicz explains, for H.265 drafts, motion vectors and motion prediction operated on blocks called PUs. Karczewicz, ¶¶33-36, ¶¶64-66. Karczewicz also teaches types of information conveyed by motion vectors. Karczewicz, ¶35. A POSITA would have been motivated to apply Rusert's known techniques for selecting PMV candidates to PUs, to improve the similar draft H.265 standard in the same way that Rusert explained for H.264. This application would have been a simple substitution of Karczewicz's PU teachings for Rusert's block teachings, which would have yielded several advantages, including improved coding efficiency as taught by both references. Rusert, ¶7; Karczewicz, ¶6.

Additionally, a POSITA would have found motivation in the similarity of the references. Both are directed to ITU video-coding standards. Rusert, ¶116; Karczewicz, ¶¶32-33. Karczewicz explains that "[i]n general, a CU" of H.265 "has a similar purpose to a macroblock of H.264" and in its simplest case, a CU was a PU. Karczewicz, ¶33, ¶35.

A POSITA would have been motivated to combine teachings from Rusert's embodiments and background section regarding H.264 with each other. Rusert explains that its embodiments were provided in the context of H.264. Rusert, ¶¶3-4, ¶67, ¶77, ¶116.

The combination of Rusert and Karczewicz relies on Rusert's teachings regarding PMV_CANDS, for which Rusert teaches two options: initializing and updating PMV_CANDS dynamically for each block or using a sliding window. Rusert, ¶41. A POSITA would have been motivated to use the first option (for each block) because Rusert presents it as the first of a finite number of options (two).

Karczewicz discusses H.264 and H.265 and applies its teachings to both. Therefore, Karczewicz's teachings regarding additional H.265 features would not have dissuaded a POSITA from combining Karczewicz with Rusert. Karczewicz, ¶5. ¶38. H.265 does not prevent H.264 teachings from being applied, or vice-versa.

The combination of Rusert and Karczewicz would have had predictable results. Rusert already applies its teachings to block-based encoding/decoding. Rusert, ¶2, ¶11. A PU is a type of block. Karczewicz, ¶35. Rusert's concepts were readily applicable to PUs, and the combination would have had the predictable result of selecting PMV candidates (as Rusert teaches) for PUs (as Karczewicz teaches). Rusert, ¶116. Therefore, the combination would not have changed the principle of operation for Rusert or Karczewicz because it applies their teachings in the manner

taught by each. Applying H.265 teachings to Rusert, and vice versa, was consistent with Rusert's statement that its principles are applicable to other standards. Rusert, ¶116.

A POSITA would have had a reasonable expectation of success combining Rusert and Karczewicz. The combination applies teachings according to their known purposes, in a conventional manner. The teachings are complementary aspects of block-based video encoding from H.264 and H.265. Rusert, ¶116. Karczewicz complements Rusert by teaching H.265 terminology and concepts. Karczewicz, ¶32. The combination of Rusert and Karczewicz does not modify Rusert or Karczewicz in a way that would render either inoperative. To the contrary, the similarities of the architectures would have given a POSITA a reasonable expectation of success in combining their teachings. Rusert, ¶11; Karczewicz, ¶2.

A POSITA would have been more than capable of applying Karczewicz's teachings to Rusert and vice versa because it would simply apply Rusert's teachings from H.264 to H.265. Motion estimation had been commonplace since the 1990s; H.264 introduced MVP by the early-mid 2000s. These were basic aspects of video-coding a POSITA would have been knowledgeable about.

Lin teaches removal of redundant MVPs for divided coding units (CUs), which is relevant to claim 4, among other dependent claims. Lin, ¶25. Lin is analogous art in the same field and teaches techniques "for motion vector coding." Lin, ¶2. A PHOSITA would have been motivated to combine Lin with Rusert and Karczewicz because a CU comprises one prediction unit (PU) when it has uniform motion and is only divided if different parts are moving in different directions, as Karczewicz explains. See Lin, ¶4; Lin Provisional, 000007; Karczewicz, ¶35. Therefore, for a divided block, the motion vector for one PU is not a good predictor for the other. Lin teaches what Karczewicz suggests, that the motion vector from one half can be removed as a candidate for the

other, thereby reducing the number of candidates. Lin, ¶25, ¶44; Lin Provisional, 000010. This would have had the predictable result of excluding such candidates, consistent with the reason why a block was divided to begin with.

Accordingly, a POSITA would have been motivated to apply Lin's teachings to the Rusert/Karczewicz combination because Lin provides a straightforward teaching for reducing redundant candidates when blocks are divided. This would have furthered Rusert's goal of "reduc[ing] the number of previous motion vectors that must be considered[.]" Rusert, ¶12, ¶7. Therefore, the combination of Rusert, Karczewicz, and Lin combines Lin's known technique to improve similar H.265 PU-based methods in the same way, which were ready for improvement to reduce the number of previous motion vectors that must be considered. Rusert, ¶12. In addition, the combination would not have changed the principle of operation for any reference, in the manner taught by each reference. Lin, ¶44; Lin provisional, 000010.

Further, a POSITA would have had a reasonable expectation of success in combining Rusert, Karczewicz, and Lin because all three references teach aspects of block-based video encoding for H.264/H.265 to reduce PMV candidates. Rusert, ¶25, ¶39, ¶¶42-44; Karczewicz, ¶3, ¶5, ¶38; Lin, ¶4, ¶25; Lin Provisional, 000009-11. The combination does not modify Rusert, Karczewicz, or Lin in a way that would render any reference inoperative. In addition, the underlying rationale for Lin's teachings is broadly applicable to scenarios when a block has been divided because blocks are divided into multiple PUs to assign them different motion vectors. Karczewicz, ¶35; Lin, ¶4; Lin Provisional, 000007.

As a further example, and as discussed in Respondents' invalidity charts, To the extent the asserted claims are not anticipated or rendered obvious by Lin, a POSITA would have been motivated to combine Lin's teachings, as explained for and throughout its various disclosed

embodiments with the teachings of US Patent Application Publication 2011/0194609 ("Rusert"), entitled "Selecting Predicted Motion Vector Candidates", to render the asserted encoding and decoding claims obvious.

Lin and Rusert are analogous references as they are in the same field of video encoding/decoding techniques. In particular, Lin and Rusert are both directed to aspects of block-based video encoding for H.264/H.265 to reduce or eliminate duplicate/duplicative motion vector prediction candidates. *Rusert* at ¶25, ¶39, ¶¶42-44; *Lin* at ¶4, ¶25. A person skilled in the art would have been motivated to combine Lin and Rusert. In particular, a person of ordinary skill in the art would have been motivated to combine the video coding techniques described Lin (e.g. deriving a motion vector predictor (MVP) for a current block in an Inter, Merge, or Skip mode, as described in Lin) with the purported improvement of selecting a list of PMV candidates and removing duplicates by comparing new candidates to a subset of the set of previously coded motion vectors (as described in Rusert), as was already known in the art. The combination of Lin and Rusert would have been nothing more than the application of a known technique (i.e. block-based selection of PMV candidates in the context of H.264) to a known method ready for improvement (i.e. the in-development video codec standard, H.265/HEVC discussed in Lin, including techniques to derive a motion vector predictor) to yield a predictable results (i.e. generating/de-duplicating MVP candidate lists with H.265 concepts, including PUs and related information for motion vectors). As a result, a person of ordinary skill in the art would have been motivated to combine the disclosures of Lin with Rusert, in order to use the improved video coding methods of the in-development H.265/HEVC standard described in Lin with the known block-based selection of PMV candidates described in Rusert. A person of ordinary skill in the art would have had a reasonable expectation of success in doing so, at least because it was well-known in the art for a

video encoding system to improve coding efficiency. Further, a person of ordinary skill in the art would have understood that known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces (e.g., optimizing performance and increasing coding efficiency). Therefore, a person of ordinary skill in the art would have been motivated to combine aspects of Lin with Rusert in order to make modifications, e.g., to the manner in which the video processing would operate.

Respondents incorporate by reference in their entirety prior art from the prosecution histories, background sections of the asserted patents, and any deposition testimony from relevant inventors. Respondents further incorporate in their entirety the Petitions submitted in IPR2024-00604 and IPR2024-00605. Respondents expect to rely on the testimony of one or more expert witnesses and documents referenced by those expert witnesses in support of these contentions and incorporate those forthcoming expert reports as if fully set forth herein.

