Paper 10
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners,

v.

SNAPAID, LTD.
Patent Owner.

CASE NO. PGR2025-00083
U.S. PATENT NO. 12,250,452

PATENT OWNER'S PRELIMINARY RESPONSE

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2011	Email thread dated October 8, 2015, from Ishay Sivan, Founder & CEO, SnapAid (attaching SnapAid Android App User Manual)
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2045	Certified File History of U.S. Patent No. 11,671,702

Patent Owner SnapAid Ltd. ("SnapAid") submits this Preliminary Response to the Petition for Inter Partes Review filed by Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner" or "Samsung") seeking review of Claims 1–12 of U.S. Patent No. 12,250,452 (the "'452 Patent").

I. Introduction

This proceeding is part of an aggressive invalidity campaign Samsung has launched against five related patents within a family of eight U.S. patents asserted in parallel district court litigation.[1] Across multiple PTAB proceedings, Samsung has advanced more than forty separate grounds of alleged prior-art invalidity. Yet

[1] U.S. Patent Nos. 9,338,348 (the "'348 Patent"), 9,661,226 (the "'226 Patent"), 10,009,537 (the "'537 Patent"), 10,659,682 (the "'682 Patent"), 10,944,901 (the "'901 Patent"), 11,252,325 (the "'325 Patent"), 11,671,702 (the "'702 Patent"), and 12,250,452 (collectively, the "Asserted Patents") are asserted against Samsung in *SnapAid, Ltd. v. Samsung Electronics Co., Ltd. et al*, 2-25-cv-00378-RWS-RSP pending in the Eastern District of Texas. The parallel IPR proceedings are: IPR2025-01519 (challenging the '901 Patent), IPR2025-01520 (challenging the '702 Patent), IPR2025-01521 (challenging the '325 Patent), and IPR2025-01522 (challenging the '682 Patent).

here, as in its other petitions, none of its grounds is developed with the rigor, specificity, or evidentiary support required to warrant institution.

The '452 Patent describes a camera-based system for real-time image quality evaluation and user guidance. The claimed method includes calculating (i) a first quality indicator (QI1) for a subject's face or object, (ii) a second quality indicator (QI2) for the aesthetic quality of that subject based on a background-blurring test, and (iii) a total quality indicator derived from QI1 and/or QI2. Based on that total quality score, the system selects and presents a suggestion to the user—such as repositioning the device—before capture.

The specification and dependent claims expand on this framework with embodiments that integrate data from multiple sensors (e.g., accelerometers, gyroscopes, GPS modules, autofocus lenses), compute statistical confidence levels from sensor error models, dynamically adjust indicator weights based on correlations, and apply algorithms such as blur detection, PSNR calculation, corner detection, and deep learning. These features form a technical architecture that materially improves camera operation and image quality.

Samsung's cited references describe conventional approaches and fail to disclose the integrated framework and design claimed in the '452 Patent. In particular, the cited prior art does not disclose the use of specific aesthetic quality indicators, such as background blur of a face or object, in quality-indicator

calculations, or the selection of user suggestions based on the calculated total quality-indicator value. The cited references also omit numerous limitations relating to, for example, quality-indicator dependencies, use of confidence levels, and the adaptability of the claimed framework.

Samsung also fails to provide any adequate motivation to combine its cited references to achieve the claimed invention. The rationale offered consists of generic assertions that the references share a broad goal of improving image quality, without any claim-specific or evidence-based explanation for why a skilled artisan would integrate their features in the manner alleged. Moreover, the limited "reasoning" conflates a speculative assertion that multiple references *could* be combined with the distinct requirement to demonstrate that a person of ordinary skill in the art *would* have been motivated to make such a combination. This conclusory approach, stitching together disparate elements without articulating a credible, non-hindsight reason for the combination, is precisely the type of reconstruction the Federal Circuit has cautioned against. Accordingly, the Petition fails to demonstrate a reasonable likelihood of prevailing on its obviousness challenge.

Compounding these substantive flaws, the Petition advances contradictory positions on claim scope. In district court, Samsung contends that the very claim phrases it applies here are indefinite and "do not have a meaning that can be clearly determined from the patent." In this PGR, however, it purports to apply the plain and

ordinary meaning of those same phrases without explanation, mapping them to alleged prior art disclosures while offering the Board no coherent guidance on claim construction.

Samsung's remaining challenges under § 112 and § 101 fare no better. Its indefiniteness arguments do not account for the detailed definitions, examples, and multi-module embodiments provided in the specification, and fail to show that a skilled artisan would be unable to understand the claims with reasonable certainty. Its patent-eligibility attack reduces the claims to an oversimplified generalization, ignoring the specific, hardware-linked, image-quality assessment method recited in the claims, and disregards Federal Circuit precedent confirming that such concrete technological improvements to camera operation are patent-eligible.

Viewed as a whole, the Petition glosses over actual claim requirements, sidesteps its own conflicting positions, and substitutes conclusory assertions for the detailed, claim specific analysis required. When considered alongside Samsung's overlapping challenges and litigation tactics, these deficiencies create cumulative circumstances that weigh strongly in favor of denying institution on all challenged claims of the '452 Patent.

II. The '452 Patent

The '452 Patent is directed to systems and methods of performing real-time assessment of picture or video quality by aggregating various quality indicators,

often derived from both image analysis and device hardware sensors, to generate a quality score and provide immediate, actionable guidance or assistance to the user during the capture process. Specifically, the '452 Patent describes a comprehensive, real-time image quality assessment system that:

- obtains multiple, diverse quality indicators (QIs) (technical, compositional, contextual, semantic);
- integrates data from device sensors (e.g., image sensor) in real time;
- computes per-indicator confidence values, including, for example, values based on sensor reliability, historical stability, and contextual agreement/disagreement;
- provides user and/or system-initiated real-time feedback (text, icon, audio) and actionable suggestions for capture improvement based on the total quality indicator calculation; and
- supports both automatic and user-initiated image (and video) capture, conditionally based on real-time, sensor-fused quality threshold.

A. Challenges of Previous Systems

The challenged '452 Patent is one patent in a family of U.S. patents with the common title of "Real Time Assessment of Picture Quality" that claims priority back to October 2012. Around October 2012, cell phone camera technology was rapidly maturing past basic snapshot quality with the focus shifting toward advanced sensor

technology and the initial integration of advanced mechanical features, such as Optical Image Stabilization, establishing smartphones as a credible challenger to consumer point-and-shoot cameras. *See*, *e.g.*, Ex. 2027, 2028, 2029. This period was right at the onset of the smartphone camera uptake: "by 2011 more than a quarter of all photographs captured were taken using smartphone cameras. By 2015, over one trillion photos were being captured each year, with the vast majority of them coming from smartphones." *See* Ex. 2027.

The specification of the '452 Patent provides a robust background explaining both the issues in the art at the time of the invention as well as the conventional technology. With the onset of improved camera technology within widely adopted mobile phones, nearly everyone now has a decent camera readily available to them in a moment's notice. At the time of the invention of the '452 Patent, however, while the cameras have auto modes and functionality, the cameras "still rely on the camera user to assess a picture's quality, either at the time of taking the picture, or at a later stage." Ex. 1001 at 1:37–40. To obtain a quality picture, users would end up taking numerous pictures and then later have to go back and select or favorite the "best." *Id.* at 1:41–43. But this manual process is inefficient as it involves the unnecessary taking of extra photos (which take up memory) and require the user to go back and manually identify the "best" photo of the series, potentially delete the others, and then there still may be some post-processing required. The invention of the '452

Patent solves these inefficiencies by better utilizing and implementing a process of getting a quality image in one take, as explained in greater detail below.

The specification and priority provisional applications identify and incorporate by reference numerous articles and patent references describing the "conventional technology" at the time of the invention. Ex. 1001 at 1:44–2:14, 10:33, 14:52–54, 15:34–36, 15:64–67, 16:5; Ex. 2005 at 1. The background references do not teach combining and adaptable technical indicator metrics in the comprehensive and contextually adaptive fashion as in the '452 Patent. *See* Ex. 1001 at 2:47–3:5. Ultimately, neither the background references nor the alleged challenging prior art teach or suggest, *inter alia*, adaptive quality indicator weighting, confidence scoring, or aggregation as provided in the invention.[2]

B. The Invention of the '452 Patent

The '452 Patent discloses systems and methods for real time assessment of picture quality that integrate camera hardware with multiple sensors, such as image sensors, accelerometers, gyroscopes, GPS modules, step counters, and autofocus lenses. These components work together to produce quality indicators (QIs) that

[2] Notably, Samsung does not attempt to distinguish the alleged prior art it cites against the Challenged Claims from the background references already cited by the patent specification and considered by the Office.

reflect various aspects of image capture conditions.

The '452 Patent describes that conventional approaches were typically applied isolated QIs and manually adjusted weights:

> Prior art has used certain independent quality indicators, each giving a quality of one particular aspect of a picture, for a given picture. Some try to quantify the quality by means of a total quality indicator.
>
> $$\mathrm{QI}_{\mathrm{total}} = \sum_{i=1}^{n} \mathrm{QI}(t)_i$$
>
> Where the number of quality indicators (QI), and t is the time of test.
>
> Some implementations use a weight function in computation, but the weight is either constant or can be change [sic] by the user manually.
>
> $$\mathrm{QI}_{\mathrm{total}} = \sum_{i=1}^{n} \mathrm{QI}(t)_i * w_i(t)$$
>
> However, in this invention, the weight of one indicator will take into account data from other quality indicator/s e.g. their quality indicator value, weight, confidence level (explained forthwith) in them and their previous value, weight and confidence level.

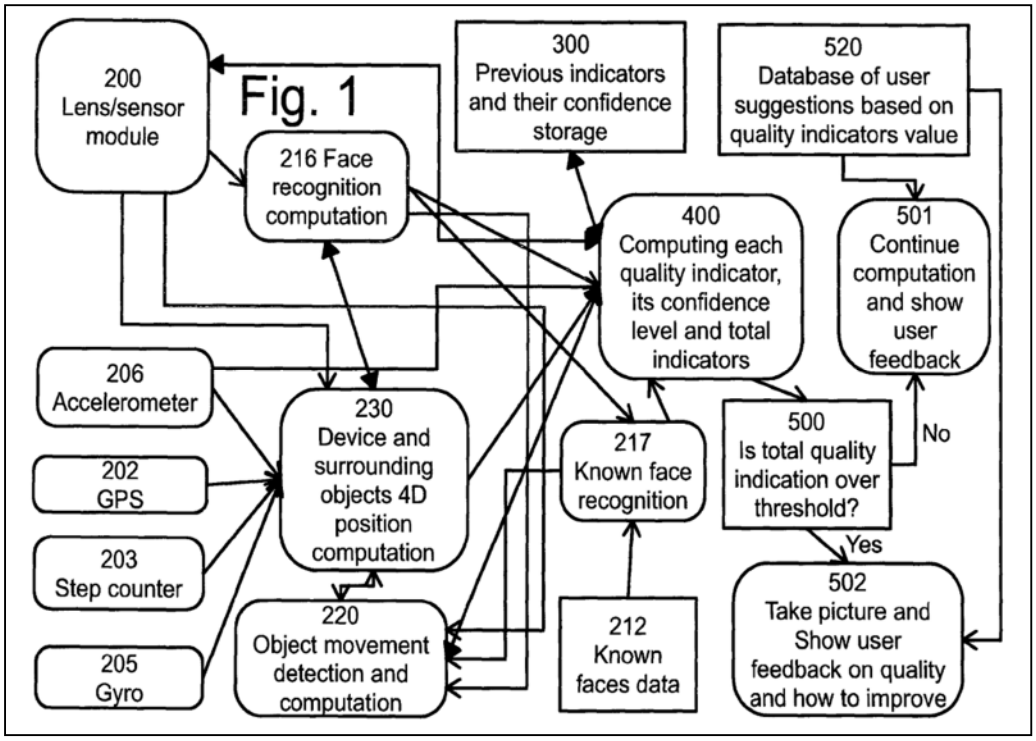
Ex. 1001 at 2:47–3:5; *see also, id.* at 8:15–17 ("When prior art computes a quality indicator value, it was done without taking into account the possibility of error in the computed QI"); *see also*, *supra* § II.A.

Unlike prior art systems, the invention of the '452 Patent can also apply

adaptive weighting in which the weight assigned to a given QI incorporates data from other QIs, including their measured values, assigned weights, confidence levels, and historical data. *See* Ex. 1001 at 2:59–3:5, 8:15–17.

The confidence level for each QI can be calculated from factors such as potential sensor error, statistical probability, historical performance data, and contextual scene information. Statistical measures such as variance over time and disagreement between multiple sensors or QIs are used to adjust the relevance of each indicator in real time. Reliable indicators can be given greater influence, while less reliable ones can be down-weighted or disabled altogether. This adaptive weighting prevents flawed measurements from degrading the overall Total Quality Indicator (TQI).

Figure 1, replicated below, is an exemplary functional block diagram illustrating components of a system and method for real time assessment of picture quality as disclosed by the patent:



Id. at Fig. 1.

Available sensors provide raw data to a central processing component (400), which obtains individual QIs, determines confidence levels, and synthesizes them into the TQI. The processing component receives three broad categories of inputs:

1. Raw hardware sensor data, such as lens and image sensor readings, accelerometer and gyroscope measurements, GPS location, and step counter activity. *Id.* at Figs. 1 and 2 (illustrating Lens/sensor module 200, Accelerometer 206, GPS 202, Step counter 203, Gyro 205).
2. Computational inputs, including scene recognition tasks like face detection, face recognition, object movement detection, and same scene recognition. These functions depend on sensor data but add a higher level of analysis. *Id.*

at Fig. 1 (Known faces data 212, Face recognition computation 216, Known face recognition 217, Object movement detection and computation 220, Device and surrounding objects 4D position computation 230), Fig. 4 (Compute Same Scene quality indicator 242), 8:41–43 ("Other examples may be comparison to a similar image for same scene recognition, as objects have moved or just look similar"), 14:3 ("a scene with face recognition"), 14:20–21 ("If the image sensor or operating system supports scene recognition/scene mode, or object recognition is present").

