

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Samsung Electronics Co., Ltd.,
Petitioner,

v.

SiOnyx, LLC,
Patent Owner.

Case No. IPR2025-00161
Patent No. 11,721,714

PETITIONER'S PRELIMINARY REPLY

I. Claim Construction of “Pixel”

Patent Owner does not dispute that Hwang and Yamada both disclose light trapping devices comprising *light trapping materials* which reflect light and include *a high refractive index material sandwiched between two low refractive index materials*, as the '714 patent's independent claim 1 requires. Nor does Patent Owner raise any arguments on any of the combination references or dependent claims.

Rather, on the merits of Petitioner's obviousness challenges, Patent Owner disputes just a single element of claim 1: whether Hwang's "pixel semiconductor patterns" and Yamada's "light receiving sections" constitute *light sensitive pixels*. POPR, 10–17. Under any reasonable interpretation, they do. Patent Owner attempts to argue otherwise by misstating the ITC record to try to justify overly narrow interpretations of *pixel*. Yet the term was deemed at the ITC to carry its plain and ordinary meaning, and there is nothing in the ITC record that would support Patent Owner's dubious arguments about this term.

A. “Pixel” Argument for Hwang (Ground I)

Hwang's image sensor includes "pixel semiconductor patterns 110a," which constitute *light sensitive pixels* under the '714 patent. Petition at 9. Patent Owner seeks to argue otherwise based on a curious lexicography argument, asserting that the *pixel* in Hwang is not the pixel semiconductor pattern but rather Hwang's depletion region. POPR, 12–13. Although Hwang labels this region as "photodiode

145,” it merely constitutes a subpart of the pixel that is doped with only one dopant—and that is incapable of converting light to electrical signals on its own.

Nothing in the ITC *Markman* proceedings (nor the ’714 patent) could support a construction that would limit *pixel* to a depletion region. In fact, in the ITC, the term was deemed to carry its plain and ordinary meaning, after Patent Owner argued that construing *pixel* to mean “photodiode” would improperly limit the term. *See* Ex-2005, 27, 22 (“SiOnyx states that ‘Samsung’s proposal ... seeks to change ‘pixel’ to ‘photodiode,’ even though the patentee expressly chose to claim a pixel.”).

Rather, as the POPR purports to acknowledge (at 10), the parties agreed at the ITC that a pixel “converts light into an electrical signal.” The pixel semiconductor pattern is the structure in Hwang that performs this function, as Dr. Lebby explained:

While Hwang calls element 145 a “photodiode,” a POSITA would understand that term (i.e., the structure that converts light into an electrical signal) encompasses more than just element 145, and would further include the surrounding pixel semiconductor patterns 110a. The photodiode comprises a junction created between the differently doped semiconductor regions. See Hwang, 5:52-6:6 (“photodiodes 145 form a PN junction with the pixel semiconductor pattern 110a.”).

Ex-1003, ¶ 62, n. 5 (emphasis added to identify portion of quote omitted by the POPR). That is, a photodiode comprises a PN junction created by differently doped semiconductor regions. *See* Hwang, 5:52–6:6. What Hwang labels as “photodiode 145” comprises only one doped region, *see* Hwang, 5:60–62, which cannot on its

own function as a diode to convert light into electrical signals. Instead, Hwang's photodiode encompasses the differently doped regions of pixel semiconductor pattern 110*a*. *See* Hwang, 6:58–62 (“patterns 110*a* are doped with a first conductive dopant” and “photodiodes 145 are regions doped with a second conductive dopant”).

B. “Pixel” Argument for Yamada (Ground 6)

Likewise, Yamada's device includes a “plurality of light receiving sections (7),” which constitute *light sensitive pixels* as they can be “composed of a PIN photodiode,” and convert “light energy ... into electrical energy.” Yamada at [0009], [0016], [0035]; *see* Petition at 62–63. Patent Owner seeks to argue that this element is not a *pixel* because “Yamada does not disclose an image sensor.”