Respondents contend that there are no secondary considerations of non-obviousness evidencing the validity of any of the asserted claims of the ’714 patent. Secondary considerations of non-obviousness, also referred to as objective indicia of non-obviousness, “can include copying, long felt but unsolved need, failure of others, commercial success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing industry respect for the invention, awards or other industry praise for the invention, and skepticism of skilled artisans before the invention.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc*., 711 F.3d 1348, 1368 (Fed. Cir. 2013). “A nexus between the merits of the claimed invention and evidence of secondary considerations is required in order for the evidence to be given substantial weight in an obviousness decision.” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Moreover, even if a nexus exists, secondary considerations of non-obviousness “simply

cannot overcome [a] strong prima facie showing of obviousness." *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008). Nokia has not established the existence of any objective indicia of non-obviousness or secondary considerations. Respondents reserve the right to supplement their contentions to respond to any such evidence should Nokia be permitted to raise them in the future. While discovery in this case is ongoing, and Respondents' investigation continues (which will include expert discovery), to the extent Nokia contends that one or more asserted claims of the '714 patent is not obvious based on secondary considerations recognized by relevant authority Respondents contend such allegations are without merit.

If Nokia identifies any additional secondary considerations of non-obviousness, Respondents reserve the right to amend and/or supplement their contentions.

C. Other Invalidity Grounds

Respondents hereby identify grounds upon which the asserted claims are invalid for failure to meet the requirements of 35 U.S.C. §§ 112(a), 112(b), and 112(f). These contentions shall not be construed as an admission that any claim construction advanced by Respondents in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Respondents from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Nokia's purported construction of the claim language or of other positions advanced by Nokia during the course of this litigation. Respondents' Invalidity Contentions under 35 U.S.C. § 112 may depend, in part, on the Court's claim construction, as well as Nokia's alleged scope of the asserted claims. Consequently, Respondents identify only the issues under 35 U.S.C. § 112 of which they are presently aware.

1. 35 U.S.C. § 101 – Ineligible Subject Matter

Under 35 U.S.C. § 101, "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of [Title 35]." "This provision, however, contains longstanding judicial exceptions, which provide that laws of nature, natural phenomena, and abstract ideas are not eligible for patenting." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 765 (Fed. Cir. 2019). To determine if claims are patent eligible, the first step is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). If so, the second step is to "search for an 'inventive concept'—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217–18 (internal quotation marks omitted). Under this framework, numerous cases have invalidated patents directed to video coding, encryption, and/or data manipulation. *See, e.g.*, *Realtime Data LLC v. Array Networks Inc.*, No. 2021-2251, 2023 WL 4924814 (Fed. Cir. Aug. 2, 2023), *cert. denied sub nom. Realtime Data LLC v. Fortinet, Inc.*, No. 23-498, 2024 WL 72018 (U.S. Jan. 8, 2024); *Hawk Tech. Sys., LLC v. Castle Retail, LLC*, 60 F.4th 1349 (Fed. Cir. 2023); *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1315 (Fed. Cir. 2021); *Sensormatic Elecs., LLC v. Wyze Labs, Inc.*, No. 2020-2320, 2021 WL 2944838, at *3 (Fed. Cir. July 14, 2021); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161 (Fed. Cir. 2018); *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322 (Fed. Cir. 2017); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014); *see also In re Gitlin*, 775 F. App'x 689 (Fed. Cir. 2019).

The asserted claims of the '714 patent are directed to an abstract idea under the first step of the two-step *Alice* analysis. Specifically, the claims are directed to the patent-ineligible abstract

idea of comparing and selecting subsets of data. For example, the claims merely use a computer to select a first spatial motion vector prediction candidate from a set of candidate, determine based on location a subset of spatial motion vector prediction candidates, compare the candidates against other candidates in the subset, and determine whether to include or exclude the first spatial motion prediction candidate. Thus, the claims of the '714 patent merely use a computer to organize data into groupings (a desired result), without providing any details or limitations as to how that comparison or selection should be performed, which is simply abstract data analysis and/or management.

The asserted claims of the '714 patent also fail the second step of the *Alice* analysis because they do not recite an "inventive concept" capable of rendering the abstract idea into patent-eligible subject matter. The claims merely recite conventional functions performed by generic computing equipment, used in conventional ways (or do not involve computer components at all). *See, e.g.*, '714 patent, Cls. 1, 9. The abstract idea itself cannot provide the inventive concept, but that is all the claims purport to add—the use of a standard video encoder or decoder to implement the abstract idea does not add anything significant to the abstract idea. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." *BSG Tech. LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290–91 (Fed. Cir. 2018) (patent directed to "system and method for indexing data" directed to patent-ineligible abstract idea and lacked inventive concept). Further, the '714 patent specification confirms that it uses generic computer components ("processor," "memory," "computer code") that are not themselves inventive. '714 patent at 24:41-25:4. Nor is there anything in the ordered combination of limitations that would be inventive, as they generally accord with the order for how existing video coding techniques already operated.

1. 35 U.S.C. § 112(a) – Enablement and Written Description

To comply with the enablement requirement of 35 U.S.C. § 112(a), the patent specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Courts consider multiple factors to determine whether experimentation is undue, including: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *In re Wands*, 858 F.2d 731. 737 (Fed. Cir. 1988).

To comply with the written description requirement of 35 U.S.C. § 112(a), the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention. *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997). Further, to satisfy the written description requirement, the disclosure of the patent must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention." *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). "An applicant demonstrates that he was in possession of the invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). "[T]he written description inquiry looks to the four corners of the specification to discern the extent to which the inventor(s) had possession of the invention as broadly claimed. The knowledge of ordinary artisans may be used to inform what is actually in the specification, but not to teach limitations that are not in the specification, even if those limitations would be rendered obvious by the disclosure in the specification." *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1322-23 (Fed.

Cir. 2017) (citations omitted). In other words, even if something reflects an obvious variation of the invention disclosed in the specification, the claims are invalid for lack of written description.

The asserted claims are invalid for failure to enable and/or provide a written description of the alleged invention as required by 35 U.S.C. § 112(a). A person skilled in the art would not be able to make and use the claimed inventions by reading the specification. For example, the '714 patent fails to sufficiently describe or enable at least the following limitations: "determining a subset of spatial motion vector prediction candidates based on a location of the block" as found in Claim 1; "the block associated with the first spatial motion vector prediction candidate" as found in Claims 1, 9, 15, 23, 29, and 30; "based on the/a location.," as found in Claims 1, 9, 15, 23, 29, and 30; and "comparing motion information of the first spatial motion vector prediction candidate with motion information of another spatial motion vector prediction candidate of the set of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates," as found in Claim 9.

2. 35 U.S.C. § 112(b) – Indefiniteness

The claims of a patent must "particularly point out and distinctly claim the subject matter which the applicant regards as his invention." 35 U.S.C. § 112(b). A claim is invalid as indefinite if it is not sufficiently precise to permit a potential competitor to determine whether or not it is infringing. *Morton Int'l, Inc. v. Cardinal Chem. Co.,* 5 F.3d 1464, 1470 (Fed. Cir. 1993). Specifically, "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig, Instruments, Inc.*, 572 U.S. 891, 901 (2014). Furthermore, when a claim includes a term of degree, the patent "must provide 'some standard of measuring that degree' such that the claim language provides 'enough certainty to one of skill in the art when read in context of the invention.'" *GE Lighting Solutions,*

LLC v. Lights of Am., Inc., 663 Fed. Appx. 938, 940 (Fed. Cir. 2016); *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). For terms of degree, "the patent must provide that additional information in the form of 'objective boundaries.'" *Id.* And the Federal Circuit's "case law is clear that the objective boundaries requirement applies to terms of degree." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018).

Under this standard, a person skilled in the art would not be able to determine the scope of the invention because of the indefiniteness of at least the following terms: "the block associated with the first spatial motion vector prediction candidate,." as found in Claims 1, 9, 15, 23, 29, and 30; "comparing motion information of the potential spatial motion vector prediction candidate with motion information of at most one other spatial motion vector prediction candidate of the set of spatial motion vector prediction candidates" as found in Claims 3 and 10; "the potential spatial motion vector prediction candidate has essentially similar motion information than a spatial motion vector prediction candidate," as found in Claims 6, 13, 20, and 27; and "comparing motion information of the first spatial motion vector prediction candidate with motion information of another spatial motion vector prediction candidate of the set of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates," as found in Claims 1, 9, 29, and 30.