3. Historical and contextual data, such as stored prior QI values and confidence levels, enable detection of anomalies and refinement of current measurements. *Id.* at Fig. 1 (Previous indicators and their confidence storage 300), 8:48–49 ("previous data can aid in computation of a better confidence level"), 9:60–64 (describing previous frames data and that the "confidence level is a function of old values inherited by virtue of distribution formula N(t). So if the QI value is significantly different then expected, the QI value's confidence level may drop thereby bypassing a current QI that may be problematic."). These historical/contextual inputs are mathematically incorporated into current scoring in certain embodiments, enabling temporal confidence modeling.

Figures 3 and 4, replicated below, detail how the processing component uses

these inputs in cross-QI computational dependencies, resulting in a more accurate and context-aware TQI.

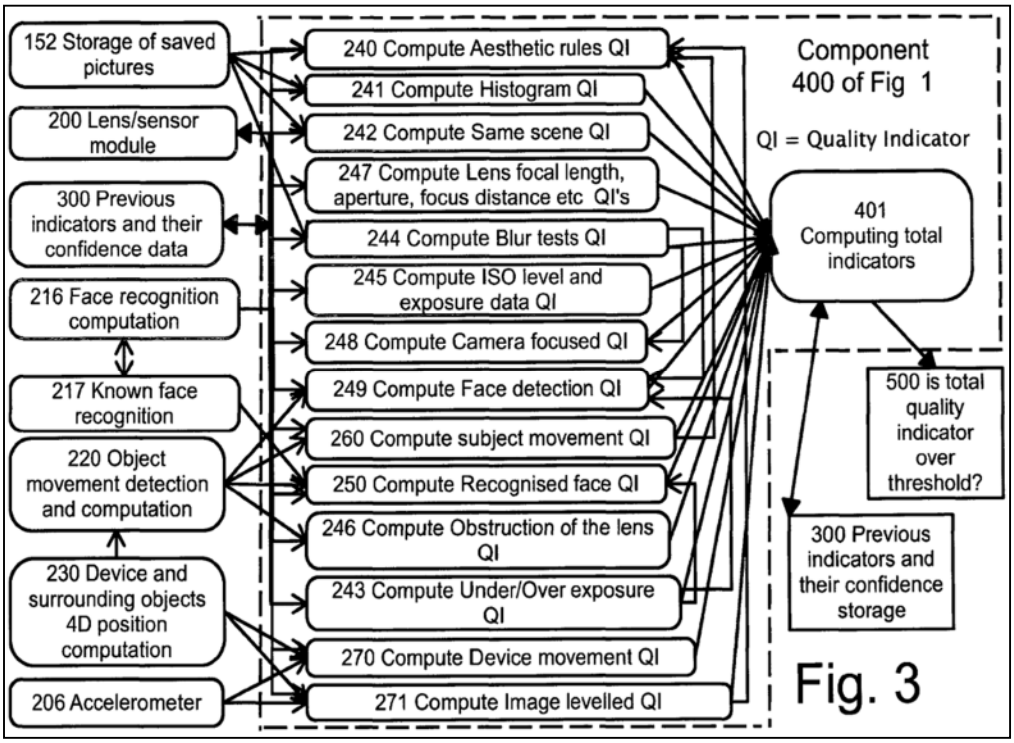


Fig. 3

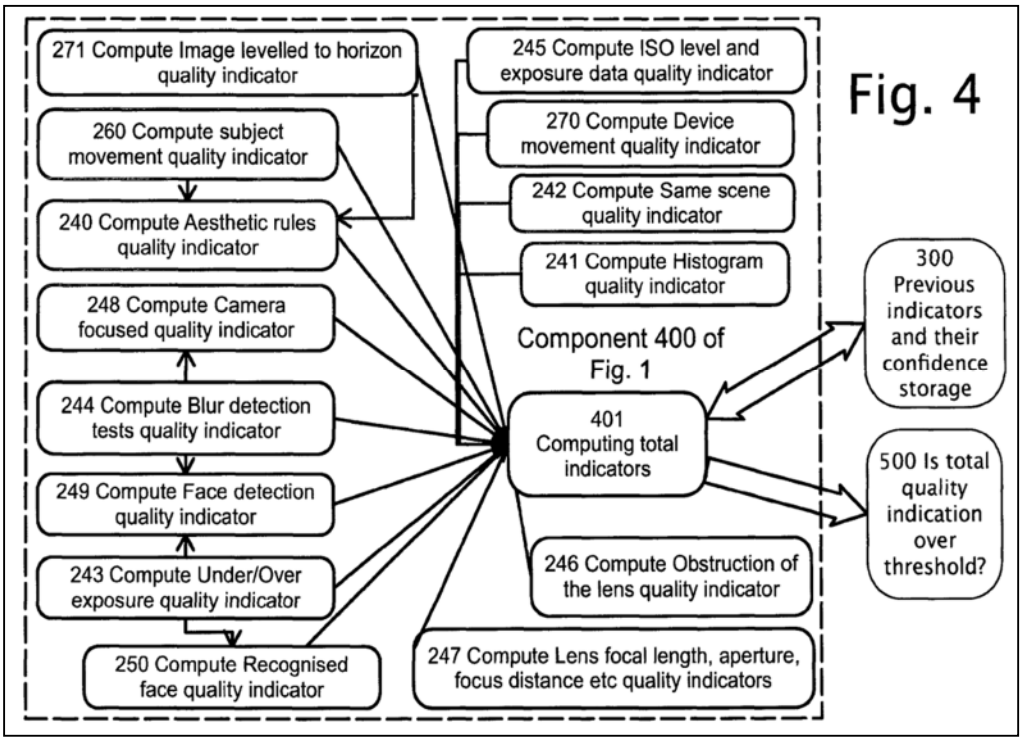


Fig. 4

Id. at Figs. 3 and 4.

The TQI can be compared against predefined thresholds to control camera behavior. For example, the system may delay capturing a photo until the TQI or certain QIs with sufficient confidence exceed the threshold or until a timeout occurs. *Id*. at Fig. 1 (Is total quality indication over threshold? 500), 17:43–46. This ensures photos are taken only when conditions support high quality. The invention also generates real-time feedback for the user based on QI values, offering targeted suggestions to improve the next shot. *Id.* at 18:3–6 ("user may choose to get suggestions from the application on how to improve the next shot. The application may use the quality indicators and their correlation [to provide suggestions]."), 3:45–48; *see also id.* at Fig. 1 (Continue computation and show user feedback 501, Take picture and show user feedback on quality and how to improve 502, and Database of user suggestions based on quality indicators value 520).

The specification provides various examples of how some "quality indicators and their confidence levels may depend on other QI data." *Id*. at 16:43–44; *see also id*. at 15:58–16:49 (listing various examples). While the examples are provided as ways to implement "a total indicator that is dependent on quality indicators, their confidence levels and their relations," the broader conceptual idea conceived by the inventor "is to enable a general formula as quality indicators are added or removed in some embodiments, or for different implementations with various levels of

complexity and interconnections between QI." *Id*. at 17:35–40.

As one example, the system can dynamically enable or disable certain QIs based on the performance of others. For instance, if both the device shake QI and the focus QI indicate poor quality, the aesthetic QI is excluded from the TQI calculation, even if the user has prioritized it. *Id*. at 3:5–12.

The contextual cross-evaluation of QIs also enables advanced functionality. When blur is detected, the system determines whether it results from poor focus or device movement, then responds accordingly—such as increasing shutter speed if the subject is moving or prompting the user to steady the camera. *Id*. at 3:55–56, 10:21–27. Scene recognition can influence QI weighting as well. For example, in a sunset scene, the system may reduce sensitivity to overexposure in sun-lit areas, while in a scene with a detected face, it may increase the weighting of face exposure checks. *Id*. at 16:63–17:4.

The invention also teaches the use of aesthetic quality indicators in total quality computations. *Id.* at 3:11–12 ("[o]nce shake is low and focus is optimal, aesthetic QI may be used in total quality computations.") Specifically, the invention teaches the implementation of aesthetic rules to enable the user to take a better-looking picture. The specification lists various heuristics that provide a means to improve the composition of a photograph, including, "rule of thirds, golden triangle, golden spiral, shapes and lines, amputation avoidance, visual balance, and diagonal

dominance." *Id.* at 15:53–57.

The calculation of these aesthetic quality indicators is used to provide suggestions to a user, including suggesting to the user that he "move from his current location to another location." *Id.* at 16:8–9. For example, the Patent explains that "a lamp in the street behind a person at night will not be good even if it fits a golden rule," and so, the Patent teaches that:

> Using data from Device/surrounding objects 4D position computation component 230, [the device] can assess distance to the person's face, say 2 meters, the distance to a lamp of 4 meters height 4 meters behind him, [and] can suggest to the user that he should move 2 steps to the right and one forward, tilting the device 20 degrees to the left if he wishes to achieve a better aesthetic QI score and a better total QI.

Id. at 16:13–21. The '452 Patent further teaches "testing background blurring," which the Patent recognizes as an element that "may sometimes actually be desired." *Id.* at 14:1–2. The specification further describes that for "a scene with face recognition…a very small aperture…yields a bad quality [photo], whereas a wide aperture, say f2.8 on these conditions, yields a good quality [photo]." *Id.* at 14:2–7. The '452 Patent teaches providing a user with suggestions to achieve a good quality photo under such conditions.

Another inventive aspect is the consideration of statistical variability,

probability factors, and sensor error when determining the relevance of each QI. The specification explains that each QI algorithm has assumptions and each sensor can produce measurement errors or drift. Unreliable or highly variable QI values may be reassessed or down-weighted. Sensor-specific error models, such as accelerometer drift or GPS location error ranges, are integrated into the confidence value calculation. *Id*. at 3:17–23, 8:14–26, 9:7–10. Probability modeling is also applied—object recognition may assign an 80% probability when four out of five target features are identified. *Id*. at 8:33–45. These probability and error considerations improve the reliability of QI weighting.

Historical data plays a key role in refining confidence calculations. If a current QI value deviates significantly from expected historical trends, its confidence level may be reduced to avoid skewing the TQI. *Id*. at 9:60–64. The invention also incorporates deep learning algorithms and neural networks to enhance confidence level computation, particularly in areas such as object and face detection. *Id*. at 10:13–16. AI-driven pattern recognition allows the system to adapt QI weights based on learned correlations and scene characteristics.

By combining adaptable weighting, cross-indicator context, historical trend analysis, error and probability modeling, and AI-based enhancements, the '452 Patent delivers an adaptive, sensor-aware framework for picture quality assessment. These features directly address the deficiencies of prior art systems and result in a

more accurate, reliable, and intelligent image capture process.

C. The Claims of the '452 Patent

1. Independent Claim 1

Independent Claim 1 of the '452 Patent describes a "method for presenting suggestion to a user of a device to move the device to a different location."[3] The method includes, *inter alia*, calculating a first quality indicator (QI1) of a face or object and calculating a second aesthetic quality indicator (QI2) that uses a background blurring test of said face or object. The method further teaches calculating a total quality indicator based at least partially on the values of QI1 and QI2. Based on the total quality indicator, the method teaches selecting an appropriate suggestion to provide to the user.

Claims 2-12 depend from Claim 1.

D. Prosecution History

The history of the eight U.S. Asserted Patents begins in October 2012. The family, which shares a common specification, claims priority to U.S. Provisional Application No. 61/717,216 filed October 23, 2012, and U.S. Provisional Application No. 61/759,643 filed February 1, 2013. On October 22, 2013, the Applicant filed a related PCT application (International Publication No. WO2014064690) before entering U.S. national stage prosecution.

[3] A full listing of the Claims of the '452 Patent are provided in Appendix A.

In February 2014, the USPTO, acting as the International Searching Authority, issued an International Search Report and Written Opinion citing three references. Ex. 2030 at 43–44, 61–63. International Preliminary Reports on Patentability followed in January and April 2015. *Id*. at 64–78.

On April 20, 2015, shortly after receiving the international reports, the Applicant entered the national stage with U.S. Application No. 14/437,105. In May 2015, an Information Disclosure Statement (IDS) was filed identifying nine U.S. patents, nineteen U.S. applications, and seven international publications. Ex. 2031 at 101–105. In August 2015, the pending claims were amended to "conform the claims of this U.S. Application to the claims that were found in the International Preliminary Report on Patentability with novelty, inventive step and industrial applicability." *Id*. at 158–163. Following these amendments, the USPTO issued a Notice of Allowance in October 2015, and the issue fee was paid in January 2016. *Id*. at 171–177, 210.

The '348 Patent, the first U.S. patent in the family, issued from Application No. 14/437,105 on May 10, 2016, with seventeen claims. Independent Claim 1 is directed to a "digital image acquisition system," and independent Claim 17 is directed to a "computer program product" adapted "to be executed to implement a digital image acquisition." Ex. 2032.

On January 27, 2016, after paying the first issue fee for the '348 Patent, the

Applicant filed U.S. Application No. 15/007,253 as a continuation. An IDS filed with the application identified twelve U.S. patents, twenty-one U.S. publications, and seven foreign patent documents. Ex. 2033 at 51–55. In February 2016, the Supplemental European Search Opinion in a related EP application issued, citing five references. Ex. 2034 at 2. In March 2016, a second IDS was filed with the USPTO identifying the five U.S. publication references from the EP search report, along with the Search Report and Opinion. Ex. 2033 at 88–89.

