

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

**Before The Honorable Bryan F. Moore
Administrative Law Judge**

**In the Matter of
CERTAIN SENSORS WITH PIXELS AND
PRODUCTS CONTAINING THE SAME**

Investigation No. 337-TA-1403

**RESPONDENTS SAMSUNG ELECTRONICS CO., LTD.;
SAMSUNG ELECTRONICS AMERICA, INC.; AND
SAMSUNG SEMICONDUCTOR, INC.'S INVALIDITY CONTENTIONS**

Term	Relevant Claim(s)	Basis
increase the quantum efficiency of the device	44, 45, 48, 49, 50, 51, 52, 54	
the textured layer	6	Samsung incorporates by reference its claim construction briefs.
processing the region of the semiconductor layer or support substrate comprising the surface features with CMP after depositing the oxide material	26, 27, 28, 29, 30, 31	Missing antecedent basis.

D. Improper Inventorship

Samsung incorporates by reference its responses to Interrogatory No. 43.

VIII. THE ASSERTED CLAIMS OF THE '714 PATENT ARE INVALID

A. Priority Date

Complainant has yet to satisfy its burden of proving that any of the Asserted Claims of the '714 Patent are entitled to a priority date prior to the filing date of its earliest parent application, March 15, 2013. Because Complainant has not shown that United States Provisional Patent Application No. 61/614,275 ("275 Provisional App.") provides written description support for the Asserted Claims, Complainant is not entitled to the priority date of March 22, 2012, the filing date of that application. Additionally, because Complainant has not shown that any of the Asserted Claims of the '714 Patent were conceived or reduced to practice, actually or constructively, prior to the filing date of the '714 Patent, none of the Asserted Claims of the '714 Patent are entitled to a date of invention that is earlier than the filing date, March 15, 2013. Samsung reserves the right to supplement and amend its invalidity contentions should Complainant subsequently identify alleged support for its claimed priority date.

The '275 Provisional App. does not support any of the Asserted Claims of the '714 patent. For example, at a minimum, the '275 Provisional App. does not disclose:

- “a peripheral sidewall disposed into at least a portion of the pixel and extending at least substantially around the pixel periphery,” (claim 1);
- “a peripheral light trapping material substantially covering the peripheral sidewall,” (claim 1);
- “light contacting the backside light trapping material or the peripheral light trapping material is reflected back toward the pixel,” (claim 1);
- “at least one of the two low refractive index materials includes a member selected from the group consisting of an oxide, a nitride, oxynitrides, a gas, at least a partial vacuum, and combinations thereof,” (claim 3);
- “at least one of the two low refractive index materials includes a member selected from the group consisting of silicon oxide, silicon nitride, silicon dioxide, and combinations thereof,” (claim 4);
- “the peripheral sidewall extends completely around the pixel periphery,” (claim 10);
- “a frontside light trapping material at least partially covering the light incident surface,” (claim 12);
- “the frontside light trapping material is an antireflective layer coating,” (claim 13);
- “at least one of the backside light trapping material and the peripheral light trapping material is a metal layer,” (claim 17);
- “at least one of the backside light trapping material and the peripheral light trapping material has a sloped surface at the pixel device interface,” (claim 18).

B. Invalidity Grounds Under 35 U.S.C. §§ 102 and 103

Samsung attaches as Appendix E to its invalidity contentions claim charts showing examples of how the cited references anticipate and/or render obvious the Asserted Claims of the

'714 Patent under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and/or (e) and 103 either expressly or inherently as understood by a person having ordinary skill in the art, or based on Complainant's apparent interpretation of the claims.

Ex.	Patent No. or Title (Primary Inventor/Author)	Date of Issue/ Publication	Filing Date
E-1	U.S. Patent No. 7,675,099 (Hwang)	March 9, 2010 (Issued)	December 4, 2007
E-2	Japanese Patent Application Publication No. 2011-119558 (Mori)	June 16, 2011 (Published)	December 7, 2009
E-3	U.S. Patent No. 7,285,808 (Kasuga)	October 23, 2007 (Issued)	October 2, 2002
E-4	U.S. Patent Application Publication No. 2009/0160000 (Kim)	June 25, 2009 (Published)	June 2, 2008
E-5	U.S. Patent No. 7,709,775 (Konno)	May 4, 2010 (Issued)	December 13, 2007
E-6	Japanese Patent Application Publication No. 2009-188316 (Yamada)	August 20, 2009 (Published)	February 8, 2008
E-7	E. Fred Schubert, Light-Emitting Diodes (2nd ed. 2006) (Schubert)	2006 (Published)	N/A
E-8	International Patent Application Publication No. 2011/035188 (Haddad188)	March 24, 2011 (Published)	September 17, 2010
E-9	Japanese Patent Application Publication No. H11-330501 (Suzunaga)	November 30, 1999 (Published)	May 13, 1998
E-10	U.S. Patent Application Publication No. 2011/0156186 (Iida)	June 30, 2011 (Published)	September 3, 2010
E-11	U.S. Patent Application Publication No. 2009/0266973 (Roy)	October 29, 2009 (Published)	April 24, 2009
E-12	U.S. Patent Application Publication No. 2012/153127 (Hirigoyen)	June 21, 2012 (Published)	December 21, 2011
E-13	U.S. Patent No. 8,674,283 (Roy '283)	March 18, 2014 (Issued)	December 21, 2011

The attached claim charts identify specific examples of disclosures that teach or suggest a given claim limitation. These identifications should be understood to be exemplary; the charts do not necessarily indicate every location within a particular prior art reference where a claim limitation may be disclosed or suggested. Samsung and its expert witnesses may rely on other portions of the prior art.