The contentions do not represent Respondents' agreement or views as to the meaning of any claim term. The contentions also do not represent Respondents' agreement or views as to the definiteness, written description support for, or enablement of any claim not specifically identified herein. Respondents reserve the right to supplement or amend these disclosures and to identify additional and/or different claim terms for construction.

VII. U.S. PATENT NO. 11,805,267

A. Identification of Relevant Prior Art

Respondents identify the following prior art references that anticipate and/or render obvious the asserted claims of the asserted patent. The following patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g). Respondents have identified each prior art patent by its inventor, title, number, country of origin, date of filing, date of issue, and, where applicable, the relevant priority date, or such information may be derived from the face of the patent. Each prior art publication is identified by its title, date of publication, and, where feasible, author and publisher. For prior art under 35 U.S.C. § 102(b), Respondents have identified the item offered for sale or publicly used or known, the date by which the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known, to the full extent currently known.

Based on the information reasonably available to Respondents, the priority date for the ’267 patent is January 6, 2012, the filing date of application No. 13/344,893, the earliest filed application to which the ’267 patent claims priority as a continuation. Nokia bears the burden of showing on a claim-by-claim basis that it is entitled to a priority date earlier than January 6, 2012, including the filing date and description of the alleged inventions claimed in the ’267 patent in any earlier provisional application. Nokia has not done so, including in any of its interrogatory responses served to date. If Nokia contends or demonstrates that any of the asserted claims of the ’267 patent are entitled to a priority date before January 6, 2012, then Respondents reserve the right to identify additional prior art references which anticipate or make obvious the asserted claims of the ’267 patent.

1. Prior Art Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following prior art patent publications. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Respondents reserve the right to supplement this list as it learns in the course of discovery of other prior art patent publications that would anticipate and/or render the asserted claims obvious.

Prior Art	**Inventor**
U.S. Patent No. 5,754,240	Wilson
U.S. Patent No. 6,259,734	Boon
U.S. Patent No. 6,404,815	Sekiguchi et al.
U.S. Patent No. 6,512,523	Gross
U.S. Patent No. 6,539,058	Pearlstein et al.
U.S. Patent No. 6,704,360	Haskel et al.
U.S. Patent No. 6,931,157	Yang
U.S. Patent No. 6,950,469	Karczewicz et al.
U.S. Patent No. 7,020,109	Grilli et al.
U.S. Patent No. 7,224,733	Benzler et al.
U.S. Patent No. 7,555,043	Sato et al.
U.S. Patent No. 7,580,456	Li et al.
U.S. Patent No. 7,620,109	Srinivasan
U.S. Patent No. 7,720,152	Boyce
U.S. Patent No. 7,792,191	Nyeongkyu Kwon
U.S. Patent No. 7,974,344	Ji et al.
U.S. Patent No. 8,005,137	Han et al.
U.S. Patent No. 8,014,450	Regunathan
U.S. Patent No. 8,194,746	Suzuki
U.S. Patent No. 8,149,910	Tanizawa et al.
U.S. Patent No. 8,284,835	Iguchi
U.S. Patent No. 8,374,237	Demos
U.S. Patent No. 8,428,133	Ye et al.
U.S. Patent No. 8,498,336	Tourapis et al.
U.S. Patent No. 8,514,939	Chen et al.
U.S. Patent No. 8,594,188	Demos
U.S. Patent No. 8,606,028	Noda
U.S. Patent No. 8,660,174	Fu et al.
U.S. Patent No. 8,665,964	Joshi et al.

U.S. Patent No. 8,676,000	Alshina et al.
U.S. Patent No. 8,711,930	Karczewicz et al.
U.S. Patent No. 8,711,939	Alshina et al.
U.S. Patent No. 8,750,378	Karczewicz et al.
U.S. Patent No. 8,831,086	Ye
U.S. Patent No. 8,942,289	Srinivasan et al.
U.S. Patent No. 8,971,412	Ye et al.
U.S. Patent No. 8,995,526	Karczewicz et al.
U.S. Patent No. 9,014,280	Ye et al.
U.S. Patent No. 9,161,057	Karczewicz et al.
U.S. Patent No. 9,237,355	Chien et al.
U.S. Patent No. 9,307,122	Ugur et al.
U.S. Patent No. 9,344,744	Kirchhoffer
U.S. Patent No. 9,432,693	Ugur et al.
U.S. Patent No. 9,877,037	Ugur et al.
U.S. Patent No. 11,805,267	Ugur et al.
U.S. Patent Appl. Publication No. 2003/0112864	Karczewicz
U.S. Patent Appl. Publication No. 2003/0194011	Srinivasan
U.S. Patent Appl. Publication No. 2003/0202607	Srinivasan
U.S. Patent Appl. Publication No. 2004/0057523	Koto
U.S. Patent Appl. Publication No.2004/0208247	Barrau et al.
U.S. Patent Appl. Publication No.2004/0247031	Hagai et al.
U.S. Patent Appl. Publication No.2005/0053292	Mukerjee et al.
U.S. Patent Appl. Publication No.2005/0105620	Fukushima
U.S. Patent Appl. Publication No.2005/0207496	Komiya et al.
U.S. Patent Appl. Publication No.2005/0281334	Walker et al.
U.S. Patent Appl. Publication No.2006/0067406	Kitada et al.
U.S. Patent Appl. Publication No.2006/0067406	Winger
U.S. Patent Appl. Publication No. 2007/0009044	Tourapis et al.
U.S. Patent Appl. Publication No. 2007/0086526	Koto et al.

U.S. Patent Appl. Publication No. 2007/0140351	Hsieh-Chang Ho
U.S. Patent Appl. Publication No. 2008/0075169	Ugur et al.
U.S. Patent Appl. Publication No. 2008/0089417	Bao et al.
U.S. Patent Appl. Publication No. 2008/0198927	Wu
U.S. Patent Appl. Publication No. 2008/0198935	Srinivasan et al.
U.S. Patent Appl. Publication No. 2008/0310745	Ye et al.
U.S. Patent Appl. Publication No. 2009/0087111	Noda et al.
U.S. Patent Appl. Publication No. 2009/0092188	Lee et al.
U.S. Patent Appl. Publication No. 2009/0232215	Park et al.
U.S. Patent Appl. Publication No. 2009/0257499	Karczewicz et al.
U.S. Patent Appl. Publication No. 2009/0257503	Ye et al.
U.S. Patent Appl. Publication No. 2010/0002770	Motta et al.
U.S. Patent Appl. Publication No. 2010/0086027	Panchal et al.
U.S. Patent Appl. Publication No. 2010/0111182	Karczewicz et al.
U.S. Patent Appl. Publication No. 2011/0007799	Karczewicz et al.
U.S. Patent Appl. Publication No. 2011/0032991	Sekiguchi et al.
U.S. Patent Appl. Publication No. 2011/0090966	Chujoh et al.
U.S. Patent Appl. Publication No. 2009/0097545	Ugur
U.S. Patent Appl. Publication No. 2011/0200108	Joshi et al.
U.S. Patent Appl. Publication No. 2012/0051431	Chien et al.
U.S. Patent Appl. Publication No. 2012/0063515	Panchai et al.
U.S. Patent Appl. Publication No. 2013/0034158	Kirchhoffer et al.
U.S. Patent Appl. Publication No. 2013/0142262	Ye et al.

U.S. Patent Appl. Publication No. 2013/0182763	Yasuda et al.
U.S. Provisional Patent Appl. No. 60/305,891	Rajan et al.
U.S. Provisional Patent Appl. No. 60/341674	Lin et al.
Canadian Patent Application No. 2729615	Chujoh et al.
EP 1353513	Srinivasan
EP2003897	Noda et al.
EP2249572	Wada et al.
CN 101523922	Ye et al.
CN 101816183	Lee et al.
KR 100708114	Kim et al.
JP4355319B2	芳典 鈴木
Korean Patent Appl. No. KR10-2007-0014956 A	Yun et al.
RU 2004103743	БАРРО Эрик et al.
RU 2008138706	НОДА Реико et al.
WO 2007/042063	Schwarz et al.
WO 2008/048864	Ye et al.
WO 2008/067734	Zhou et al.
WO 2009/151615	Gomila et al.
WO 2010/001832	Chujoh et al.
WO 2011/086777	Yasuda et al.
WO 2011/127964	Kirchhoffer et al.
WO 2012/008040	Tanizawa et al.