In November 2016, the USPTO issued a Non-Final Rejection, rejecting the claims as allegedly anticipated or obvious in view of U.S. Publication No. 2011/0075930 ("Cerosaletti"). *Id*. at 114–121. In January 2017, the Applicant filed amended claims in response. *Id*. at 146–152. A Notice of Allowance issued in February 2017, and the issue fee was paid in April 2017. *Id*. at 163–169. The '226 Patent issued on May 23, 2017, with twenty claims. *Id*. at 197. Independent Claim 1 is directed to a "method for real time estimating of an image quality" that includes obtaining multiple values and estimating multiple weights, calculating a total value, comparing the value to a threshold, and taking actions based on the total value relative to the threshold. Ex. 2035.

In April 2017, U.S. Application No. 15/582,722 was filed as a continuation of the '226 Patent. Two IDSs were filed contemporaneously, identifying sixteen U.S. patents, twenty-eight U.S. patent publications, and seven foreign patent documents.

Ex. 2036 at 54–64. The application received a Notice of Allowance in February 2018, and the '537 Patent issued on June 26, 2018, with twenty claims. *Id*. at 770–777, 968. Independent Claims 1 and 10 are directed to "method[s] for estimating quality of a digital image frame having pixels." Ex. 2037. Independent Claim 1 describes, *inter alia*, how the "second weight (c2) is partially based respective values of previous images in said video." *Id*. Independent Claim 10, describes, *inter alia*, where the "first value (QI1) is associated with said camera movement at the time of said image frame capture." *Id.*

In May 2018, U.S. Application No. 15/992,217 was filed as a continuation of the '537 Patent. On July 29, 2019, the USPTO issued a Non-Final Office Action rejecting the then pending claims under 35 U.S.C. §§ 102 and 103 as being anticipated or obvious over U.S. Publication No. 2012/0177352 ("Pillman"). Ex. 2042 at 94–101. In response, SnapAid submitted a revised set of claims. *Id*. at 285–292. The USPTO subsequently issued a Notice of Allowance, which included the Examiner's statement of reasons for allowance distinguishing the claimed methods from the cited prior art. *Id*. at 310–316. The '682 Patent issued on May 19, 2020, with twenty claims, including independent Claims 1 and 17. *Id*. at 348. On January 13, 2025, the Applicant submitted a Request for Certificate of Correction, and the USPTO issued a Certificate of Correction to address certain mistakes of a typographical nature. *Id*. at 351–365.

In May 2020, U.S. Application No. 16/867,919 was filed as a continuation of the '682 Patent. Two IDSs were filed contemporaneously, identifying eighteen U.S. patents, thirty-four U.S. patent publications, eight foreign patent documents, and four other publications. Ex. 2043 at 57–67. The application received a Notice of Allowance in November 2020, and the '901 Patent issued on March 9, 2021, with twenty claims. *Id*. at 82–88. Independent Claims 1 and 10 are directed to methods for estimating quality of at least one image from a plurality or stream of images.

In March 2021, U.S. Application No. 17/189,587 was filed as a continuation of the '901 Patent. The Examiner confirmed consideration of eighteen U.S. patents, thirty-four U.S. patent publications, eight foreign patent documents, and one non patent literature reference submitted by SnapAid. Ex. 2044 at 333–338, 342–345. The USPTO issued a Notice of Allowance in October 2021, which included the Examiner's statement of reasons for allowance distinguishing the claimed methods from the cited prior art. *Id*. at 103–109. The '325 Patent issued on February 15, 2022, with twenty claims, including independent Claims 1 and 11. *Id*. at 354. On January 12, 2025, the Applicant submitted a Request for Certificate of Correction, and the USPTO issued a Certificate of Correction to address certain mistakes of a typographical nature. *Id*. at 357–62.

In February 2022, U.S. Application No. 17/666,585 was filed as a continuation of the '325 Patent. Two IDSs were filed contemporaneously,

identifying eighteen U.S. patents, thirty-four U.S. patent publications, eight foreign patent documents, and four other publications. Ex. 2045 at 53–63. In July 2022, SnapAid amended the claims, canceling claims 1–20 and entering new claims 21–40. *Id.* at 85–91. On October 5, 2022, the USPTO issued a Non-Final Office Action allowing claims 21–30 and rejecting the then pending claims 31–40 on the grounds of nonstatutory double patenting as being unpatentable over claims 1, 3–6, 6, 8, and 9 of the '901 Patent. SnapAid filed a terminal disclaimer on January 1, 2023, and the USPTO subsequently issued a Notice of Allowance in February 2023. *Id.* at 95–99. The '702 Patent issued on June 6, 2023 with 20 claims, including independent Claims 1 and 11. *Id.* at 346.

The '452 Patent, challenged in this proceeding, issued from U.S. Application No.18/139,368, filed April 26, 2023. On January 16, 2024, the USPTO issued a Non-Final Office Action rejecting the then pending claims 1-17 and 19 under 35 U.S.C. §103 as being obvious over U.S. Publication No. 2011/0074928 ("Misawa") in view of U.S. Patent No. 9,438,816 ("Robinson") and pending claims 18 and 20 as being obvious over U.S. Publication No. 2011/0074928 ("Misawa") in view of U.S. Patent No. 9,438,816 ("Robinson") and further in view of U.S. Patent No. 7,973,848 ("Koh"). Ex. 1002 at 88–92. The Examiner also confirmed consideration of eighteen U.S. patents, thirty-four U.S. patent publications, eight foreign patent documents, and four non patent literature references submitted by SnapAid, including the

references identified in the '452 Patent noted above in section II.A. *Id*. at 96–106.

In response, SnapAid submitted a revised set of claims. *Id*., 339–342, 356–357. The USPTO subsequently issued a Notice of Allowance, which included the Examiner's statement of reasons for allowance distinguishing the claimed methods from the cited prior art. *Id*. at 361–367.

The '452 Patent issued on March 11, 2025, with twelve claims, including independent Claim 1. *Id*. at 610–11.

On its face, the '452 Patent cites fifty-three U.S. patent documents, eight foreign patent documents, and three other publications. Ex. 1001, 1–2. These references were considered during the detailed prosecution of the '452 Patent and its related applications. The Petition does not explain how the ten references it asserts differ in substance from those already reviewed by the USPTO.

E. Priority Date

As noted above, the '452 Patent claims priority to US Provisional Application 61/717,216, filed October 23, 2012, and US Provisional Application 61/759,643 filed, February 1, 2013. Ex. 1001 at 2; Ex. 2005; Ex. 2006. Thus, the '452 Patent is not eligible for post-grant review as it does not have any claims with an effective filing date of March 16, 2013 or later.

It is Samsung's burden to establish that the '452 Patent is eligible for post-grant review, and Samsung fails to meet that burden with its cursory and vague

analysis of the priority date issue. In fact, Samsung dedicates no more than a single paragraph to this issue and does little more than identifying claim terms and asserting that they are "not disclosed" by the provisional applications. Pet. at 6.[4]

However, Samsung's argument is incorrect. Each of the claim terms of the '452 Patent it identifies are disclosed in US Provisional Applications 61/717,216 and US Provisional Application 61/759,643.

U.S. Provisional Application No. 61/717,216 ("the '216 Application") describes a system and method for real-time assessment of picture quality using multiple sensors, such as image sensors, accelerometers, and gyroscopes, typically found in smartphones. Ex. 2005 at Abstract. The '216 Application explains that the invention combines data from multiple sensors and multiple quality indicators (QIs), and notes that there are many possible QIs depending on device capabilities and implementation. *Id.* at 3–4. Examples provided include:

1. Image leveled to the horizon
2. motion detection
3. camera is focused or still focusing
4. ISO level and how it is related to the specific sensor

[4] As discussed in Patent Owner's Discretionary Denial brief, the '452 Patent's priority date is a threshold issue for this PGR, and Samsung fails to provide any actual analysis on this issue. *See* Paper 7 at 16–20.

5. Exposure time and how is it related to the scene taken if data available

6. Lens focal length, aperture, focus distance and sensor type and model.

7. Histogram evaluation

8. Image details (acutance, corners detected, DCT coefficient for high details, image sharpness)

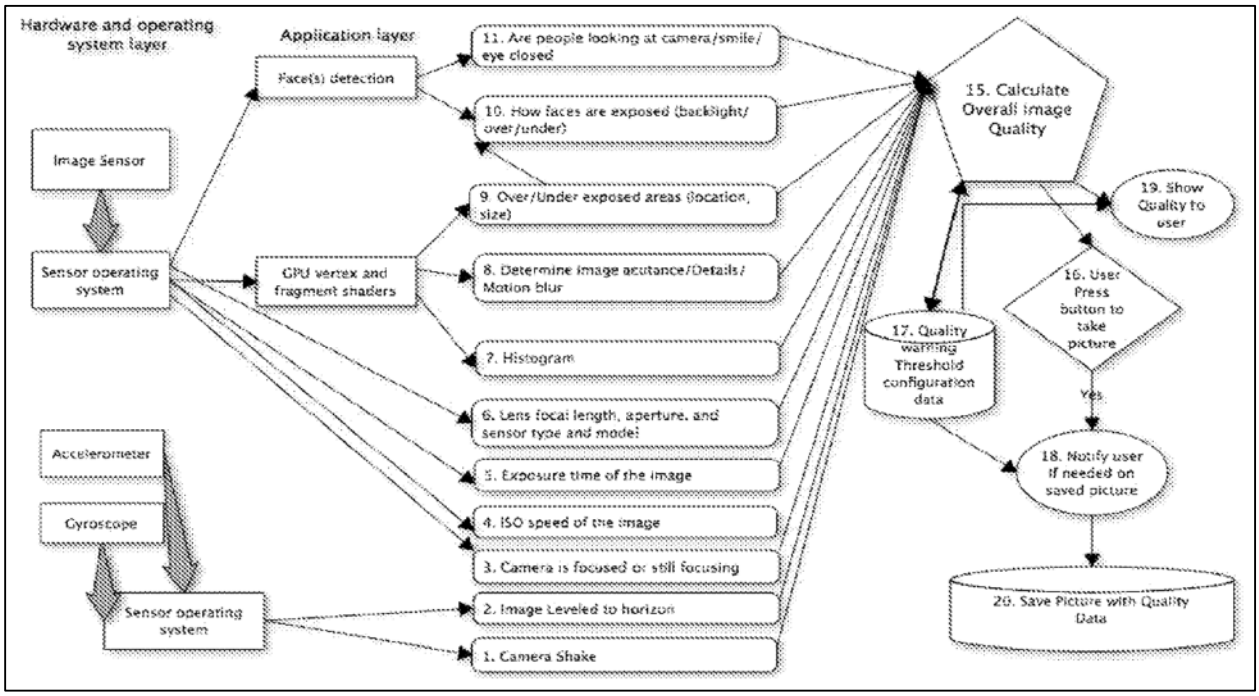
9. Under and over exposure area

10. Face detection and over or under exposed area near faces.

11. Face detection and is face is smiling and/or looking at camera

Id.

"Diagram 1," replicated below, illustrates an exemplary embodiment of the invention:



Id. at 2.

The '216 Application describes sending data from a hardware layer that includes sensors such as the image sensor and movement sensors like an accelerometer and a gyroscope. *Id*. at 3. The sensors feed data to the operating system and an application layer, which can perform detection of subjects or objects within an image. *Id*. Examples in the '216 Application include detection of faces, with the note that "Face detection can be made in the operating system or application layer." *Id*. at 2.

The '216 Application explains that hardware capabilities may vary between devices, and therefore some devices may not include all possible quality indicators or may be unable to process certain detailed indicators due to slower hardware. *Id*. at 4. Devices with more advanced sensors or processing systems can support additional quality indicators suited to their capabilities.

A novel aspect described in the '216 Application is the combination of separate quality indicators to generate a total quality indicator, where "the formula [for] a weight function of one indicator will take into account the data from another quality indicator." *Id*. at 5. A specific example describes how face detection data "can be used in combination with the under/over exposure area calculated before, to determine if the faces are under or over exposed, or more likely if there is a particular over exposed area near the face." *Id*. at 4. In that embodiment, "the average

luminance of the face is calculated" and, if below a threshold, "this may indicate the face is underexposed (backlight)," resulting in a low-quality value for the "face underexposed" indicator. *Id*. This example illustrates one way in which data from one quality indicator can be combined with another to refine the total quality indicator; other comparable combinations and refinements would be apparent to a person of ordinary skill in the art based on the disclosure.

The '216 Application also describes providing feedback to the user based on the total quality indicator. *Id*. at 5. For example, the system may indicate when the TQI is below a minimum threshold or automatically save a picture without requiring the shutter button to be pressed. *Id*. The '216 Application further explains that "the user may choose to get suggestions from the application on how to improve the next shot" and that "the quality indicators [can be] used [to] suggest to the user how to improve the picture he is taking." *Id*.

Regarding the priority date, the Petition asserts without any analysis that "neither provisional…provides support for all the limitations of any Challenged Claim." Pet. at 6. Samsung quotes two limitations from independent Claim 1 and provides a conclusory sentence declaring all dependent claims as unsupported but offers no substantive explanation for any of its arguments. *Id.* The accompanying sixty-six-page declaration from Dr. Dan Schonfeld likewise does not address the priority date issue with any depth, stating only that in his opinion "the '452 patent is

not entitled to either an October 23, 2012, or February 1, 2013, priority date." Ex. 1004 at ¶38. Ultimately, Samsung does not meaningfully challenge the priority of the '452 Patent. *See, e.g.*, *Am. Honda Motor Co., Inc. v. Neo Wireless LLC*, IPR2023-00797, Paper 29 at 17–18 (Sep. 3, 2024) (rejecting Petitioner's priority date challenge where "despite 'written description' being a question of *fact*, and despite having its own technical expert…at the ready, Petitioner [did] not direct [the Board] to any evidence supporting [its] plain attorney arguments" on why the "[p]rovisional [application] allegedly does not explicitly or *inherently* disclose the subject limitation to the *skilled artisan*."); *see also*, Paper 7 at 16–20.