The chart below identifies references that invalidate the Asserted Claims and specifies which claims each reference anticipates (denoted by an asterisk) or renders obvious, either alone or as part of a specified combination. The discussion below sets forth rationale and motivation for combining the respective references with respect to the claimed features they disclose.

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Hwang (E-1)	X*	X*	X*	X*	X*	X*	X*	X*	X*				
Hwang (E-1) & Mori (E-2)	X	X	X	X	X	X	X	X	X				
Hwang (E-1) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X		
Hwang (E-1) & Kasuga (E-3) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X				X
Hwang (E-1) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X			
Hwang (E-1) & Kim (E-4) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X			X
Hwang (E-1) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Hwang (E-1) & Konno (E-5) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X		X	X
Hwang (E-1) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X		X	
Hwang (E-1) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X
Hwang (E-1) & Haddad188 (E-8) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X	X	X
Hwang (E-1) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Hwang (E-1) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X				X
Yamada (E-6)	X*				X*		X*	X*	X*	X*		X*	
Yamada (E-6) & Konno (E-5)	X				X		X	X	X	X		X	X
Yamada (E-6) & Schubert (E-7)	X	X	X	X	X	X	X	X	X	X		X	

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Yamada (E-6) & Schubert (E-7) & Mori (E-2)	X	X	X	X	X	X	X	X	X	X		X	
Yamada (E-6) & Schubert (E-7) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X		X	
Yamada (E-6) & Hwang (E-1) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Hwang (E-1) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Hwang (E-1) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Haddad188 (E-8)	X				X		X	X	X	X		X	X
Yamada (E-6) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Suzunaga (E-9) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Roy (E-11)	X	X	X	X	X	X	X	X	X	X		X	
Yamada (E-6) & Roy (E-11) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Roy (E-11) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Hirigoyen (E-12)	X	X	X	X	X	X	X	X	X	X		X	
Yamada (E-6) & Hirigoyen (E-12) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Yamada (E-6) & Hirigoyen (E-12) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X		X	X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Yamada (E-6) & Hirigoyen (E-12) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X		X	X
Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Hwang (E-1) & Mori (E-2)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Hwang (E-1) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Mori (E-2)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Mori (E-2) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Schubert (E-7)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Schubert (E-7) & Mori (E-2)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Schubert (E-7) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Yamada (E-6)	X				X		X	X	X	X	X	X	X
Haddad188 (E-8) & Roy (E-11)	X	X	X	X	X	X	X	X	X	X	X	X	X
Haddad188 (E-8) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Haddad188 (E-8) & Hirigoyen (E-12)	X	X	X	X	X	X	X	X	X	X	X	X	X
Suzunaga (E-9)	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*		X*
Suzunaga (E-9) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X		X
Suzunaga (E-9) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X	X	X	X
Suzunaga (E-9) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X	X		X
Suzunaga (E-9) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X		X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Mori (E-2) & Hwang (E-1)	X	X	X	X	X	X	X	X	X				
Mori (E-2) & Hwang (E-1) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X		
Mori (E-2) & Hwang (E-1) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X			
Mori (E-2) & Hwang (E-1) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X			X
Mori (E-2) & Hwang (E-1) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X			
Mori (E-2) & Hwang (E-1) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X		X
Mori (E-2) & Hwang (E-1) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Mori (E-2) & Hwang (E-1) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X				X
Mori (E-2) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X			
Mori (E-2) & Yamada (E-6) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X		
Mori (E-2) & Yamada (E-6) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X			
Mori (E-2) & Yamada (E-6) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X			X
Mori (E-2) & Yamada (E-6) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X		X
Mori (E-2) & Yamada (E-6) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Mori (E-2) & Yamada (E-6) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X			X
Mori (E-2) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X
Mori (E-2) & Haddad188 (E-8) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X	X	X
Mori (E-2) & Haddad188 (E-8) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X	X	X	X
Mori (E-2) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Mori (E-2) & Suzunaga (E-9) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X	X	X
Mori (E-2) & Suzunaga (E-9) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Hwang (E-1) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Hwang (E-1) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X			X
Iida (E-10) & Hwang (E-1) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Hwang (E-1) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Hwang (E-1) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Hwang (E-1) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Iida (E-10) & Hwang (E-1) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Konno (E-5) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Konno (E-5) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Konno (E-5) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Konno (E-5) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Konno (E-5) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Yamada (E-6) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Yamada (E-6) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Yamada (E-6) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Yamada (E-6) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Yamada (E-6) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Yamada (E-6) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Iida (E-10) & Haddad188 (E-8) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Haddad188 (E-8) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X	X	X
Iida (E-10) & Suzunaga (E-9)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Suzunaga (E-9) & Hwang (E-1)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Suzunaga (E-9) & Kasuga (E-3)	X	X	X	X	X	X	X	X	X	X	X		X
Iida (E-10) & Suzunaga (E-9) & Kim (E-4)	X	X	X	X	X	X	X	X	X	X			X
Iida (E-10) & Suzunaga (E-9) & Konno (E-5)	X	X	X	X	X	X	X	X	X	X			X
Iida (E-10) & Suzunaga (E-9) & Yamada (E-6)	X	X	X	X	X	X	X	X	X	X		X	X
Iida (E-10) & Suzunaga (E-9) & Haddad188 (E-8)	X	X	X	X	X	X	X	X	X	X	X	X	X