2. Prior Art Non-Patent Publications

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works of prior art. These publications constitute additional prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby disclose as prior art publications all references disclosed below in Section 3 (regarding on sale/public use), such as press releases, users manuals, and other related documentation about such prior art products. Respondents reserve the right to supplement this list as they learn in the course

of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the asserted claims obvious.

- Weidi, et al.: "Motion- and Aliasing-Compensated Prediction for Hybrid Video Coding" IEEE Transactions on Circuits and Systems for Video Technology
- Ji, Xiangyang, et al., Block-Wise Adaptive Motion Accuracy Based B-Picture Coding with Low-Complexity Motion Compensation.
- Sun, Haiwei, et al., Fast Motion Vector And Bitrate Re-Estimation For Arbitrary Downsizing Video Transcoding.
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- ITU-T Recommendation H.264, Advanced Video Coding for Generic Audiovisual Services, Series H: Audiovisual And Multimedia Systems, Infrastructure of audiovisual services - Coding of moving video, ITU-T Recommendation H.264, Nov. 2007.
- Alvarez, J., "Discrepancies in Documentation and Implementation of Sub-pel Interpolation in TML-8 (Draft 0)", ITU Telecommunications Standardization Sector, Study Group 16 Question 6, Video Coding Experts Group (VCEG), 14th Meeting, Santa Barbara, CA (Sep. 24-27, 2001); Document VCEG-N71.
- Chiu et al., "Description of Video Coding Technology Proposal: Self Derivation of Motion Estimation and Adaptive (Wiener) Loop Filtering", Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 1st Meeting, (Apr. 15-23, 2010); Document JCTVC-A106.
- Chujoh, T et al.; Bidirectional prediction for stored B-slice; ITU - Telecommunications Standardization Sector STUDY GROUP 16 Question 6 Video Coding Experts Group (VCEG); 35th Meeting: Berlin, Germany, 16-18 July, 2008; Document: VCEG -AI20 (and corresponding attachments).
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- “Test Model under Consideration”; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 1st Meeting: Dresden, DE, 15-23 April, 2010; JCTVC-A205.
- Weigand et al.; WD1: Working Draft 1 of High-Efficiency Video Coding; oint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 3rd Meeting: Guangzhou, CN, 7-15 October, 2010; JCTVC-C403.

- Ye et al.; High Precision Interpolation and Prediction; 35 VCEG Meeting; 85. MPEG Meeting; Jul. 16, 2008-Jul. 18, 2008; Berlin; Video Coding Experts Group ofltu-T SG.16; No. VCEG-AI33; Jul. 12, 2008; XP030003598.
- Yi-Jen Chiu et al.; TEI: Fast Techniques to Improve Self Derivation of Motion Estimation; JCT-VC Meeting; Jul. 21, 2010-Jul.28, 2010; Geneva; Joint Collaborative Team on Video Coding of ISO/IEC JTC1/SC29/WG11 and ITU-T SG.16; Jul. 28, 2010; Document: JCTVC-B047.
- Yoshino et al.; Enhanced Switching of Interpolation Filter for HEVC; Joint Collaborative Team on Video Coding (JCT-VC) or ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 3rd Meeting, JCTVC-C183 (Oct. 7-15, 2010).
- Huang, Yu-Wen; A Technical Description of MediaTek's Proposal to the JCT-VC CfP; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 1st Meeting: Dresden, DE, 15-23 April, 2010; Document: JCTVC-A109 (and related attachments and revisions).
- Sullivan, Gary; Meeting report of the second meeting of the Joint Collaborative Team on Video Coding (JCT-VC), Geneva, CH, 21-28 July, 2010; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 2nd Meeting: Geneva, CH, 21-28 July, 2010; Document: JCTVC-B200.
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- Wiegand, Thomas et al.; Joint Draft 10 of SVC Amendment; Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6); 23rd Meeting: San Jose, California, USA, 21–27 April, 2007; Document: JVT-W201.
- Wang, Ye-Kui et al.; Comments to SVC JD 10; Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6); 24th Meeting: Geneva, CH, 29 June–5 July, 2007, Document: JVT-X033 (including all revisions and attachments).
- Chujoh, Takeshi et al.; Internal bit depth increase for coding efficiency; ITU - Telecommunications Standardization Sector, Study Group 16 Question 6, Video Coding Experts Group (VCEG); 31st Meeting: Marrakech, MA, 15-16 January, 2007; Document: VCEG-AE13.
- Ugur, Kemal et al.; Implementation of Adaptive Filters with 16-bit Integer Arithmetic; ITU - Telecommunications Standardization Sector, Study Group 16 Question 6 Video Coding Experts Group (VCEG); 33rd Meeting: Shenzhen, China, 20 October, 2007; Document: VCEG-AG22.
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- Wiegand, Thomas; Joint Draft 5: Scalable Video Coding (in integrated form with ITU-T Rec. H.264 | ISO/IEC 14996-10); Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6); 18th Meeting: Bangkok, Thailand, 14-20 January, 2006; Document: JVT-R201.
- SMPTE Standard, VC-1 Compressed Video Bitstream Format and Decoding Process, SMPTE 421M-2006.
- Rao, K.R., Kim, D.N., Hwang, J.J., The VC-1 Video Coding. In: Video coding standards. Signals and Communication Technology.
- Srinivasan, Sridhar, et al., *Windows Media Video 9: Overview and Applications*, Microsoft, Signal Processing: Image Communication (2004), pp. 851-875.
- Srinivasan, Sridhar, *An overview of VC-1*, Proc. SPIE 5960 (2005).

- Wiegand, Thomas, *Overview of the H.264/AVC Video Coding Standard*, IEE Transactions on circuits and Systems for Video Technology (July 2003).
- ITU-T Recommendation H.264, Advanced Video Coding for Generic Audio Visual Services (March 2009).
- Springer, *Numerical Computation: Methods, Software, and Analysis* (1995).
- Springer, *The VC-1 and H.264 Video Compression Standards for Broadband Video Services* (2008).Prior Art Items and/or Knowledge
- ITU-T, *H.264, Series H: Audiovisual and Multimedia Systems, Infrastructure of Audiovisual Services – Coding of Moving Video, Advanced Video Coding for Generic Audiovisual Services* (2010)
- RealNetworks, *RealVideo 9 External Specification* (August 2005)
- A. Alshin et al.; "Bi-directional optical flow for improving motion compensation"; 28th Picture Coding Symposium; IEEE; Nagoya, Japan 8-10 December 2010.

Respondents contend that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on prior art items embodying and alleged inventions or structures described in, and/or any knowledge disclosed by or referred to in, any of the prior art patents or prior art publications identified above in Sections VII.A.1 and VII.A.2. Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or other further investigation.

3. Prior Art Under 35 U.S.C. §§ 102(f) and 102(g)

Because Respondents have not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through discovery or other further investigation.

B. Anticipation and Obviousness

Respondents contend that the prior art references identified in Respondents' contentions anticipate or render obvious the asserted claims of the '267 patent. Respondents attach Exhibits E-

1 to E-16, which provide exemplary disclosures showing how the prior art anticipates and/or renders obvious the asserted claims of the ’267 patent.

Prior art that anticipates and/or render obvious the asserted claims of the ’267 patent are cited and described in the claim charts attached hereto as Exhibits E-1 to E-16, each of which describes anticipation and/or obviousness of one or more claims of the asserted patents by a prior art reference. These claim charts provide citations to portions of the above references, illustrating how the prior art explicitly discloses every element of the asserted claims of the ’267 patent. To the extent any element is not provided by an expressly enabling disclosure by the referenced prior art, all elements of the asserted claims of the ’267 patent would still be the inherent result of putting into practice the systems and methods described by the prior art referenced herein, as set forth below.