III. The Alleged Prior Art

The Petition asserts nine proposed grounds of unpatentability under §103 asserting ten alleged prior art references:

- Ground 1A alleges obviousness of Claims 1 and 2 over the combination of Anon, Takeuchi, and Garcia-Molina;
- Ground 1B alleges obviousness of Claim 3 over the combination of Anon, Takeuchi, Garcia-Molina, and Kosaka;
- Ground 1C alleges obviousness of Claim 4 over the combination of Anon, Takeuchi, Garcia-Molina, and Li;
- Ground 1D alleges obviousness of Claims 5 and 10 over the combination of Anon, Takeuchi, Garcia-Molina, Bigioi, and

Wakabayashi;

- Ground 1E alleges obviousness of Claim 6 over the combination of Anon, Takeuchi, Garcia-Molina, and Ramesh;
- Ground 1F alleges obviousness of Claim 7 over the combination of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, and Wakabayashi;
- Ground 1G alleges obviousness of Claim 8 over the combination of Anon, Takeuchi, Garcia-Molina, Ramesh, Bigioi, Wakabayashi, and Kosaka;
- Ground 1H alleges obviousness of Claim 9 over the combination of Anon, Takeuchi, Garcia-Molina, and Liu;
- Ground 1I alleges obviousness of Claims 11 and 12 over the combination of Anon, Takeuchi, Garcia-Molina, and Yang.

Pet. at 1-2.

Every ground listed above relies on at least the combination of Anon, Takeuchi, and Garcia-Molina. No reference, alone or in combination, renders obvious the combination of claim limitations recited in the '452 Patent. Moreover, the references are largely duplicative of the conventional technology already known in the art and already considered by the Office during prosecution of the '452 Patent and related applications

A. Anon

Anon is US Patent No. 8,508,622, which issued on August 13, 2013 and is assigned on its face to Disney Enterprises, Inc., and describes certain embodiments of an image capturing device incorporating a "composition and feedback engine." Ex. 1005. Figure 1 depicts an example of the composition and feedback engine:

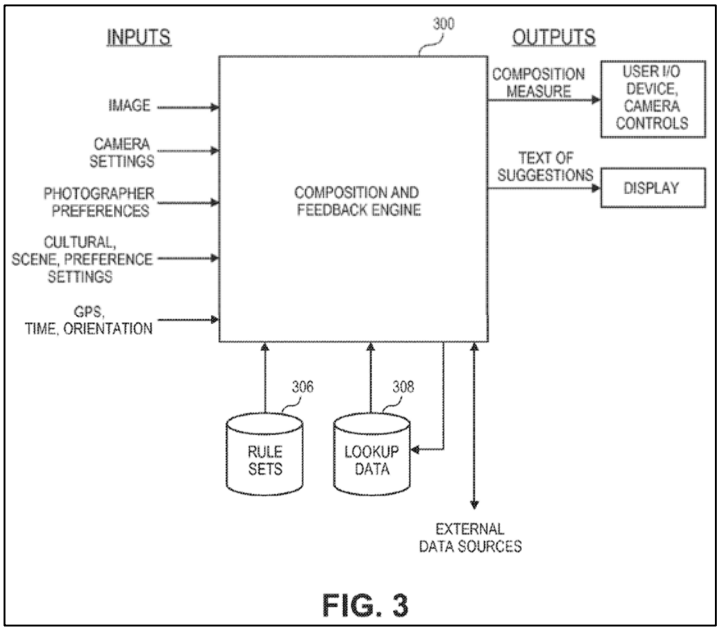


FIG. 3

Anon provides that the engine can receive two types of inputs:

- Intrinsic inputs, or image-based characteristics, which include data from the image sensor, camera settings (such as f-stop, aperture, shutter speed), and characteristics derived from the image itself (such as indication of where a subject is located within an image or an "energy" measure of the image). *Id.* at 3:53–59, 4:4–23.
- External inputs, or external characteristics, which are independent

> of pixel color values and may include camera-specific parameters (such as location, time of day, and camera orientation), photographer-specific preferences (including possible use of a "training set"), and cultural preferences (such as preferred color combinations). *Id*. at 2:16–28, 3:59–62, 4:24–55.

In described embodiments, a "composition measure" is computed and, in some cases, feedback may be provided to the user. *Id*. at 1:59–2:8, 7:55–56. However, there is no specific method, formula, or algorithm for determining the composition measure or performing such balancing disclosed. *See id*. at 8:32–35.

Anon states:

> the characteristics that are used to judge a properly composed image often depend upon the type of image that is sought to be captured. In other words, the characteristics that define what is 'a good image' are highly dependent upon the photographer's intent.
>
> …
>
> Context is useful for suggestions, since parameters for what would be a good shot might vary between, say, a Disney theme park, rural Montana, or a snow covered peak, as well as varying by location, orientation of the camera, time of day, etc.

Id. at 8:15–9:44. Anon further provides that, when there is insufficient contextual

information, the system can separately optimize "low-level characteristics" such as light, focus, aperture, and depth of field. *Id.* at 9:64–67.

Anon does not disclose the use of a background blurring test as an aesthetic measure, nor does it disclose quantitatively assessing inputs based on aesthetics to provide suggestions to a user. Anon also does not teach incorporating historical quality indicator or weight values, and it contains no disclosure of deep-learning or neural-network algorithms for computing quality indicators or total quality values.

B. Takeuchi

Takeuchi (US 2010/0149361, published June 17, 2010, assigned to Nikon Corporation) describes a camera system for evaluating a series of images captured in rapid succession, such as in a burst or continuous shooting mode. Ex. 1006, Abstract; ¶¶[0006]–[0007], [0089], [0156]. Multiple images are stored in a buffer and assessed based on how the subject changes over time, using characteristics such as motion vectors, defocus amounts, and main subject location. *Id.*, ¶¶[0007]–[0009], [0097], [0121]–[0122], [0129], [0139]–[0140], [0153].[5]

Images are segmented into blocks, with motion vectors calculated between consecutive frames and assembled into histograms (frequency distributions) of

[5] The '452 Patent recognizes that "There are many methods of computing a motion vector." Ex. 1001 at 11:37.

movement patterns; similar histograms are generated for defocus changes. *Id*., ¶¶[0097], [0112]–[0114], [0121]–[0123], [0172], [0182]–[0183], [0129]. The number, magnitude, and location of peaks in these distributions are metrics for scoring image quality, and scene-specific rules may prioritize concentrated or dispersed motion depending on the subject matter. *Id*., ¶¶[0011], [0123]–[0124], [0127], [0163]–[0164], [0178], [0210]. After the image evaluation portion, the system may select at least one image with evaluation results equal or above a predetermined threshold value. *Id*., ¶¶[0028]–[0029], [0189]–[0203].

Takeuchi does not disclose using a blurring background test as an aesthetic measure that can be incorporated into a total quality indicator.

C. Garcia-Molina

"Database Systems – The Complete Book" by Hector Garcia-Molina, Jeffery Ullman and Jennifer Widom is purported to be a book on database systems. Ex. 1016. Garcia-Molina does not discuss computing photo quality or any form of image analysis.

IV. Level of Skill in the Art

For purposes of this Preliminary Response, SnapAid submits that a person of ordinary skill in the art ("POSITA") at the time of the invention of the '452 Patent would have possessed at least a bachelor's degree in electrical engineering, computer science, or a related field, and at least one year of experience with digital imaging

systems, including image processing and analysis.

An individual with more industry experience but a different formal education could still be of ordinary skill in the art if that additional experience relates to image processing. Likewise, an individual with less industry experience but with a focus on image processing in their education could also be of ordinary skill in the art.

A POSITA would have been familiar with the basic operation of image sensors, camera modules, and auxiliary sensors used in image capture, as well as the design and use of image quality metrics. The POSITA would also be familiar with fundamental aspects of photography, like composition, subject, exposure, aperture, shutter speed, ISO. This level of skill is appropriate given the nature of the '452 Patent, which is directed to real-time picture quality assessment integrating camera hardware with multiple sensors and applying dynamic weighting to quality indicators.

V. Claim Construction

A. Samsung's Failure to Explain Different Claim Construction Positions Warrants Denial.

In its Petition, Samsung states that "terms in the Challenged Claims need not be construed" and proceeds to argue obviousness under the alleged plain and ordinary meaning of the claim language. The Petition does not identify a proposed construction for any claim term other than the alleged plain and ordinary meaning, which it does not define. Neither the Petition nor Dr. Schonfeld's declaration

expresses any difficulty in understanding the scope of the '452 Patent's claims.

While the Petition further argues that just Claims 5–8 are indefinite, in its recently served district court Invalidity Contentions, Samsung asserts that all twelve claims of the '452 Patent are indefinite because they "do not have a meaning that can be clearly determined from the patent." Ex. 2038 at 110. Samsung specifically identifies seven phrases it contends are indefinite:

- "background blurring test" (limitations [1.a] and Claim 2);
- "obstruction of at leas[t] [sic] one lens" (Claims 3 and 8);
- "wherein a separate QI2 is calculated for each lens and a sensor module the device has, wherein QI2 of QI total or both are based on at least two QI1 from 2 such lenses and sensor modules" (Claim 5);
- "QI_total" (Claims 5–7);
- "building at least a partial reconstruction of a 3D scene according to the images from the camera module; wherein the suggestion is further based on the 3D scene reconstruction" (Claim 10);
- "wherein a confidence level of a subject detection is calculated based on the object detection" (Claim 6); and
- "wherein at least one of a focus distance or lens aperture is used to determining a depth of field of the image, wherein the depth of field is computed, based on a movement of the device in the z axis, wherein the z

> axis is the direction to the object in a scene, may be included in the total quality indicator." (Claim 4)

Id.; *see also,* Appendix A.

The Petition only argues that Claims 5–8 are indefinite. For Claims 1–4 and 10, Petitioner maps the phrases listed above to alleged prior art teachings, purportedly applying the plain and ordinary meaning without hesitation. *See, e.g.*, Pet. at 38 ("Bigioi thus teaches the creation of a 3D scene from two different images."); Ex. 1004 ¶107 ("Bigioi thus teaches the creation of a 3D scene from two different images").

The Director has made clear that when a petitioner advances different positions before the Board and a district court, the petitioner must explain why those different positions are warranted. *Tesla, Inc. v. Intellectual Ventures II LLC,* IPR2025-00340, Paper 18 at 3–4 (informative); *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 3–5 (precedential). Where, as here, the petitioner offers no such explanation, denial of institution is appropriate. *See American Airlines, Inc. v. Intellectual Ventures I LLC*, IPR2025-01055, Paper 11 at 13 (PTAB Nov. 21, 2025). Here, Samsung has offered no explanation for its contrary positions.

Samsung's silence leaves the Board without guidance on how to construe the challenged claim limitations in light of its indefiniteness allegations. This

inconsistency prejudices the Patent Owner and fails to satisfy the statutory requirement that the Petition identify the grounds of challenge for each claim. 35 U.S.C. § 312(a)(3). The Petition's obviousness arguments rest entirely on constructions that Samsung now claims are impossible to understand, undermining the credibility and sufficiency of its grounds.

For these reasons, Samsung's unexplained and contradictory positions in parallel proceedings weigh strongly in favor of denying institution.

B. Claim 5 - "wherein QI2 of QI_total or both" Includes an Obvious Typographical Error.

The POSITA would readily recognize that the phrase "QI2 *of* QI_total or both" in Claim 5 contains a typographical error. The most natural reading, consistent with the specification and other claims, is "QI2 ***or*** QI_total or both."

The POSITA would recognize that Claim 5 includes a typographical error, and thus, would understand the phrase "wherein QI2 of QI_total or both" should be "wherein QI2 ***or*** QI_total or both."

Claim 5 depends from Claim 2 and Claim 1, and addresses embodiments with multiple lens and sensor modules. In such configurations, the specification teaches that a separate QI2 value (aesthetic quality indicator) can be calculated for each lens/sensor module, and that QI_total (total quality indicator) can incorporate multiple QI1 values (e.g., face/object quality indicators) from these modules. *See* Ex. 1001 at 2:38–40 ("Some camera/lens modules may have dual cameras or more

for achieving 3D data"), 16:41–17:40 ("Combining the Separate Quality Indicators to Total Quality Indicators"), and 10:5–9 (describing multiple QIs calculated over time or per module). In short, the '452 Patent describes the quality indicators and total quality indicator as distinct computed values–separate QIs are combined into QI_total and some QIs may depend on other QI data. *See id. e.g.*, 16:41–17:40. So, for example, in the case of Claim 5, QI2 can be based QI1 at least two QI1, QI_total can be based on at least two QI1, or *both* QI2 and QI_total can be based on at least two QI1.

A POSITA, reading Claim 5 in light of the specification, would immediately recognize "QI2 *of* QI_total" as a typographical slip for "QI2 *or* QI_total." The POSITA would understand "or both" to mean that either QI2, QI_total, *or both* of those values are calculated using recited QI1 values obtained from at least two lens/sensor modules. This plain reading is consistent with Claim 1's recitation of QI1, QI2, and QI_total, as well as the detailed embodiments in the specification. The Federal Circuit has recognized that minor typographical and clerical errors in patent claims may be corrected when, as here, the error is obvious on the face of the patent, the specification and claim language make the intended correction clear, and the prosecution history does not suggest any alternative meaning. *Canatex Completion Sols., Inc. v. Wellmatics, LLC*, 159 F.4th 39, 46 (Fed. Cir. 2025).