The '714 patent does not claim an “image sensor,” and its specification states that it is “applicable to other optoelectronic devices such as solar cells.” '714 patent, 6:23–25. Nonetheless, Patent Owner seeks to import an “image sensor” requirement into the *pixel* element:

During claim construction in the ITC investigation, as acknowledged by the ALJ in the Markman Order, Samsung's and SiOnyx's experts agreed that a pixel is the “basic light-detecting unit *of an image sensor*.” EX2005 (ITC Markman Order), 22.

POPR at 15. This is simply mistaken. The purported quote does not appear in the ITC Order. Nor is there any statement in the order in which the ALJ “acknowledged” this proposition. On the contrary Samsung has consistently argued at the ITC that

pixel is not limited to image sensors. Additionally, the ALJ concluded that *pixel* “should be given [its] plain and ordinary meaning,” noting that he would rule on whether a given structure constitutes a *pixel* in his final initial determination. Ex-2005, 26–27. That *pixel* should not be limited to image sensors is reinforced by the applicants’ different claims in a related patent that instead specify “An imager device, comprising: at least two light sensitive image sensor pixels each having...” U.S. Patent No. 10,244,359, claim 1 (IPR2025-00162, Ex-1001).

II. The Board Should Not Exercise Discretion to Deny This Patent Challenge

Discretionary denial is not warranted under *Fintiv*, which provides for a “balanced assessment of all the relevant circumstances in the case, including the merits.” *Fintiv*, IPR2020-00019, Paper 11 at 14. Petitioner has established a strong case on the merits, as evidenced by the POPR’s narrow and tenuous response on the *pixel* limitation, as discussed above. “In such cases, the institution of a trial may serve the interest of overall system efficiency and integrity because it allows the proceeding to continue in the event that the parallel proceeding settles or fails to resolve the patentability question presented in the PTAB proceeding.” *Id.* at 15.

Additionally, Patent Owner has significantly narrowed the asserted claims at the ITC, such that those parallel proceedings now involve only 5 of the 18 challenged claims of the ’714 patent. Accordingly, there is no overlap of any unpatentability issues for claims 2–11 and 14–16 or Grounds 2, 4, and 8–10. In fact, across the ’714

patent and the three related patents challenged by Petitioner in IPR2025-0162–0165, Patent Owner is asserting only 21 claims at the ITC, whereas the IPRs collectively address 158 challenged claims. Thus, the ITC litigation cannot address the parties’ dispute as to the vast majority of the challenged claims in the ’714 patent (13/18) or the related patents (124/140). Moreover, there is a risk that Patent Owner may subsequently attempt to assert these remaining claims in the stayed district court case. The Board has granted institution in similar cases. *E.g.*, *Volkswagen Group of Am., Inc. v. Arigna Tech. Ltd.*, IPR2021-01321, Paper 10 at 8, 32 (PTAB Feb. 15, 2022) (declining to deny institution based on parallel ITC litigation where “only four of the nine challenged claims in [the IPR] are also at issue in the ITC proceeding”; finding that “the additional claims at issue here, but not in the ITC proceeding, weigh against exercising our discretion to deny institution”).

Applying the *Fintiv* factors, (1) there is no stay at the ITC, but the district court case is stayed, which is neutral; (2) the ITC trial date is imminent, but the district court case is stayed; (3) the parties have invested in the ITC proceeding, but such investment covers only five claims of the ’714 patent; (4) this IPR covers many more claims than the ITC; (5) Petitioner and Real Parties-in-Interest are Respondents in the ITC matter; and (6) Petitioner has established a strong case on the merits. Under a holistic assessment, Petitioner respectfully submits that this IPR presents an appropriate case for institution and resolution before the Board.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6, I hereby certify that the foregoing Petitioner's Preliminary Reply was served by electronic mail on the following counsel of record for patent owner:

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