Exhibit	Primary Reference
E-1	U.S. Patent No. 7,620,109 (“Srinivasan”)
E-2	U.S. Patent No. 9,161,057 (“Karczewicz ’057”) in combination with Srinivasan and/or U.S. Patent No. 8,606,028 (“Noda”)
E-3	US Pat. No. 9,344,744 (“Kirchhoffer”)
E-4	U.S. Patent Application Publication No. 2005/0281334 A1 (“Walker”)
E-5	U.S. Pat. Appl. No. 2009/0257499 Al (“Karczewicz ’499”)
E-6	U.S. Pat. Appl. No. 2011/0007799 A1 (“Karczewicz ’799”) in combination with Karczewicz ’499
E-7	Admitted Prior Art
E-8	JVT-R201
E-9	Secondary References
E-10	ITU-T, *H.264, Series H: Audiovisual and Multimedia Systems, Infrastructure of Audiovisual Services – Coding of Moving Video, Advanced Video Coding for Generic Audiovisual Services* (2010) (“H.264”), including systems that implement H.264[1]

[1] Respondents reserve the right to supplement these contentions in light of discovery related to system art.

Exhibit	Primary Reference
E-11	RealNetworks, *RealVideo 9 External Specification* (August 2005) ("RealVideo 9"), including systems that implement RealVideo 9
E-12	Jill Boyce, *Weighted Prediction in the H.264/MPEG AVC Video Coding Standard,* IEEE (2004) ("Boyce")
E-14	EP1353513 to Srinivasan ("Srinivasan")
E-15	EP2249572 to Wada et al. ("Wada")
E-16	"Test Model under Consideration"; Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11; 1st Meeting: Dresden, DE, 15-23 April, 2010; JCTVC-A205. ("JCTVC-A205")

In addition to the discussion above, and to the extent not anticipated, the asserted claims of the '267 patent are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. Items of prior art that render obvious the asserted claims of the '267 patent are cited and described in the claim charts attached hereto as Exhibits E-1 to E-16. Respondents also identify secondary references and obviousness combinations in Exhibit E-9. In the event a particular reference or combination of references identified in Exhibits E-1 to E-16 does not anticipate or render obvious one of the asserted claims of the '267 patent, the reference, alone or in combination with one or more of the references identified in those exhibits or in Exhibit E-9 renders the claim obvious. For clarity, if a primary reference chart indicates that a limitation may be disclosed in Exhibit E-9, the limitation would also have been obvious in view of a combination with another primary reference that discloses the limitation. The identification of certain combinations of prior art does not exclude other combinations and is without prejudice to Respondents' right to rely on additional specific combinations as well as to detail and explain such combinations.

The U.S. Supreme Court in *KSR Int'l Co. v. Teleflex Inc*., 127 S. Ct. 1727 (2007) emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense

should not be patentable. *Id*. at 1732, 1738, 1742-1743, 1746. A patent claim may be obvious if the combination of elements was obvious to try or if there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability. *Id*. at 1740. The Court stated that courts should "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id*. at 1740-41. *KSR* does not mandate evidence of a motivation or suggestion to combine prior art references. *See TGIP, Inc. v. AT&T Corp*., 527 F. Supp. 2d 561, 580-81 (E.D. Tex. 2007). "[A] court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ" to resolve the question of obviousness. *KSR*, 127 S. Ct. at 1741.

Based on all of these considerations, as further detailed in Exhibits E-1 to E-16, persons of ordinary skill in the art would have combined the teachings of the prior art references discussed and charted in those exhibits. The combinations of these references would have rendered obvious to one of ordinary skill in the art the subject matter of the asserted claims of the '267 patent. The references identified in Exhibits E-1 to E-16 are analogous prior art to the subject matter of the asserted claims of the '267 patent and, for at least the reasons set forth below, are properly combinable. Because these prior art references exist within a single field of art, particularly one in which individuals in the field often shared and/or collaborated on their work, it would have been obvious for a person of skill in the art to look from one piece of prior art to another in order to find

any missing functionality they desired to implement. Therefore, these references provide interrelated teachings and one of ordinary skill would look to the concepts in any of these references when seeking to solve the problems purportedly addressed by the asserted patents.

Numerous prior art references, including those identified in the attached exhibits, reflect common knowledge and the state of the prior art before the earliest claimed effective filing date of the asserted patents. As it would be unduly burdensome to create detailed claim charts for all of the invalidating combinations, for at least the reasons described in these initial invalidity contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those identified in the attached exhibits, to meet the limitations of the asserted claims of the '267 patent. Respondents' inclusion of exemplary combinations, in view of the factors and exemplary motivations to combine identified herein, does not preclude Respondents from identifying other invalidating combinations and/or motivations as appropriate.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, because 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, instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court 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. Nevertheless, in addition to the information contained herein, Respondents hereby identify additional motivations and reasons to combine the cited art.

Clear and logical rationale to combine any of the references identified above with others exists from the prior art references themselves, as well as from the interrelated teachings of other prior art references, common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the existence and nature of a known need or problem, and/or knowledge possessed by a person of ordinary skill. In addition, it would have been obvious to combine the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompts variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combinations of the prior art references identified above would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Therefore, various reasons to combine the disclosed references exist. Respondents reserve the right to rely on the knowledge of those skilled in the art, the testimony of expert witnesses, and/or other prior art, to show that it would have been obvious to include the allegedly missing limitation and to explain the motivation to combine the prior art elements.

In addition, it would have been obvious to combine any of the prior art in Exhibits E-1 to E-16 because all of these references relate to devices and methods for motion prediction. Each prior art reference speaks to prediction techniques in the context of video coding, and if not, bi-directional prediction specifically. Each of these references speaks to predicting values of pixels (or ½ or ¼ pixels) using interpolation and an N- or P-tap filter (or both). Each of these references includes disclosures of video coding techniques that involve similar computer components—processors, memory, communication devices, encoders, decoders, etc.—to perform the relevant steps of video coding. Many, if not all, of the inventors listed on the face of the prior art in Exhibits

E-1 to E-16 were prominent engineers in the same field, they routinely attended meetings to develop video coding standards (such as H.264, etc.), and would have been familiar with and looked to the teachings of the others.

For example, as discussed further in Respondents' invalidity charts, a POSITA would have been motivated to combine the teachings of Karczewicz '799 and Karczewicz '499. Karczewicz '799 teaches bi-prediction techniques for H.264 with two motion vectors pointing to two blocks of pixels that are averaged together, and Karczewicz '499 teaches that H.264 motion vectors can also point to fractional sub-pixels (See Karczewicz '499 at paragraphs 56-58, 93-102), as well as teaching improved calculations for averaging interpolated pixel values, where rounding is delayed until later in the process, thereby maintaining higher precision for intermediate calculations. *See* Karczewicz '499, ¶¶10, 20-24, 39, 93-106. Karczewicz '799 and Karczewicz '499 are both Qualcomm patent applications, list the same three inventors on their cover page and involve duplicate figures, confirming they are directed to the same subject matter. Karczewicz '799, Cover Page, Figs. 1-2, Karczewicz '499, Cover Page, Figs. 1-2. Both Karzcewicz references are in the same field and speak to solving problems in digital video coding. Karczewicz '499 at [0002]; Karczewicz '799 at [0002]. Both relate to "digital televisions, digital direct broadcast systems, wireless communication devices, wireless broadcast systems, personal digital assistants (PDAs), laptop or desktop computers, digital cameras, digital recording devices, video gaming devices, video game consoles, cellular or satellite radio telephones, digital media players, and the like." Karczewicz '799, [0003], Karczewicz '499, [0003]. Both speak to video compression techniques, such as MPEG-2, MPEG-4, or ITU-T H.264/MPEG-4 standards. *Id.* Both speak to temporal prediction to reduce transmission of redundant video information, including interpolation techniques. Karczewicz '799, [0004], [0037], [0041]; Karczewicz '499, [0004], [0007], [0009],

[52]. A POSITA would have been motivated to use Karczewicz ’499’s known techniques to improve similar devices/methods, as taught by Karczewicz ’799, in the same way to improve prediction accuracy. A POSITA would have been motivated to use Karczewicz ’499’s known techniques to improve similar devices/methods, as taught by Karczewicz ’799, in the same way to improve prediction accuracy. A POSITA would have recognized the applicability of Karczewicz ’499 to the corresponding calculations in Karczewicz ’799, which was a simple matter given that a POSITA would have understood fundamental computer logic concepts (e.g., binary arithmetic, bit shifting, precision control, rounding and offsetting, and error analysis) and mathematical calculations for known motion estimation and compensation techniques (e.g., bi-directional prediction, determination and use of motion vectors, interpolation for fractional pixels) because they are integral to working with video codecs. And ’499 notes that its encoder can be used to perform bidirectional prediction, whereas the ’799 then discloses additional teachings specific to bi-directional prediction. Karczewicz ’799, [0002], [008], [0022]; Karczewicz ’499, [0054]. Thus, the combination of these two references would not have changed the operation of either reference, given their overlap in subject matter and similar goals. Moreover, a POSITA would have had a reasonable expectation of success because the combination applies the math behind Karczewicz ’799’s improved calculations to Karczewicz ’499’s bi-directional prediction without further modification to reduce a rounding error that occurs in bi-directional prediction, including because Karczewicz ’799 teaches that its disclosed interpolation techniques are applicable to bi-prediction that “keep[ing] the highest possible precision through the intermediate steps” and avoiding “any shifting, rounding and clipping operations[] until the very last step of the interpolation process.” See Karczewicz ’799, ¶¶53-54, 59, 99, 102.