As such, SnapAid submits that Claim 5 would be understood to the POSITA

to recite "wherein a separate QI2 is calculated for each lens and a sensor module the device has, wherein QI2 ***or*** QI_total or both are based on at least two QI1 from 2 such lenses and sensor modules."

C. Claim 7 - "a correlation between each QI2" Includes an Obvious Typographical Error.

Claim 7 recites "a correlation between each QI2," but in context the intended phrase is "a correlation between each QI." The numeral "2" is a drafting error. Claim 7 depends from Claims 6, 2, and 1. Claim 1 identifies two specific quality indicators, QI1 and QI2, and the specification repeatedly describes correlations between quality indicators in the context of providing a suggestion for improvement of the image.

The specification repeatedly describes how suggestions may be provided to the user utilizing "quality indicators and their correlation." Ex. 1001, at 3:45–48 ("The user may get, or choose to get, suggestions from the application on how to improve the next shot, using the quality indicators *and their correlation*." (emphasis added)), 18:3–10 ("The user may choose to get suggestions from the application on how to improve the next shot. The application may use the quality indicators *and their correlation* to answer that. This can be done before a final picture is taken and/or after. The application may use quality indicators, their confidence level, importance *and their correlation* to respond." (emphasis added)). The specification even provides a specific, exemplary algorithm for computing a confidence level that is dependent on other values including a function specific to "quality indicator

correlations." *Id.* at 9:37–49.

Claim 1 of the '452 patent explicitly recites two, calculated quality indicators:

- QI1: quality indicator of a face or object (limitation 1.a.1)
- QI2: quality indicator that uses a background blurring test of said face or object (limitation 1.a.2).

And then Claim 1 includes making a suggestion to the user, specifically "suggesting to the user to move the device." Claim 7 includes "a confidence level of a subject focus" that is calculated based on a correlation between quality indicators. Given this, the POSITA would reasonably understand Claim 7's intended correlation to be between QI1 and QI2 of Claim 1, not multiple QI2 values.

This understanding is further supported by the specific quality indicators described in Claim 1. Given the context, it would be reasonable to the POSITA that the correlation being made is between the "QI1 *of a face or object*" with the "QI2 that uses a background blurring test *of said face or object*." There is already the dependence "of said face or object" in Claim 1, but Claim 7 is adding calculating a confidence level based on the correlation of each of the identified quality indicators. Again, minor typographical imprecision does not render the scope uncertain. *See, e.g., Canatex Completion Sols., Inc. v. Wellmatics, LLC*, 159 F.4th 39, 46–47 (Fed. Cir. 2025) (reversing a district court finding of indefiniteness where the error was "plainly is simple and 'minor' as a textual matter" and that "a relevant artisan would

immediately see that, as written, there is an error in the claim.").

As such, the POSITA would understand that, given the context of the claims and specification, the phrase "a correlation between each QI2" should be construed as "a correlation between each QI."

D. No Additional Specific Claim Construction is Warranted at this Time

For the purposes of this preliminary response, no other specific construction of any claim phrase or term is necessary at this time for the Board to find that Samsung did not meet their burden for institution. *See, e.g., Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)); *see also, Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an inter partes review). SnapAid reserves the right to seek constructions of these terms in litigation or if institution is granted, and to further respond to any constructions that the Petitioners propose.

VI. Petitioner Fails to Meet its Burden

Neither the Director nor the Board should institute because Petitioner has not met its burden to show a reasonable likelihood that it will prevail in establishing that any claim of the '452 Patent is unpatentable on any ground. The Petition

inadequately explains why a POSITA would have been motivated to combine the cited references in the manner alleged and fails to establish that the cited references teach the full scope of the challenged claims.

A. Ground I.A of the Petition Fails to Establish a Reasonable Likelihood that Claim 1 Is Unpatentable Under 35 U.S.C. § 103.

Claim 1 of the '452 Patent recites a specific, step-wise process: (i) calculate two defined quality indicators — QI1 (quality of a face/object) and QI2 (aesthetic quality using a background blurring test); (ii) calculate a total quality indicator (QI_total) based at least partially on QI1 and/or QI2; (iii) select, based on QI_total, a suggestion from a pre-stored table; and (iv) suggest moving the device and present that suggestion to the user. Petitioner's mapping never connects all of these dots. Anon's "composition measure" is not shown to be calculated from the claimed QI1 and QI2—particularly not from the required background blur aesthetic metric—and its rule-based suggestions are not shown to be selected from a QI_total-indexed table. The attempt to fill these gaps with Takeuchi's blur/focus defect test and Garcia-Molina's generic "table" teaching is hindsight reconstruction, not a reasoned combination. These fundamental disconnects leave multiple claim elements undisclosed and the asserted rationale to combine unsupported.

1. The Petition fails to adequately explain why a POSITA would combine the alleged prior art as suggested.

Obviousness requires more than locating claim elements in multiple

references. As the Supreme Court explained, "[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). A petitioner must show that a POSITA would have been motivated to consult the secondary reference as a whole for a specific reason, identify a teaching compatible with the primary reference's objectives, and ensure that the overall disclosure of the secondary reference does not discourage the combination. *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (explaining that in KSR, the Supreme Court "[r]eject[ed] a blinkered focus on individual [prior art references]" and "required an analysis that reads the prior art in context").

Here, the inventive concept of the '452 Patent is improving the aesthetic quality of an image by calculating quality indicators related to the face or object in the image (QI1) and the background blurring of the face or object (QI2), and presenting suggestions to the user to move the device based on the measure of a total quality indicator that integrates diverse QIs into a unified, weighting framework that can adapt to varying conditions and contexts in real time by considering other QIs, confidence levels, probability models, sensor error estimates, and historical data. The specification describes embodiments where background blurring around the subject of a photograph is desirable to draw the viewer's attention to the subject. *See, e.g.*, 14:1–7 (explaining that "background blurring…may sometimes actually

be desired," and adjusting the aperture "yields a good quality" photo.) The quality indicators calculated supply the quantitative metrics necessary for the '452 Patent's device to select and present suggestions that guide the user in achieving this effect.

The Petition never articulates why a POSITA would be motivated to combine the cited references in the manner and framework provided by the claims to achieve this specific photographic outcome. Instead, Petitioner cherry picks individual features from disparate references and justifies the combinations with conclusory statements about analogous fields or broad goals such as "ensuring that photographs taken…are of high quality" or "increasing the overall quality of the photograph and making it pleasing to the eye." *See* Pet. at 22–23. Such generalities are not a contemporaneous motivation in the art; they are reverse engineering from the claims, which is precisely the hindsight reconstruction condemned by the Federal Circuit. *Netflix, Inc. v. DivX, LLC*, 80 F.4th 1352, 1358 (Fed. Cir. 2023) ("We analyze whether prior art is analogous with the foresight of a person of ordinary skill, not with the hindsight of the inventor's successful achievement.") (internal quotations omitted). As the Federal Circuit has emphasized, "it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination." *Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017).

As explained below, Petitioner's failure to articulate a claim specific,

evidence-backed motivation to combine is structural to its hindsight driven approach and infects all proposed grounds. Across each combination, Petitioner relies on generic statements that the references share a broad goal or field, without identifying a technical reason for integration, without explaining how the secondary method would be adapted to the primary architecture, and without addressing the differences in problem space, methodology, or data handling. This is not the "reasoned explanation" required, and it warrants denial of institution.

a. The proposed combinations are straightforward illustrations of improper hindsight.

The Petition's combinations are not driven by any contemporaneous, claim-specific reason a POSITA would have had to make them, but by hindsight reconstruction using the '452 Patent as a roadmap. As the Federal Circuit has long recognized, "[d]efining the problem in terms of its solution reveals improper hindsight." *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1998).

The claims of the '452 Patent are directed to improving the aesthetic quality of an image by calculating quality indicators related to the face or object in the image (QI1) and the background blurring of the face or object (QI2), and presenting suggestions to the user to move the device based on the measure of a total quality indicator that depends at least on one of QI1 and QI2. Petitioner offers no explanation for why a POSITA would have sought to create such an evaluation

system from the cited art. Instead, it identifies individual claim-mapped elements in secondary references and inserts them into Anon's architecture without any reasoned analysis of how or why those elements would be chosen, integrated, and made to work together.

For example, Claim 1 identifies two specific quality indicators:

- QI1: quality indicator of a face or object (limitation 1.a.1)
- QI2: quality indicator that uses a background blurring test of said face or object (limitation 1.a.2)

See Appendix A (listing the different calculating steps of limitation 1.a).

The Petition's approach is to identify each claimed QI in either Anon, Takeuchi, or both, and assert that the combination is obvious because "a POSITA would have naturally been motivated" to combine the claimed QIs to achieve the goal of improving image quality. Pet. at 22. In doing so Petitioner never explains why a POSITA would choose these specific indicators, or why they would be integrated into a framework that evaluates the aesthetics of a potential image based on these values or how the different methodologies, such as real time composition feedback (Anon) and burst mode motion scoring (Takeuchi), would be adapted to work together.

Petitioner's pattern of identifying claim elements in disparate references, asserting they share a broad goal, and declaring the combination obvious, is precisely

the type of "blueprint" reasoning condemned by the Federal Circuit. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) ("The mere fact that the prior art could be modified … would not have made the modification obvious unless the prior art suggested the desirability of the modification."). Without a contemporaneous, claim-specific reason in the prior art to assemble these particular elements into the image analysis framework of the '452 Patent, the Petition's combinations amount to reconstruction with the benefit of the invention as a roadmap.

This flaw underlies Petitioner's reliance on generic "shared goal" reasoning (§ VI.A.1.b) and its boilerplate "known technique" assertions (§ VI.A.1.c).

In short, the Petition's motivation-to-combine analysis is not based on what a POSITA would have been motivated to do at the time, but on reconstructing the '452 Patent from the prior art with the benefit of hindsight. That structural defect warrants denial of institution.

b. The Petition's generic rationale that the references relate to image quality is inadequate given their different technical purposes and methodologies.

Petitioner repeatedly relies on a generic rationale that the cited references all relate to "evaluation apparatus and camera which are capable of evaluating an image which is comprehensively good" a POSITA would have been motivated to combine them. *See e.g.*, Pet. at 21–22 ("like Anon, Takeuchi teaches using a "total evaluation result" for an image using a weighted combination of different quality evaluation

methods"); 30 ("Anon and Kosaka are both concerned with improving the quality of captured images and automating the process of identifying and selecting 'good' photographs").

But having a common goal or being analogous art is not enough to supply a reason to combine. The Federal Circuit has made clear that the motivation inquiry asks why a POSITA would be motivated to make the specific combination or modification of prior art to arrive at the claimed invention, not simply whether the references are in the same field or share a general objective. *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068 (Fed. Cir. 2018); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

Here, the two leading references address a different technical problem with a different primary methodology:

- **Anon**: single-image composition feedback based on scene context, camera settings, and image characteristics, producing a composition measure. *See supra*, § III.A.
- **Takeuchi**: burst-mode or continuous-shooting evaluation using multi-frame motion vector histograms and defocus metrics to select "best shots" post-capture. *See supra*, § III.B.

These systems are not interchangeable modules for a single architecture; they are designed for different inputs, timing (real-time versus post-capture), and output

objectives. Petitioner offers no explanation of how or why a POSITA would adapt these distinct approaches into the '452 Patent's framework, which unifies multiple QIs in real time and provides suggestions to a user based on a quantitative assessment of the QIs. Instead, Petitioner assumes that because each reference contains an element that can be mapped to a claim limitation, the combination would have been obvious. That is not the law. *Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 888 (Fed. Cir. 2024) ("It does not suffice to simply be known. A reason for combining must exist.").

Without a claim-specific, evidence-backed rationale for integration, the Petition's generic "shared goal" reasoning is conclusory. It does not explain why a POSITA would merge the fundamentally different systems of Anon and Takeuchi to achieve the claimed image evaluation framework.

c. The Petition's reliance on boilerplate "use of a known technique" language is conclusory and unsupported.

Petitioner's particular combination of Anon with Takeuchi fails for an additional reason. Petitioner's stated rationale is that a POSITA "would have naturally been motivated to incorporate Takeuchi's blur/focus test, including evaluation of background focus/blur, with Anon's focus analysis" and that "[u]se of Takeuchi's blur/focus test would have been nothing more than use of a known technique to improve similar devices in the same way and applying a known technique to a known device ready for improvement to yield predictable results."

Pet. at 21–22. This reasoning is conclusory and lacks any claim specific explanation or evidentiary support.

The PTAB has repeatedly rejected generic statements such as "use of a known technique to improve similar devices in the same way" when petitioners fail to provide a factual nexus between the known technique and the claimed invention. *See Klas Telecom, Inc. v. Arnouse Digital Devices Corp*., No. IPR2020-01057, 2020 WL 6875596, at *5 (P.T.A.B. Nov. 23, 2020) (finding inadequate the "use of a known technique to improve similar devices in the same way" where petitioner failed to offer "sufficient evidence or testimony regarding a reason for combining the known elements in the fashion claimed").

Here, Petitioner does not explain how Takeuchi's post-capture image analysis—which uses focus/blur evaluation across multiple frames to detect defects and select the highest quality shots—would be adapted into Anon's composition feedback engine, which evaluates single frame composition quality using scene context, camera settings, and image characteristics. These systems differ in inputs, timing, and purpose, and Petitioner offers no analysis of how their methodologies could be integrated to produce the '452 Patent's framework. Without that analysis, Petitioner's rationale is exactly the type of conclusory assertion the Board has rejected.

This is yet another manifestation of the same structural flaw addressed above:

Petitioner relies on generic rationales based on the similarity of the references to support its combination without providing a claim-specific, evidence-backed reason. Such hindsight-driven reasoning cannot support institution.

2. Petitioner fails to show that Anon, Takeuchi, and Garcia-Molina disclose or suggest the specific QI1/QI2/QI_total framework recited in Claim 1.