	<u>Asserted Claims of the '714 Patent</u>												
<u>Prior Art</u>	1	2	3	4	5	6	9	10	11	12	13	17	18
Iida (E-10) & Suzunaga (E-9) & Roy '283 (E-13)	X	X	X	X	X	X	X	X	X	X	X		X

For each specified combination, Samsung relies on the references herein, as well as the knowledge of a person of ordinary skill in the art, including that which will be discussed through expert discovery. Although Samsung provides exemplary disclosures and motivations to combine below, Samsung will present expert opinion in accordance with the procedural schedule. Samsung reserves the right to supplement or modify the anticipation and obviousness grounds in response to, for example, Complainant's positions regarding the scope and meaning of the asserted claims taken in this Investigation, before the PTAB, or during prosecution of pending matters related to the Asserted Patents, claim construction determinations made in this Investigation or other proceedings involving the Asserted Patents, updates or changes to Complainant's infringement and/or technical domestic industry positions, and materials later obtained during discovery, including from Complainant or in response to any third party subpoenas.

In support of its invalidity contentions, Samsung incorporates by reference its petition for inter partes review of the '714 Patent (IPR2025-00161), filed with the PTAB on November 22, 2024. In particular, Samsung incorporates the arguments in its petition, the expert testimony in the supporting declaration of Dr. Michael Lebby, and the references cited in, and attached to, the petition and declaration.

Samsung reserves the right to rely on the prior art references identified in connection with any of the other Asserted Patents in connection with the '714 patent. In addition, Samsung hereby cites the following additional references as being relevant to the subject matter claimed in the '714 patent. Samsung is producing concurrently herewith a number of such references that are relevant

to the validity of the Asserted Patents, the state of the art, and as evidencing a motivation to combine various references. Samsung reserves the right to rely on one or more of the references produced concurrently herewith as anticipatory references under 35 U.S.C. § 102, as further evidence of obviousness under 35 U.S.C. § 103 (including as evidence of motivation to combine or reasonable expectation of success), as background references demonstrating the state of the art, as a limitation upon the doctrine of equivalents, or for any other purpose. Based on further investigation and discovery, based on positions that SiOnyx may take regarding the scope of the asserted claims, and/or based on the Court's claim construction (once issued), Samsung reserves the right to revise these contentions and to rely on these references to prove the invalidity of the '714 patent in a manner consistent with this ALJ's Ground Rules.

- U.S. Patent No. 8,951,823
- U.S. Patent No. 8,767,108
- U.S. Patent No. 8,670,054
- U.S. Patent No. 8,674,469
- U.S. Patent No. 8,487,030
- U.S. Patent No. 8,471,301
- U.S. Patent No. 8,368,160
- U.S. Patent No. 8,288,836
- U.S. Patent No. 8,269,264
- U.S. Patent No. 7,919,798
- U.S. Patent No. 7,563,637
- U.S. Patent No. 7,524,690
- U.S. Patent No. 7,470,965

- U.S. Patent No. 6,969,899
- U.S. Patent No. 6,946,352
- U.S. Patent No. 6,927,432
- U.S. Patent No. 6,255,681
- U.S. Patent No. 4,871,689
- U.S. Patent No. 4,644,553
- U.S. Patent Application Publication No. 2012/0033119
- U.S. Patent Application Publication No. 2012/0009720
- U.S. Patent Application Publication No. 2010/0144084
- U.S. Patent Application Publication No. 2008/0283728
- F. Lopez & E. Bernabéu, *Refractive Index of Vacuum-Evaporated SiO Thin Films: Dependence on Substrate Temperature*, ELECTRONICS & OPTICS, 13 (1990)
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1. Level of Ordinary Skill in the Art

To assess the level of ordinary skill of a POSITA, the following factors can be considered: (i) the type of problems encountered in the art; (ii) the prior solutions to those problems; (iii) the rapidity at which innovations are made; (iv) the sophistication of the technology; and (v) the level of education of active workers in the relevant field.