As another example, Kirchhoffer discloses a "concept for directional inter prediction with increased precision for arbitrary size blocks of images of video data," that can be used in an encoder or decoder. Kirchhoffer, 10:66-11:3. Although the main focus of Kirchhoffer is intra prediction, embodiments of its invention may also be configured to perform inter prediction. Id. at 8:42-44. This addresses a "desire to improve a compression efficiency of the transmitted information and to reduce a computational load in video coding." *Id.*, 2:35-37. Kirchhoffer also discusses the H.264/AVC Video Coding Standard. *Id.*, 1:25-33. Kirchhoffer discloses a "concept for directional inter prediction with increased precision for arbitrary size blocks of images of video data," that can be used in an encoder or decoder. *Id.*, 10:66-11:3. Kirchhoffer discloses using higher precision values during a prediction, which allows the system to obtain a more precise prediction and corresponding residual used for reconstruction. *See, e.g.*, *id.* at 7:4-19. Kirchhoffer even cites to other inventors mentioned in the other primary references, including Yan Ye, a named inventor on both Karzcewicz references. *Id.*, p. 2.

As another example, Walker relates to "weighted bi-directional predicted video pictures." Walker at Abstract. A POSITA would have been motivated to combine Walker's teachings, as explained for its embodiments, because Walker presents those teachings as complementary aspects of video encoders and decoders that are meant to be used together. Ex-1003, ¶¶49-54. Walker discusses numerous related video coding standards, including MPEG-1, MPEG-2, MPEG-4 (collectively designated MPEG-x), H.261, H.262, H.263, and H.264 (collectively designated H.26x). *Id.* at Fig. 1, [0005], [0025], [0045]-[0046], [0072]. Walker explains that the processes discussed with respect to Figures 5, 8, and 9 are applicable to the encoder and decoder devices of Figure 1. See, e.g., Ex-1004, ¶29, ¶110, ¶114. Walker discloses pixel interpolation in the context of motion compensated predictive coding, as well as temporal prediction. *E.g.*, Walker at [0015],

[0114]. Walker relies on multiple types of encoder and decoder devices to execute predictive coding techniques. *Id.* at [0025].

As another example, Demos speaks to high precision encoding and decoding of video images using video encoders and decoders. Demos at Title, Abstract. Demos is "directed to improved quality video compression based on novel improvements to MPEG-like encoding and decoding systems. In one aspect, the invention provides a method for significantly improving image quality from MPEG-style video coding by preserving a higher number of bits during intermediate encoding and decoding processing steps." Demos, 3:43-49; *see also id.* at 5:51-6:65 (speaking to the precision used for calculations during the prediction process). Demos discusses other related video coding standards, including MPEG-2 and MPEG-4, which teach the use of predictions to compactly represent video frame data. *Id.* at 1:25-34. Demos speaks to how prediction, including bidirectional prediction using B-frames can be used to represent video frames and capture/transmit only the "image differences". *See, e.g., id.* at 1:60-67, 6:15-17.

As another example, Marpe discloses video compression using picture partitioning for predictions and residual coding. Marpe at 1677. As Marpe states, the "primary goal of this partitioning concept is to provide a high degree of adaptability for both temporal and spatial prediction as well as for the purpose of space-frequency representation of prediction residuals." Marpe at Abstract. "This paper describes a video compression scheme that intends to address both the aspects of coding efficiency and implementation cost in a well-balanced relationship." *Id.* at 1676. "The next section highlights the main features of the proposed video compression scheme… Internal bit-depth expansion and in-loop filtering are described in Sections VII and VIII, respectively." *Id.*

As another example, U.S. Patent No. 9,161,057 ("Karczewicz '057") relates to "video encoding and, more particularly, video encoding techniques that use bi-directional prediction." *See, e.g.*, Karczewicz '057 at 1:13-16. Karczewicz '057 describes Video encoder 22 and video decoder 28 may operate according to a video compression standard, such as the ITU-T H.264 standard, alternatively described as MPEG-4, Part 10, Advanced Video Coding (AVC). *See, e.g.*, *id.* at 1:49-2:28; 7:38-51; 9:4-19; 10:64-11:52 and 12:32-43. Karczewicz '057 also discusses high precision interpolation and various weighed sample prediction techniques for bi-directional prediction. *See, e.g.*, *id.* 7:66-8:12; 12:32-43; 13:25-54. Based on the disclosure of Karczewicz, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine Karczewicz with references relating to devices and methods for improving video coding performance.

For example, U.S. Patent No. 8,606,028 ("Noda") describes video codec techniques to minimize rounding errors that occur in bi-directional prediction. *See, e.g.*, Noda. at 1:42-55. Noda relates to "an image encoding apparatus and an image encoding method and an image decoding apparatus and an image decoding method to improve an encoding efficiency by enhancing a precision of intra-prediction or motion compensation enough." *See, e.g.*, Noda at 1:66-2:4, 28:12-39. Noda describes that the prediction image signal is created with precision higher than the input image signal by M bits such that the precision of a filter for motion compensation is improved, making it possible to decrease a prediction error signal and upgrade encoding efficiency. *See, e.g.*, Noda at 13:5-31; FIG. 42.

As another example, US Patent No. **7,**620,109 ("Srinivasan") relates to "techniques and tools for sub-pixel shifting in motion estimation/compensation in video coding/decoding applications." *See, e.g.*, Srinivasan at 1:20-26. Specifically, Srinivasan describes improving coding

performance by increasing a bit-depth of values of pixels in the context of motion compensation. *See, e.g.*, *id.* at 5:12-28; 5:46-50; 16:21-17:17; 20:33-38; 21:22-52. Based on the disclosure of Srinivasan, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine Srinivasan with references relating to devices and methods for improving video coding performance.

As discussed further in Respondent's invalidity charts, a POSITA would have been motivated to combine Srinivasan's interpolation disclosures and teachings with the bi-prediction models and related disclosures of Karczewicz '057. Karczewicz '057 teaches bi-directional prediction by obtaining two prediction values based on two reference pictures, applying weighted prediction to those prediction values, combining the predictions, and apply right shifting to the combined two prediction values having higher precision. *See, e.g.*, Karczewicz '057 at 9:4-19, 12:32-43, 13:25-54. Karczewicz '057 also teaches techniques for coding improvements relative to the H.264/AVC standard, such as high precision interpolation to increase precision of prediction value in bi-directional prediction. *See* Karczewicz '057 at 7:38-8:12. Srinivasan teaches methods of performing motion vector prediction using interpolation filters that "retain[] precision in multi-stage interpolation by deferring clamping and/or bit shifting (operations which can result in loss of precision) until later stages in the interpolation." Srinivasan at 6:47-49. A POSA would have been motivated to combine these techniques because: (1) Karczewicz '057 and Srinivasan are analogous references in the same field and both directed to solutions for bi-directional prediction; (2) combining these techniques would improve coding efficiency and reduce prediction error, as discussed in Srinivasan, and (3) Srinivasan's teachings are consistent and compatible with Karczewicz '057's and both try to solve similar problems. A POSITA would have had a reasonable expectation of success in combining both references, including because it was well known in the

prior art for a video coding system to use predictions with higher precision, which created rounding errors. *See also* VCEG-AI33 at page 1 (incorporated by reference in its entirety by Karczewicz '057). Moreover, a POSITA would have viewed this combination as the application of a known technique to a known method of bi-directional precision.