Petitioner's cited references fail to disclose calculating the quality indicators required by independent Claim 1, as well as calculating a total quality indicator based partially on at least one of previously calculated quality indicators.

a. Neither Anon nor Takeuchi teach or suggest limitation 1.a.2, calculating QI2, as claimed.

Independent Claim 1 of the '452 Patent requires "calculating an aesthetic quality indicator QI2 that uses a background blurring test of said face or object," referencing the face or object assessed as part of QI1. As explained in detail below, Anon does not teach any blur testing, and Takeuchi's disclosure of tracking a subject of an image and identifying when the moving subject is in focus does not make up for this deficiency in Anon. As such, limitation 1.a.2—calculating QI2 that uses a *background blurring test* of the face or subject from QI1—is not taught or suggested by the combination of Anon with Takeuchi as alleged.

The '452 Patent utilizes aesthetic quality indicators to "achieve an eye-pleasing composition" by providing "suggestions to the user to move from his current location to another location…to achieve a…better total QI." Ex. 1001 at

15:50–16:21. One method of improving aesthetics disclosed in the '452 Patent is "by testing background blurring," which the patent recognizes as an aspect that "may sometimes actually be desired." *Id*. at 14:1–2. For example, the '452 Patent teaches that "[in a] scene with face recognition," a "wide aperture, say f/2.8…yields a good quality" photo by increasing background blur and making the subject of the photo stand out. *Id.* at 14:2–8.

As Petitioner admits, Anon does not disclose a background blurring test of the face or object assessed as part of QI1. Pet. at 21. To remedy this deficiency, Petitioner argues that a POSITA would turn to Takeuchi. However, Takeuchi similarly fails to disclose the use of background blurring as an aesthetic tool that takes into consideration the face/object that is the focus of QI1. Takeuchi's disclosure is directed to ensuring that an image "is in focus ... at the position of the main subject," rather than scoring the blur of a background of an image to achieve better aesthetics as taught by the '452 Patent. Ex. 1006 at ¶ [0142].

As part of the image analysis in Takeuchi, the "body side microcomputer 21 judges that an image has back focus if the portion which is in focus is distributed more towards the infinite distance side than the position of the main subject." *Id.* at [0143]; Pet. at 22. However, nowhere does Takeuchi teach that the use of background blurring in order to focus attention on the subject. In fact, Takeuchi teaches that "points are not added for the case that the focus is back focused or front

focused, or the case [where there is no portion anywhere which is in focus]." Ex. 1006 at [0144]–[0145]. In other words, Takeuchi is concerned with making sure that the focus of the image is on the identified subject and discards any image where the focus is behind the subject, in front of the subject or where there is no portion of the photo that is in focus. Takeuchi does not recognize that background blurring can be desirable nor does it teach a system that allows for intentional background blurring and provides suggestions related to achieving that effect.

The evidence that Petitioner relies on only shows that Takeuchi's system can analyze where the focus of an image lies, rather than scoring the *background blur* in relation to the face or object in the photo for aesthetics. This is insufficient to prove obviousness. For prior art to disclose an element of a patent, "the prior art must actually contain that feature or perform that step as part of its method or operation." *Geospatial Tech. Assocs., LLC v. United States*, 158 Fed. Cl. 113, 120 (2021). Moreover, Petitioner fails to explain how a POSITA would incorporate Anon's alleged assessment of the face/object in QI1 into Takeuchi's blur/focus test. Thus, Petitioner points to no evidence that Anon in combination with Takeuchi "uses a background blurring test of said face or object" to "calculate[e] an aesthetic quality indicator," and thus, Takeuchi fails to disclose limitation [1.a.2]

b. Anon fails to teach or suggest limitation 1.a.1, calculating QI1, as claimed.

Independent Claim 1 also requires the calculation of "quality indicator QI1 of

a face or object." Petitioner relies solely on Anon as allegedly disclosing this feature. But Anon's basic disclosure of recognizing a face (Ex. 1005 at 8:27–31) is not the same as the *calculating* of a *quality* indicator QI1 of a detected face or object.

As explained by the '452 Patent, the "Face Detection Quality Indicator" can indicate not only "whether there is a face or faces" in the photo, but also "[w]hether the face is smiling and/or looking at the camera." Ex. 1001 at 13:18–21. This quality indicator can also "alert the user of a possible face amputation" in a photo where it is "possible that the picture has 'half a face.'" *Id.* at 19:32–38. The quality indicator of a face or object provides a numerical measure of clarity, obstruction, positioning, etc. The invention of the '452 Patent goes beyond just detecting or recognizing the face or object in an image, and also calculates a numerical assessment of the quality of face or object captured by the image.

Petitioner fails to show that Anon's composition and feedback engine evaluates the *quality* of the face or object in the image. The only disclosure that Petitioner cites from Anon regarding the "quality indicator QI1 of a face or object" relates to whether "within the scene [captured by the image] … a face is recognized." Pet. at 20; Ex. 1005 at 8:27–31. However, mere face recognition does not align with what is claimed by the '452 Patent, which teaches a numeric measure representative of the *quality* of the face or object in the photo.

Moreover, Anon does not teach *calculating* the quality of the face or object in

the image, it only teaches recognizing a face in an image and positioning it "so that the image is not flat and boring or overwhelmingly detailed." Ex. 1005 at 8:26–27. This disclosure from Anon relates to photo composition and the placement of objects within a scene rather than assessing the quality of the face or object in the image. Thus, Petitioner fails to show that limitation [1.a.1] is obvious.

c. Anon does not teach or suggest limitation 1.a.3., calculating a total quality indicator limitation, as claimed.

Independent Claim 1 further teaches "calculating a total quality indicator that is based at least partially on at least one of QI1 and QI2." Petitioner relies exclusively on Anon's "composition measure" as disclosing this limitation. Pet. at 23. However, Anon only teaches inputting various parameters "into a fuzzy logic set" to evaluate the image. Ex. 1005 at 8:32–35. Anon does not describe the nature of the output from this fuzzy logic set, how it reflects the total quality of the image, or whether the cited "composition measure" incorporates both QI1 and QI2 as required by Claim 1. Moreover, as discussed above, Petitioner fails to show that the combination of Anon and Takeuchi disclose the calculation of QI2, and thus, Anon cannot satisfy the requirement of "calculating a total quality indicator that is based at least partially on at least one of QI1 and QI2."

d. Neither Anon nor Garcia-Molina teach or suggest limitation 1.b, selecting at least one appropriate suggestion, as claimed.

Petition further fails to disclose the next step required by the claims, i.e.,

"selecting based on the total quality indicator at least one appropriate suggestion from a pre-stored table of suggestions." Petitioner's proposed combination of Anon and Garcia-Molina, and particularly Anon's use of rule sets triggered by qualitative conditions, fails to teach or suggest selecting a suggestion *based on the calculated total quality indicator*.

The '452 Patent describes using QI total value to provide the user "suggestion from the application on how to improve the next shot." Ex.1001 at 18:3–6. In more complex embodiments of the invention, the specification teaches that data comprising user suggestions "can be an SQL table being queried by multiple QI." *Id.*, 18:13–15. As an example, the specification provides that "such a query on the database may be 'select * from suggestion_table where Qll>0.9 and QI2<0.2.' In this example Qll can be module 200 ISO speed and QI2 can be device shake QI. The text retrieved can be 'Try to use higher ISO speed to counteract device shake.'" *Id.* at18:15–20. Thus, the numerical value of the quality indicators informs the suggestion provided to the user.

Petitioner's combination of Anon's "rule sets" and Garcia-Molina's generic teaching of organizing data sets in "tables" fails to disclose the quantitative assessments underlying the selection of the "appropriate suggestion" as required by the Claim. The "rules" in Anon—cited by Petitioner as allegedly meeting this limitation—are qualitative, scene-specific instructions dictating how a photograph

should be composed. For example, Anon describes "a data set of rules" that includes, in one example, "'when located at the GPS coordinates of the front of Cinderella's Castle™ in Disneyland, suggest centering on the castle rather than rule of thirds.'" Ex. 1005 at 5:4–6. In another example, a rule in Anon's rule set storage states: "for landscape images of large bodies of water, adjust the camera settings so that a pleasing amount of light would come from the water relative to the sky." *Id.* at 7:21–24. As these examples demonstrate, Anon's suggestions relied upon by Petitioner are not selected based on any numerical value, as the claims require. Instead, they are triggered solely by specific characteristics or conditions detected in an image, such as the GPS coordinates or presence of a large body of water or a famous monument. The qualitatively determined rule sets in Anon therefore do not disclose "selecting, *based on the total quality indicator*, at least one appropriate suggestion from a pre-stored table of suggestions."

Garcia-Molina's concept of a table does not remedy this deficiency. Petitioner relies on Garcia-Molina to suggest that Anon's data could be implemented in a "two-dimensional" table. Pet. at 25. However, this does nothing to address the fundamental shortcoming in Anon with respect to limitation [1.b], as Anon fails to teach the use of a numerical total quality indicator value to select and present an appropriate suggestion to the user.

* * *

In sum, the Petition fails to identify any disclosure in its cited prior art that teaches the stepwise calculation of specific quality indicators and the presentation of suggestions to a user based on a numeric value determined by these quality indictors. Instead, the cited art provides only vague and incomplete descriptions of concepts loosely related to the specific quality indicators, i.e., face/object quality and the background blur test, but fails to teach the full scope of what is assessed in the manner outlined by independent Claim 1. Because the proposed combination fails to teach or suggest all the limitations of independent Claim 1, the Petition has failed to establish a reasonable likelihood that any of Claims 1–12 are unpatentable for obviousness.

B. The Petition Fails to Show that Claims 5, 6, 7, and 8 are Invalid for Indefiniteness under § 112.

At institution, the question is whether Petitioner has shown a reasonable likelihood of proving that the challenged claims fail to inform a person of ordinary skill in the art of their scope with reasonable certainty, in light of the specification and prosecution history. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

Petitioner's § 112 arguments for Claims 5–8 fall far short of this standard. Rather than engaging with the claims as a whole, Petitioner (1) reads the dependent claims in isolation, without the context provided by Claim 1 and the disclosure as a whole; (2) disregards the numerous descriptions, examples, and embodiments in the

'452 Patent that give the disputed terms clear meaning to a POSITA; and (3) relies on conclusory assertions that do not address how a POSITA would readily understand the claim language in view of the specification.

When read in context, each challenged claim uses terminology that is expressly defined or illustrated in the specification. A POSITA would understand the scope of these claims with reasonable certainty, as required by *Nautilus*. Petitioner's arguments therefore do not meet the burden for instituting post-grant review on grounds of indefiniteness.

1. Claim 5 is not indefinite under § 112.

As provided in section V.B above, Claim 5, properly construed to remove the obvious typographical error, recites: "wherein a separate QI2 is calculated for each lens and a sensor module the device has, wherein QI2 *or* QI_total or both are based on at least two QI1 from 2 such lenses and sensor modules. (emphasis added)" Properly construed, Claim 5 is not indefinite. As noted above, a POSITA, reading Claim 5 in light of the specification, would immediately recognize "QI2 *of* QI_total" as a typographical slip for "QI2 *or* QI_total." The POSITA would understand "or both" to mean that either QI2, QI_total, *or both* of those values are calculated using recited QI1 values.

Petitioner's entire argument is that "Claim 5's use of the term 'or both' renders this claim unintelligible [and] nothing in the specification or prosecution history

provides any clarification." Pet. 47 (citing Ex. 1004 ¶132). Petitioner fails to address Claim 5 in the context of Claim 1's description of utilizing multiple QI values or embodiments described in the specification. *See supra*, III.C (citing Ex. 1001 at 2:38–40, 10:5–9, and 16:41–17:40). Petitioner offers no substantive analysis of the claim language in light of the specification, and no explanation for why a POSITA could not determine the scope with reasonable certainty. Thus, Petitioner fails to meet its burden to show a reasonable likelihood of indefiniteness that would overcome the presumption of validity. *See S3 Inc. v. NVIDIA Corp.*, 259 F.3d 1364, 1367 (Fed. Cir. 2001).

2. Claim 6 is not indefinite under § 112.

Claim 6 depends from Claim 2 and in turn from Claim 1, and recites the additional feature of "a confidence level of a subject detection."[6] The recited "confidence level" is based on "the object detection." "Subject detection" in Claim 6 is simply describing the confidence level type (confidence in detecting the subject of interest). Claim 1 recites, in relevant part, "calculating … a quality indicator QI1 of a face or object."

The '452 Patent relates to the processing of photographed images. Ex. 1001

[6] Similarly, Claim 7 recites, *inter alia*, "a confidence level of a subject *focus* is calculated."

at 1:31–33. The POSITA would understand that the subject of a photo is what the image is about or the main focus of the photograph, whereas an object is a visual element within a photo. *See* Ex. 2039, 2040. Objects within a photo may include a person, a face, a lamp, a chair, a rock, or any other physical element or visual component within the frame. *See* Ex. 1001 at 8:40, 11:49–51. In some cases the subject and object can be the same, for example, in a portrait when a person's face is both the subject and object. In summary, a subject can be an object, and the object may be a face.

The '452 Patent provides various descriptions of object detection, which includes face detection. *See, e.g.*, *id.* at Figures 1 and 3 (Object Movement and Detection Computation Component 220 as an input to Obstructing the Lens Quality Indicator 246, Face Detection Quality Indicator 249, Recognized Face Quality Indicator 250, and Object Movement Quality Indicator 260), 8:39–43, 9:65–10:6, 11:49–58 ("[m]ethods of statistical pattern recognition may be used to fully recognize actual objects, such as a chair, a tree, a face or a car. If either the imaging device or object is moving, the identity of the object may be considered as a factor for the related confidence level; e.g. a car is much more likely to be moving during imaging than is a tree."), 11:64–12:5, 13:61–63, 14:23–26. Moreover, as explained in the '452 Patent, the quality indicators can have a confidence level, and the confidence level can be dependent on various other values. *See, e.g.*, *id.* at 9:37–56.

So, some confidence levels may relate to degree of confidence in detection of the subject, and others relate to a degree of confidence in the focus of a subject (like in Claim 7), for example.

It is with this context that the POSITA would consider Claim 6 and would read "object detection" in Claim 6 as referring to the detection of a face or object when calculating QI1 *of a face or object* as recited in Claim 1. Again, the "confidence level of a subject detection" simply describes the type of confidence level (confidence in detecting the subject of interest), and that confidence is calculated based on the object detection already recited by Claim 1 via QI1's "face or object" requirement.

Petitioner suggests that "the object detection" has no antecedent basis, but the entirety of Petitioner's analysis is that "'Subject' and 'object' are different words with different meanings, and nothing in the specification or prosecution history provides any clarification." Pet. at 48. This type of conclusory analysis does not meet Petitioner's burden on this issue. Petitioner provides no discussion of the context of the specification, the perspective of the POSITA, or the context provided by other claims like Claim 1 (from which Claim 6 depends) or Claim 7 which recites a similar confidence level limitation.

Even if the claim did lack an antecedent basis, that would not necessarily imply that the claims are indefinite because a claim lacking antecedent basis is not

per se indefinite. *See Microprocessor Enhancement Corp. v. Tex. Instruments Inc.*, 520 F.3d 1367, 1376 (Fed. Cir. 2008) (noting the "well-settled rule that claims are not necessarily invalid for a lack of antecedent basis"). In fact, the *Manual of Patent Examining Procedure* states that "[o]bviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite." M.P.E.P. § 2173.05(e) Lack of Antecedent Basis. Petitioner must still explain why the use of "object detection" does not "inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus*, 572 U.S. at 901. Thus, Petitioner's position is completely lacking.

3. Claims 7 and 8 are not indefinite under § 112.

As provided in section V.C above, Claim 7, properly construed to remove the obvious typographical error, recites: "a correlation between each QI." The numeral "2" in "each QI2" is simply a drafting error. Properly construed, Claim 7 is not indefinite.

Claim 7 depends from Claims 6, 2, and 1. Claim 1 identifies two specific quality indicators, QI1 and QI2, and the specification repeatedly describes correlations between quality indicators in the context of providing a suggestion for improvement of the image. As explained above, given the context of the specification and claims, the POSITA would plainly understand Claim 7's intended correlation to be between the recited quality indicators within Claim 1.

Petitioner's entire argument is that "there is no antecedent basis for 'each QI2.' Further, nothing in the specification or prosecution history provides any clarification." Pet. at 48. Petitioner fails to address or analyze the context of Claim 7 in any meaningful way, and once again offers no explanation for why a POSITA could not determine the scope with reasonable certainty. Ultimately, Petitioner fails to meet its burden to show a reasonable likelihood of indefiniteness that would overcome the presumption of validity.

Finally, Petitioner alleges that Claim 8 is indefinite only because of its dependence on Claim 7. Because Claim 7 is not indefinite, Claim 8 likewise is not indefinite.

C. The Petition Fails to show that Claim 4 Lacks Written Description.[7]

Claim 4 depends from Claim 2, which depends from Claim 1, and addresses how depth-of-field information can be used in calculating the total quality indicator (QI_total). Claim 4 covers using focus distance and/or lens aperture to determine how much of the scene will be in focus, factoring in the camera's movement toward

[7] While all of Petitioner's arguments under 112 are conclusory, this argument relating to written description of a claim limitation that has direct, explicit support in the specification illustrates Petitioner's shotgun approach and abuse of the post-grant system.

or away from the subject, and then including that depth-of-field calculation in the total quality score for the image.

Depth of field, and the factors that affect the depth of field, would be known to the POSITA. Depth of field is based on a combination of aperture, focal length, and the distance from the subject (i.e., the z-axis in Claim 4). *See, e.g.*, Ex. 2041. Moreover, the specification explicitly provides support for this claim when discussing the Object Movement Detection and Computation component 220 and provides various contextual discussion relating to depth of field and calculations provided in the specification. *See* Ex. 1001 at 10:66–11:25 ("Also a depth of field of the picture (DOF) can to be computed, using the focus distance, aperture of the lens and so on. If the depth of field is small and subject distance is short (macro photography), ***then movement of the device in the z axis may have a profound effect on quality*** … For example, a scene with a baby taken from 50 cm away with a Nikon D300, 50 mm focal length lens, aperture of 1.8 means the depth of field may be 2.7 cm. … These [depth of field] computations may aid in ***determining the importance of movement in the Z axis to the value of the QI***."), 19:25–26 ("Device movement importance is high if the depth of field of the lens is very small").

Petitioner argues only that the specification "contains no disclosure of computing depth of field based on moved of the device in the z-axis." Pet. at 49. But this is plainly incorrect as the specification explicitly describes depth of field and

movement of the device (including in the z-direction) multiple times in the specification: "movement of the device in the z axis may have a profound effect." Ex. 1001 at 10:66–11:25, 19:25–26. Petitioner fails to even consider this language, undermining its arguments.

Unlike the conclusory allegations and lack of substantive analysis provided in the petition, the clear support from the specification and claim 4 readily describes the invention to a POSITA that shows the inventor actually invented what is claimed.

D. The Petition Does Not Establish Patent Ineligibility Under § 101

The Challenged Claims are patent eligible because they recite a specific, technical solution to a technical problem in digital imaging: how to reliably and automatically assess picture quality in real time and provide actionable guidance to improve the image, either before or after a picture is taken. Ex. 1001 at 18:1–8. Independent Claim 1 requires a digital camera and processor configured to calculate multiple image-quality indicators—including a first quality indicator (QI1) for a subject's face or object, a second quality indicator (QI2) for the aesthetic quality of that subject based on a background-blurring test, and a total quality indicator based at least in part on QI1 and/or QI2—and to select and present an appropriate suggestion to the user in real time. These steps are tied to specific camera hardware and change how and when image data is processed, evaluated, and acted upon.

The specification and dependent claims disclose additional embodiments that

build on this core method, including integrating data from multiple hardware sensors (e.g., accelerometers, gyroscopes, GPS modules, autofocus lenses), computing statistical confidence levels from sensor error models, dynamically adjusting indicator weights based on cross-indicator correlations, and applying algorithms such as blur detection, PSNR calculation, corner detection, and deep learning. *Id.* at Fig. 1, 2:24–31, 3:1–26, 9:23–32, 10:13–16, 10:30–36, 12:33–51, 18:3–10, Claims 2–9. These additional features illustrate the broader technical architecture and confirm that the claims are rooted in a practical application that improves camera operation.

Petitioner's high-level characterization—assessing picture quality and suggesting the photographer move—improperly abstracts away the actual claim requirements and the unconventional image-analysis framework disclosed. As the Federal Circuit has cautioned, "[d]escribing the claims at such a high level of abstraction and untethered from the language of the claims all but ensures that the exceptions to § 101 swallow the rule." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337 (Fed. Cir. 2016).

When properly understood in light of the specification, the claims are not directed to an abstract idea under *Alice* Step 1 because they recite a concrete technological improvement to camera operation through a specific real-time image-quality assessment method. Even if the Director or Board were to find the

claims involve an abstract idea, they recite an inventive concept under *Alice* Step 2 in the form of a non-conventional, ordered combination of elements that improves device performance, as recognized in cases such as *McRO*, *Koninklijke KPN*, *Thales Visionix*, *Contour IP*, and *BASCOM*.

1. *Alice* step one: The Challenged Claims are not directed to an abstract idea.

At *Alice* Step 1, the question is whether the claims are "directed to" an abstract idea, considering the claim language in light of the specification. The focus of the claimed advance here is an image-quality assessment method tied to camera hardware, which changes how the device processes scene data and interacts with the user. Ex. 1001 at 2:24–46. The claims require calculating multiple quality indicators, combining them into a total quality indicator, and using that result to select and present a specific suggestion to the user. *Id*. at 3:1–5, Claim 1. In disclosed embodiments, those calculations incorporate sensor-derived parameters, statistical confidence scoring, and dynamic weighting, features that further illustrate the practical, hardware-linked nature of the invention. *Id.* at 4:6–56.

The dependent claims and detailed embodiments in the specification illustrate the broader technical architecture supporting Claim 1's core method. In these embodiments, the camera system integrates multiple hardware sensors such as image sensors, accelerometers, gyroscopes, GPS modules, step counters, and autofocus lenses with described algorithms including blur detection, PSNR calculation, corner

detection, and deep learning. Ex. 1001 at Figs. 1–4, 2:24–28, 4:44–48, 8:22–39, 10:13–16, 10:33–34. The dependent claims reinforce the technical nature of the invention by adding:

- Hardware-linked image assessment features such as tying the aesthetic quality indicator to lens aperture data (Claim 2), computing depth of field from lens aperture and focus distance with z-axis motion detection (Claim 4), and leveraging dual-camera hardware for improved accuracy (Claim 5).
- Advanced quality-indicator processing including statistical confidence levels for object detection and focus (Claims 6 and 7), detection of lens obstruction (Claims 3 and 8), and application of multiple image-processing algorithms to quality indicator computation (Claim 9).
- Scene analysis and recognition enhancements such as partial 3D scene reconstruction (Claim 10) and deep-learning algorithms for object detection (Claims 11 and 12).

These additional features further integrate any alleged abstract idea into a specific, practical application that improves the operation of the camera and the quality of

images captured.[8]

The claims are not directed to a "mental process" or a generic "evaluate and suggest-like" function. The claimed steps depend on hardware-generated data and computational techniques that cannot be performed in the human mind. Examples include background-blurring tests that use lens aperture and z-axis motion data, correlation-based confidence scoring from multiple sensors, and real-time execution of blur-detection, PSNR, and deep-learning algorithms. *Id.* at Figs. 1–4, 2:24–36, 4:44–48, 8:22–39, 10:13–16, 10:33–34. By integrating these operations into the pre-capture workflow, the invention improves the functioning of the camera itself. It helps avoid poor-quality images and reduces trial-and-error shooting.

These claimed operations cannot be performed in the human mind and go well beyond generic computer implementation. *See* M.P.E.P. § 2106.04(a)(2)(III)(A) ("Claims do not recite a mental process when they do not contain limitations that can practically be performed in the human mind."). Petitioner's assertion that the claims are limited to "observations, evaluations, judgments, and opinions" (Pet.

[8] Petitioner submits that all twelve claims are "directed to *the same abstract idea* of assessing the quality of a picture and suggesting where to take a new picture based on that assessment without specifically describing how that result is achieved, rendering them all abstract." Pet. at 56 (emphasis added).

at 50) ignores the hardware-driven, computational nature of these steps. While a person can subjectively judge a photo after it is taken, they cannot perform the claimed real-time technical assessments. For example:

- QI2's aesthetic quality indicator, including the background-blurring test, incorporates lens aperture, focus distance, and z-axis motion data from accelerometers. Ex. 1001 at 3:5–12, 3:51–59, 14:1–7, Claims 1, 2, 4. These parameters cannot be measured or computed accurately by a human during image capture.
- Computing a total quality indicator based on correlation and confidence levels derived from sensor error models requires statistical operations over multiple sensor data streams. *Id*. at 8:33–45, 11:49–58, Claims 6 and 7.
- Executing multiple distinct algorithms such as deep learning, frequency-domain blur detection, and PSNR calculation in real time requires GPU/CPU processing beyond human capability. *Id*. at 3:40–45, 10:11–16, 10:30–38, Claims 9, 11, 12.

These examples show that the Challenged Claims are not abstract because they go beyond a photographer's mental impressions or generic image-quality assessments. They require specialized hardware and computational steps that cannot be done mentally or with pencil and paper. *See, e.g.*, *Ex Parte Michael A. Reitman et. al*,

2022 WL 58626 at *7–8 (P.T.A.B. Jan. 4, 2022) (finding claims were not directed to an abstract idea because "[s]uch complex programmed functionality … cannot practicably be performed in the human mind or with pen and paper."); *SiRF Tech., Inc. v. Int'l Trade Com'n*, 601 F.3d 1319, 1332–33 (Fed. Cir. 2010).

The Federal Circuit has repeatedly held that claims reciting a specific means or method that improves the relevant technology are not directed to an abstract idea. *Contour IP Holding LLC v. GoPro, Inc.*, 113 F.4th 1373, 1379 (Fed. Cir. 2024); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314–16 (Fed. Cir. 2016); *Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1150–51 (Fed. Cir. 2019); *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1348–49 (Fed. Cir. 2017).

In *Contour IP*, the court found claims patent-eligible where the camera processor recorded low- and high-quality video streams in parallel, transferred the low-quality stream to a remote device for real-time viewing, and adjusted camera settings accordingly. 113 F.4th at 1376–77, 1379. The court rejected the argument that the claims were merely "creating and transmitting video" because they recited a specific technological means that improved real-time viewing capabilities. *Id.* at 1379–81. The Federal Circuit also explained that even if the components used were known at the time of the invention, that does not necessarily mean the claim is directed to an abstract idea at Step 1. *Id.* at 1380 (citing *Licensing S.A.R.L. v. LG*

Elecs., Inc., 880 F.3d 1356, 1362 (Fed. Cir. 2018), and *Thales Visionix*, 850 F.3d at 1348–49). The question at Step 1 is whether the claim as a whole is directed to a specific means or method that improves the relevant technology. The '452 Patent likewise claims specific technological means for improving image capture: calculating multiple quality indicators in real time, combining them into a total quality indicator, and using that result to select and present a targeted suggestion to the user before capture. Ex. 1001 at Claim 1. These steps change how and when the camera processes scene data and interacts with the user, improving device performance regardless of whether some components were known.