A POSITA would have been additionally motivated to combine Karczewicz '057 and Srinivasan with NODA's disclosures of bi-directional prediction. Noda is in the same field as Karczewicz '057 and Srinivasan and is also directed to solutions addressing bi-directional prediction. For example, Noda discusses issues with rounding errors in the context of prediction in H.264 and tries to propose an image encoding apparatus "to improve an encoding efficiency by enhancing a precision of intra-prediction or motion compensation." Noda at 1:43-48, 1:66-2:4. Like Karczewicz '057 and Srinivasan, FIG. 20A of Noda discloses a block diagram showing a configuration example of an image encoding apparatus generating a prediction having a higher precision to decrease a prediction error signal and upgrade encoding efficiency. *See* Noda Fig. 20A, 1:43-48. Noda further discloses that the pixels of the current block, the first reference block, and the second reference block have values with a higher precision. *See* Noda at 24:51-56, 25:15-18. A POSITA would have had a reasonable expectation of success in combining Noda with Srinivasan and Karczewicz '057 because it was well-known in the art for a video encoding system to create a prediction having a higher precision in order to reduce a rounding error that occurs in bi-directional inter prediction, as each of these references demonstrates and tries to address. Thus, a POSA would have been motivated to combine their teachings to improve the manner in which video processing operates.

As another example, JVT-R201 relates to ITU-T Recommendation H.264 video coding to improve coding efficiency. *See, e.g.*, JVT-R201 at 1; 2. JVT-R201 describes video

encoding/decoding process including fractional interpolation and weighted sample prediction processes for bi-directional prediction. *See, e.g., id.* at 3; 146-147; 161; 164-165; 168-169. Based on the disclosure of JVT-R201, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine JVT-R201 references relating to devices and methods for improving video coding performance and coding efficiency.

US Patent No 8,831,086 ("Ye '086") relates to digital video devices implement video compression techniques, such as MPEG-2, MPEG-4, or ITU-T H.264/MPEG-4, Part 10, Advanced Video Coding (AVC). *See e.g.,* Ye '086 at 1:20-34. Ye '086 describes interpolation techniques have been developed in order to improve the level of compression that can be achieved in inter-coding including bi-directional prediction. *See e.g., Id* at 2:19-31. Ye '086 further discusses coding method for increasing precision of pixels to improve quality and/or compression for video sequences. *See e.g., Id* at 21:56-23: 23. Based on the disclosure of Ye '086, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine Ye '412 with references relating to devices and methods for improving video coding performance and coding efficiency.

US Patent No 8,971,412 ("Ye '412") relates to digital video devices implement video compression techniques, such as MPEG-2, MPEG-4, or ITU-T H.264/MPEG-4, Part 10, Advanced Video Coding (AVC). *See e.g.,* Ye '412 at 1:20-33. Ye '412 describes interpolation techniques have been developed in order to improve the level of compression that can be achieved in inter-coding including bi-directional prediction and minimize prediction error energy. *See e.g., Id* at 2:19-31; 14:39-51. Based on the disclosure of Ye '412, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to

combine Ye ’412 with references relating to devices and methods for improving video coding performance and coding efficiency.

As another example, ITU-T, *H.264, Series H: Audiovisual and Multimedia Systems, Infrastructure of Audiovisual Services – Coding of Moving Video, Advanced Video Coding for Generic Audiovisual Services* (2010) (“H.264”) relates to digital video decoding techniques. Specifically, H.264 “represents an evolution of the existing video coding standards (H.261, H.262, and H.263) and it was developed in response to the growing need for higher compression of moving pictures . . . .” H.264 at i. H.264 discloses decoding techniques that include bi-predictive inter coding, arithmetic left and right shifts, sub-pixel interpolation, and weighted sample prediction. *See, e.g.*, *id*. at 3, 15, 165-71, 171-74. Based on the disclosure of H.264, its widespread adoption as of the earliest alleged ’267 patent priority date, the ongoing development of video coding, and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine H.264—including systems that implement H.264—with references relating to devices and methods for improving video coding performance and coding efficiency.

As another example, RealNetworks, *RealVideo 9 External Specification* (August 2005) (“RealVideo 9”) relates to digital video decoding techniques. RealVideo 9 “achieves new levels of compression performance at low as well as high data rates.” RealVideo 9 at 1. RealVideo 9 discloses decoding techniques that include bi-predictive inter coding (or B frames), arithmetic shifts, sub-pixel interpolation, and weighted sample prediction. *See, e.g.*, *id*. at 10-12, 29-31. Based on the disclosure of RealVideo 9, the ongoing development of video coding, and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine RealVideo 9—including systems that implement RealVideo 9—with references relating to devices and methods for improving video coding performance and coding efficiency.

As another example, Jill Boyce, *Weighted Prediction in the H.264/MPEG AVC Video Coding Standard*, IEEE (2004) ("Boyce") relates to digital video coding techniques. Boyce explains that "H.264/MPEG AVC is the first international video coding standard to include a Weighted Prediction (WP) tool . . . ." Boyce at 1. Further, "[i]n B pictures, bi-directional prediction is used and predictions are formed from two different pictures, and the two predictions are averaged together using equal weighting factors of (½, ½) to form a single averaged prediction." *Id*. at 1. Boyce discloses video coding techniques that include bi-directional prediction (B pictures), arithmetic shifts, interpolation, and weighted prediction. *See, e.g.*, *id*. at 1-4. Based on the disclosure of Boyce, the ongoing development of video coding, and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine Boyce with references relating to devices and methods for improving video coding performance and coding efficiency.

As another example, the claims of the '267 patent are also obvious because the recited limitations were generally known in the art at the time of the 267 patent's invention, as confirmed by the admitted prior art ("*APA*") disclosed therein. The *APA* set forth in U.S. Patent No. 11,805,267 relates to H.264/AVC video coding supporting bi-directional prediction. *See, e.g.*, *APA* at 1:24-4:25. APA discusses conventional prediction techniques using two reference blocks to obtain two predictions with higher precision, obtaining a combined prediction based at least partly upon said first prediction and said second prediction and decreasing a precision of said combined prediction by shifting bits of the combined prediction to the right. *See, e.g.*, *id.* at 3:66-4:20. For further example, the specification to the 267 patent contains a lengthy "Background Information" section. '267 patent at 1:24-4:25. Moreover, the "Background Information" section of the '267 patent's specification confirms that the prior art includes video coding standards, such as H.264

(267 patent at 1:34-46), and "bi-directional prediction" (*id.* at 3:49-55), with reference blocks determined by motion vectors (*id.* at 2:20-34, 3:12-18), predictions determined based on reference blocks (*id.* at 1:34-46), bi-directional prediction obtained by combining two predictions (*id.* at 3:49-55, 3:66-4:20), and residual data calculated as a difference between the prediction and current block (*id.* at 1:52-59, 3:25-30, 2:1-12). The '267 patent further admits that the prior art included various techniques for addressing rounding errors when averaging two blocks. *Id.* 3:66-4:20.

Based on the disclosure of *APA*, the ongoing development of video coding and the relevant prior art, it would be obvious to a person of ordinary skill in the art to combine *APA* references relating to devices and methods for improving video coding performance and coding efficiency. Consistent with these disclosures, Respondents prepared invalidity Exhibit E-7, which demonstrates how the asserted claims of the '267 patent are invalid in view of the admitted prior art set forth in the '267 patent's specification. These admissions and the evidence set forth in Exhibit E-7 apply equally to each of Respondent's invalidity grounds for the '267 patent because the claims of the '267 patent amount to nothing more than a routine and conventional combination of known prior art elements.

Respondents incorporate by reference in their entirety prior art from the prosecution histories, background sections of the asserted patents, and any deposition testimony from relevant inventors. Respondents further incorporate in their entirety the Petitions submitted in IPR2024-00626 and IPR2024-00627. Respondents expect to rely on the testimony of one or more expert witnesses and documents referenced by those expert witnesses in support of these contentions and incorporate those forthcoming expert reports as if fully set forth herein.