The decision in *McRO* confirms that applying computational rules to achieve a technological improvement is not abstract. In that case, the claims automated 3-D animation by applying a specific set of rules to transform input speech into synchronized morph animations. 837 F.3d at 1314, 1316. The court found that the rules were a "specific means" that improved animation technology. *Id.* at 1314. The '452 claims apply computational steps that include calculating a first quality indicator for a face or object, calculating a second quality indicator for aesthetic quality using a background-blurring test, and computing a total quality indicator from those results. *See e.g.*, Ex. 1001 at Claim 1. These steps improve camera operation and guide user positioning before capture.

The Federal Circuit's reasoning in *Koninklijke KPN* further supports

eligibility here. In that case, the claims improved error-detection systems by varying the way check data was generated, even though the components were known. 942 F.3d at 1150–51. The court held that the claimed variation was a specific implementation that improved system performance. *Id.* at 1151. The '452 claims similarly combine multiple quality indicators, weight them, and base the weighting on correlations and confidence levels derived from sensor error models. Ex. 1001 at Figs. 1–4, 2:24–36, 3:1–5. This arrangement improves the accuracy and responsiveness of image-quality assessment compared to prior art systems that used static or manually adjusted weights. *Id.* at 2:59–61.

Finally, *Thales Visionix* illustrates that using sensors in an unconventional way to solve a technical problem is patent-eligible. The claims there used inertial sensors to calculate the position and orientation of a moving object on a moving platform. 850 F.3d at 1348–49. The '452 claims also use sensor data in an unconventional way. For example, they incorporate accelerometer-derived motion data with lens aperture and focus distance to assess background blur, and they correlate multiple indicators to adjust confidence levels. Ex. 1001 at Claims 1–12. These operations inform capture decisions and user guidance before the image is taken.

These precedents confirm that the Challenged Claims, like those upheld in *Contour IP*, *McRO*, *Koninklijke KPN*, and *Thales Visionix*, are directed to

specific, hardware-linked methods that improve the functioning of a technological device. They are not abstract ideas, but concrete implementations that change how a camera operates to produce better images.

Petitioner's reliance on *Longitude Licensing*, *Yu v. Apple*, *Broadband iTV*, and *USC IP* is misplaced. See Pet. at 52–53. The Federal Circuit's decision in *Longitude Licensing* involved claims that were abstract because they lacked any disclosed mechanism for achieving the alleged improvement. 2025 WL 1249136, at *2 (Fed. Cir. Apr. 30, 2025). In contrast, the '452 Patent claims and specification describe in detail how quality indicators are calculated and used within a defined architecture to generate real-time suggestions.

Petitioner's citation to *Yu v. Apple* fares no better.[9] In *Yu*, the claims were directed to the result of an enhanced image using generic camera components, without reciting specific steps that improved camera operation. 1 F.4th 1040, 1043 (Fed. Cir. 2021). The '452 claims specify how multi-sensor data is processed, weighted, and applied to produce actionable feedback before capture.

In *Broadband iTV*, the claims concerned generic data reordering and recommendation in an abstract environment, not improvements to a hardware

[9] Notably, the Federal Circuit distinguished the claims at-issue in *Contour* from those in *Yu v. Apple Inc.*, 1 F.4th 1040 (Fed. Cir. 2021). *Contour*, 113 F.4th 1373 at 1380.

device. *Broadband iTV, Inc. v. Amazon.com, Inc.*, 113 F.4th 1359, 1368–69 (Fed. Cir. 2024). The '452 claims improve camera operation through hardware-linked processing and real-time user guidance.

Finally, *USC IP P'ship v. Meta Platforms* addressed claims for collecting and using intent data to recommend content. The court found that this was not a technical solution to a technical problem. 2023 WL 5606977, at *3 (Fed. Cir. Aug. 30, 2023). The '452 claims address a genuine technical problem in digital imaging by integrating sensor-based calculations and described algorithms to guide pre-capture device behavior.

The Challenged Claims recite specific, hardware-linked steps for calculating and combining quality indicators, applying computational techniques, and using those results to guide camera operation and user positioning before or after capture. Ex. 1001 at These steps improve how the camera functions by changing when and how scene data is processed and acted upon. Under Federal Circuit precedent, such claims are patent-eligible even if they use known components. The claims solve a technical problem with a concrete technological improvement, and thus, are not directed to an abstract idea under *Alice* step one.

2. *Alice* Step Two: The Challenged Claims Recite an Inventive Concept.

Even if the Challenged Claims were viewed as involving an abstract idea, they recite significantly more. The inventive concept lies in the specific,

non-conventional arrangement of hardware components and processing steps that fundamentally changes how a camera operates and interacts with the user before capture. The claims integrate data from multiple hardware sensors, calculate multiple quality indicators using algorithms tied to sensor parameters, can assign statistical confidence levels based on sensor error models and historical trends, can dynamically adjust indicator weights based on correlations between indicators, and generate actionable user suggestions in real time. Ex. 1001 at Claims 1–12. This architecture was not well-understood, routine, or conventional in the field of digital imaging and represents a meaningful improvement over prior systems that relied on static or manually adjusted quality-indicator weights.

The Federal Circuit has recognized that an inventive concept can reside in the "non-conventional and non-generic arrangement of known, conventional pieces." *BASCOM Global Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016). That principle applies here. While components such as an optical lens, image sensor, and processor were generally known, the '452 Patent combines them in a specific architecture that operates in an unconventional way. The claimed methods integrate these components into a real-time quality-assessment system that calculates multiple quality indicators, assigns confidence scores based on statistical error models, adjusts indicator weights according to correlations between indicators, and uses those results to control device

behavior and guide the user before capture. Ex. 1001 at Fig. 1, 2:24–31, 3:1–26, Claims 1–12. For example, the system can combine accelerometer-derived motion data with lens aperture and focus distance to assess background blur, then decide whether to prompt the user to reposition before taking the picture. *Id*. at Claims 1, 2, 4. This ordered combination produces capabilities not found in prior art cameras and supplies "significantly more" than the alleged abstract idea.

Petitioner has not met its burden to prove that the claimed architecture was well-understood, routine, and conventional at the time of the invention. As the Federal Circuit explained in *Berkheimer v. HP Inc.*, "the mere fact that something is disclosed in a piece of prior art… does not mean it was well understood, routine, and conventional." 881 F.3d 1360, 1369 (Fed. Cir. 2018). The '452 specification describes a new technique for real-time image-quality assessment that departed from prior systems. Earlier approaches relied on static or manually adjusted quality-indicator weights and lacked adaptable weighting, confidence scoring, and sensor error modeling. Ex. 1001 at 2:59–61. Here, for example, the system adjusts the weight of an aesthetic quality indicator in real time based on motion data from accelerometers and the confidence level of a focus quality indicator. *Id*. at 3:1–16, 3:51–55, 12:63–13:16. This adaptive process is computed before capture, guiding the user or the device to improve the image in ways prior systems could not.

The dependent claims add inventive features that deepen the technical

implementation and further integrate any alleged abstract idea into a practical application. Claim 2 ties the aesthetic quality indicator to lens-aperture data. Claim 4 computes depth of field from lens aperture and focus distance in conjunction with z-axis motion detection. Claim 5 leverages dual-camera hardware for improved accuracy. Claims 6 and 7 compute statistical confidence levels for object detection and focus. Claims 3 and 8 detect lens obstruction. Claim 9 applies multiple specific image-processing algorithms to quality-indicator computation. Claim 10 incorporates partial 3D scene reconstruction. Claims 11 and 12 employ deep-learning algorithms for object detection. These dependent-claim features show that, even if the core method of Claim 1 were considered abstract, the claimed implementations go further. They integrate the method into concrete, hardware-linked processes that improve how the camera operates, enhance image quality, and reduce trial-and-error photography. This level of technical integration is a hallmark of an inventive concept under *Alice* Step 2.

Petitioner's authorities do not undermine the inventive concept in the '452 claims. The decision in *Mobile Acuity Ltd. v. Blippar Ltd.* involved claims that were purely "result-oriented" and failed to specify how the claimed steps were performed. 110 F.4th 1280, 1292–94 (Fed. Cir. 2024). The '452 claims are different: they detail how quality indicators are calculated from sensor data, how weights and confidence levels are applied, and how those results drive specific device actions and user

guidance before capture. In *Weisner v. Google LLC*, the court found the claims used existing technology without any improvement, relying on specification statements and patentee concessions. 51 F.4th 1073, 1083 (Fed. Cir. 2022). The '452 specification, by contrast, describes new techniques for sensor-based image-quality assessment, including adaptable weighting and confidence scoring, that improve camera operation. Petitioner points to no comparable admissions here. These distinctions confirm that the cases Petitioner cites do not apply. The '452 claims recite specific, hardware-linked processes that improve device performance, and they contain the inventive concept required by *Alice* Step 2.

Even if the Challenged Claims were viewed as involving an abstract idea, they contain "significantly more" in the form of a non-conventional and non-generic arrangement of hardware components and defined processing steps. The inventive concept is reflected in the real-time integration of multiple sensor inputs, dynamic calculation and weighting of quality indicators, confidence scoring based on statistical error models, and the use of those results to control device behavior and guide the user before capture. *Id.* at Figs. 1–4, 2:24–36, Claim 1. These features were not well-understood, routine, or conventional in the art, as confirmed by the specification and the scope of the dependent claims. Federal Circuit precedent, including *BASCOM* and *Berkheimer*, recognizes that such ordered combinations transform any alleged abstract idea into a patent-eligible application. For this reason,

the Petition fails to establish ineligibility under § 101.

VII. Conclusion

Samsung has not shown a reasonable likelihood that any challenged claim is unpatentable. The Petition relies on conventional prior art without teaching the claimed integration or offering a credible motivation to combine and advances contradictory claim construction positions in parallel proceedings. Combined with its overlapping challenges and litigation tactics, these deficiencies warrant denial. SnapAid respectfully requests that the Director deny institution of inter partes review for all challenged claims of the '452 Patent.

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Respectfully submitted,

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APPENDIX A – SNAPAID'S '452 PATENT CLAIM LISTING

Claim [Element]	Claim Language
1 [1.pre]	A method for presenting suggestion to a user of a device to move the device to a different location, where the device comprises at least one digital camera module that comprises at least one optical lens and an image sensor coupled to said optical lens for capturing an image, and at least one processor coupled to the image sensor or digital camera for receiving data therefrom, the method by the processor comprising:
1 [1.a.1]	calculating from an image received by at least one sensor and lens, a quality indicator QI1 of a face or object,
1 [1.a.2]	and calculating an aesthetic quality indicator QI2 that uses a background blurring test of said face or object,
1 [1.a.3]	and calculating a total quality indicator that is based at least partially on at least one of QI1 and QI2;
1 [1.b]	selecting based on the total quality indicator at least one appropriate suggestion from a pre-stored table of suggestions,
1 [1.c]	suggesting to the user to move the device to different location; and
1 [1.d]	presenting the suggestion to the user.
2	The method according to claim 1, wherein the background blurring test is based at least partially on data from at least one of, the sensor, lens, lens aperture or any combination thereof.
3	The method according to claim 1, wherein the total quality indicator also comprises of testing the obstruction of at least one lens.
4	The method according to claim 2, wherein at least one of a focus distance or lens aperture is used to determining a depth of field of the image, wherein the depth of field is computed, based on a movement of the device in the z axis, wherein the z axis is the direction to the object in a scene, may be included in the total quality indicator.
5	The method according to claim 2, wherein a separate QI2 is calculated for each lens and a sensor module the device has, wherein QI2 of QI_total or both are based on at least two QI1 from 2 such lenses and sensor modules.

Claim [Element]	Claim Language
6	The method according to claim 2, wherein a confidence level of a subject detection is calculated based on the object detection, and used in calculation of QI_total.
7	The method according to claim 6, wherein a confidence level of a subject focus is calculated based on a correlation between each QI2, and the confidence level is used in computation of QI_total.
8	The method according to claim 7, wherein the total quality indicator also comprises of testing an obstruction of at least one lens.
9	The method according to claim 1, wherein the analyzing of the captured image comprises applying multiple algorithms selected from a group consisting of an aesthetic algorithm, an artificial neural network employing deep learning algorithm, a corner detection algorithm, a blur detecting algorithm, and Peak Signal-to-Noise Ratio (PSNR) calculation, and the method further comprising obtaining a respective third value (QI2i) associated with each of multiple algorithms, and calculating or estimating the second value (Q12) based on the multiple third values (QI2i) from the multiple algorithms.
10	The method according to claim 1, further comprising building at least a partial reconstruction of a 3D scene according to the images from the camera module; wherein the suggestion is further based on the 3D scene reconstruction.
11	The method according to claim 1, wherein the analyzing of at least one images for detecting or recognizing one or more objects uses algorithms of a deep learning.
12	The method according to claim 2, wherein the analyzing of at least one images for detecting or recognizing one or more objects uses algorithms of a deep learning.

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing Patent Owner's Preliminary Response is produced using a 14 point Times New Roman font and contains 17,500 words excluding any table of contents, mandatory notices under 37 C.F.R. § 42.8, certificates of service or compliance, or appendix of exhibits, according to the word-processing program used to prepare this document (Microsoft Word).

Dated: December 15, 2025

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ERROR! REFERENCE SOURCE NOT FOUND.SNAPAID LTD.

CERTIFICATE OF SERVICE

The undersigned certifies that on the fifteenth day of December, 2025, a complete and entire copy of the foregoing Patent Owner's Preliminary Response including exhibits, if any, was served on the date below on the following counsel of record via email per Petitioner's consent to electronic service.

Dated: December 15, 2025

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