Secondary considerations of non-obviousness, also referred to as objective indicia of non-obviousness, "can include copying, long felt but unsolved need, failure of others, commercial

success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing industry respect for the invention, awards or other industry praise for the invention, and skepticism of skilled artisans before the invention." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc*., 711 F.3d 1348, 1368 (Fed. Cir. 2013). "A nexus between the merits of the claimed invention and evidence of secondary considerations is required in order for the evidence to be given substantial weight in an obviousness decision." *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Moreover, even if a nexus exists, secondary considerations of non-obviousness "simply cannot overcome [a] strong prima facie showing of obviousness." *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008).

Nokia has not established the existence of any objective indicia of non-obviousness or secondary considerations. Respondents reserve the right to supplement their contentions to respond to any such evidence should Nokia be permitted to raise them in the future. While discovery in this case is ongoing, and Respondents' investigation continues (which will include expert discovery), to the extent Nokia contends that one or more asserted claims of the '267 patent is not obvious based on secondary considerations recognized by relevant authority Respondents contend such allegations are without merit.

If Nokia identifies any additional secondary considerations of non-obviousness, Respondents reserve the right to amend and/or supplement their contentions.

C. Other Invalidity Grounds

Respondents hereby identify grounds upon which the asserted claims are invalid for failure to meet the requirements of 35 U.S.C. §§ 101, 112(a), 112(b), and 112(f). These contentions shall not be construed as an admission that any claim construction advanced by Respondents in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Respondents from advancing claim construction and/or non-infringement positions in lieu of, or

in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Nokia's purported construction of the claim language or of other positions advanced by Nokia during the course of this litigation. Respondents' Invalidity Contentions under 35 U.S.C. § 101, 112 may depend, in part, on the Court's claim construction, as well as Nokia's alleged scope of the asserted claims. Consequently, Respondents identify only the issues under 35 U.S.C. § 101, 112 of which they are presently aware.

1. 35 U.S.C. § 101 – Ineligible Subject Matter

Under 35 U.S.C. § 101, "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of [Title 35]." "This provision, however, contains longstanding judicial exceptions, which provide that laws of nature, natural phenomena, and abstract ideas are not eligible for patenting." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 765 (Fed. Cir. 2019). To determine if claims are patent eligible, the first step is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). If so, the second step is to "search for an 'inventive concept'—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217–18 (internal quotation marks omitted). Under this framework, numerous cases have invalidated patents directed to video coding, encryption, and/or data manipulation. *See, e.g.*, *Realtime Data LLC v. Array Networks Inc.*, No. 2021-2251, 2023 WL 4924814 (Fed. Cir. Aug. 2, 2023), *cert. denied sub nom. Realtime Data LLC v. Fortinet, Inc.*, No. 23-498, 2024 WL 72018 (U.S. Jan. 8, 2024); *Hawk Tech. Sys., LLC v. Castle Retail, LLC*, 60 F.4th 1349 (Fed. Cir. 2023); *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1315 (Fed. Cir. 2021); *Sensormatic Elecs., LLC v. Wyze Labs, Inc.*, No. 2020-2320, 2021 WL 2944838, at *3 (Fed. Cir. July 14, 2021); *SAP*

Am., Inc. v. InvestPic, LLC, 898 F.3d 1161 (Fed. Cir. 2018); *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322 (Fed. Cir. 2017); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014); *see also In re Gitlin*, 775 F. App'x 689 (Fed. Cir. 2019).

The asserted claims of the '267 patent are directed to an abstract idea under the first step of the two-step *Alice* analysis. Specifically, the claims are directed to the patent-ineligible abstract idea of deferring rounding until after combining two numbers to avoid rounding errors, which is a simple mathematical principal. The '267 patent fundamentally seeks to monopolize the concept of using higher precision and deferring rounding to avoid rounding errors. While the claims arise in the context of bidirectional prediction, limiting mathematical claims to particular field is insufficient to be patent eligible. Every accountant understands the importance of maintaining intermediate values at a higher precision until a final calculation, so as to avoid rounding errors. Maintaining an intermediate prediction at a higher precision until after combination merely captures a fundamental mathematical principal and is an abstract idea.

The asserted claims of the '267 patent also fail the second step of the *Alice* analysis because they do not recite an "inventive concept" capable of rendering the abstract idea into patent-eligible subject matter. The '267 patent contrasts the "existing systems" of the prior art depicted in Figure 10 with its invention in Figure 11, which confirms that the only difference between the '267 patent and the prior art is how many bits the prediction is down-shifted before combination. '267 patent, Figs. 10, 11, 13:51-55. Where the only difference between what was conventional and the challenged claims is the abstract idea itself, the claims are not inventive and are not patent-eligible. Moreover, the claims merely recite conventional functions performed by generic computing equipment, used in conventional ways. See, e.g., '267 patent, cl. 1 ("An apparatus . . . comprising:

at least one processor and at least one memory including computer program code . . . ."). Using conventional components to increase the speed or efficiency of a process does not confer patent eligibility on an otherwise abstract idea. The use of a standard video encoder or decoder to implement the abstract idea does not add anything significant to the abstract idea. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." *BSG Tech. LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290–91 (Fed. Cir. 2018) (patent directed to "system and method for indexing data" directed to patent-ineligible abstract idea and lacked inventive concept).

2. 35 U.S.C. § 112(a) – Enablement and Written Description

To comply with the enablement requirement of 35 U.S.C. § 112(a), the patent specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Courts consider multiple factors to determine whether experimentation is undue, including: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *In re Wands*, 858 F.2d 731. 737 (Fed. Cir. 1988).

To comply with the written description requirement of 35 U.S.C. § 112(a), the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention. *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997). Further, to satisfy the written description requirement, the disclosure of the patent must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention." *Vas-*

Cath Inc. v. Mahurkar, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). "An applicant demonstrates that he was in possession of the invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). "[T]he written description inquiry looks to the four corners of the specification to discern the extent to which the inventor(s) had possession of the invention as broadly claimed. The knowledge of ordinary artisans may be used to inform what is actually in the specification, but not to teach limitations that are not in the specification, even if those limitations would be rendered obvious by the disclosure in the specification." *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1322-23 (Fed. Cir. 2017) (citations omitted). In other words, even if something reflects an obvious variation of the invention disclosed in the specification, the claims are invalid for lack of written description.

The asserted claims are invalid for failure to enable and/or provide a written description of the alleged invention as required by 35 U.S.C. § 112(a). A person skilled in the art would not be able to make and use the claimed inventions by reading the specification. For example, the '267 patent fails to sufficiently describe or enable at least the following limitations: "obtaining a combined prediction based at least upon said first and second prediction."

3. 35 U.S.C. § 112(b) – Indefiniteness

The claims of a patent must "particularly point out and distinctly claim the subject matter which the applicant regards as his invention." 35 U.S.C. § 112(b). A claim is invalid as indefinite if it is not sufficiently precise to permit a potential competitor to determine whether or not it is infringing. *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470 (Fed. Cir. 1993). Specifically, "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig, Instruments, Inc.*, 572

U.S. 891, 901 (2014). Furthermore, when a claim includes a term of degree, the patent "must provide 'some standard of measuring that degree' such that the claim language provides 'enough certainty to one of skill in the art when read in context of the invention.'" *GE Lighting Solutions, LLC v. Lights of Am., Inc.*, 663 Fed. Appx. 938, 940 (Fed. Cir. 2016); *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). For terms of degree, "the patent must provide that additional information in the form of 'objective boundaries.'" *Id.* And the Federal Circuit's "case law is clear that the objective boundaries requirement applies to terms of degree." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018).

Under this standard, a person skilled in the art would not be able to determine the scope of the invention because of the indefiniteness of at least the following terms of the patent: "first/second precision", "obtaining a combined prediction based at least partly upon said first and second prediction."

The contentions do not represent Respondents' agreement or views as to the meaning of any claim term. The contentions also do not represent Respondents' agreement or views as to the definiteness, written description support for, or enablement of any claim not specifically identified herein. Respondents reserve the right to supplement or amend these disclosures and to identify additional and/or different claim terms for construction.

CERTIFICATE OF SERVICE

I hereby certify that true and correct copies of the foregoing document:

RESPONDENTS' INITIAL INVALIDITY CONTENTIONS

have been served on this 1st day of July, 2025 on the following:

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/s/ Ashley Cox