

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

CRX TECH, LLC,

Plaintiff,

v.

SAMSUNG ELECTRONICS CO. LTD.,  
SAMSUNG ELECTRONICS AMERICA,  
INC., SAMSUNG LED CO., LTD., and  
SAMSUNG ELECTRO-MECHANICS CO.,  
LTD.,

Defendants.

Case No. 2:17-cv-00611

**JURY TRIAL DEMANDED**

**COMPLAINT FOR PATENT INFRINGEMENT**

This is an action for patent infringement arising under the Patent Laws of the United States of America, 35 U.S.C. § 1 *et seq.*, in which Plaintiff CRX Tech, LLC (“CRX” or “Plaintiff”) makes the following allegations against Defendants Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., Samsung LED Co., Ltd., and Samsung Electro-Mechanics Co., Ltd. (collectively, “Samsung” or “Defendants”).

**PARTIES**

1. CRX Tech, LLC is a Texas limited liability company and has a place of business at 1601 Elm Street, Suite 4360, Dallas, Texas 75201.
2. On information and belief, Samsung Electronics Company, Limited (“SEC”) is a South Korean entity located at 1320-10, Seocho 2-Dong, Seocho-Gu, Seoul 137-857, South Korea.
3. On information and belief, Samsung Electronics America, Incorporated (“SEA”) is a New York entity located at 85 Challenger Road, Ridgefield Park, New Jersey 07660. SEA’s

registered agent for service of process is CT Corporation System, 111 Eighth Avenue, New York, New York 10011.

4. On information and belief, Samsung LED Company, Limited (“SLED”) is a South Korean entity located at 314, Maetan 3-Dong, Youngtong-Gu, Suwon, 443, South Korea.

5. On information and belief, Samsung Electro-Mechanics Company, Limited (“SEMC”) is a South Korean entity located at 314, Maetan 3-Dong, Youngtong-Gu, Suwon, 443, South Korea.

6. On information and belief, SLED is a joint venture between at least SEC and SEMC. SEA is a wholly-owned subsidiary of SEC.

#### **JURISDICTION AND VENUE**

7. This action arises under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

8. This Court has personal jurisdiction over Defendants in this action because, among other reasons, Defendants have committed acts within the Eastern District of Texas giving rise to this action and have established minimum contacts with the forum state of Texas. Defendants maintain multiple established places of business within the District, including an office at 1301 East Lookout Dr., Richardson, Texas 75080, used by at least SEC and SEA. SEA also operates an established place of business in this District at 1000 Klein Rd., Plano, Texas 75074. Defendants directly and/or through subsidiaries or intermediaries (including distributors, retailers, and others), both individually and in joint enterprise with each other, have committed and continue to commit acts of infringement in this District by, among other things, making, using, importing, offering for sale, and/or selling products that infringe the patent-in-suit. Thus,

Defendants purposefully availed themselves of the benefits of doing business in the State of Texas and the exercise of jurisdiction over Defendants would not offend traditional notions of fair play and substantial justice.

9. Venue is proper in this District under 28 U.S.C. §§ 1391 (c) and 1400(b) because SEC, SEM and SLED are foreign corporations not resident in the United States and have committed acts of patent infringement in the District. *Brunette Machine Works, Ltd. v. Kockum Industries, Inc.*, 406 U. S. 706, 714 (1972). Venue is also proper as to at least SEA and SEC because they maintain at least one established and regular place of business in this District and have committed acts of patent infringement in this District.

### **BACKGROUND**

10. The inventions disclosed and claimed in the patent in suit were invented by Michael L. Wach in the early 2000s. Mr. Wach is the founder of Cirrex Corporation and Cirrex Systems, LLC, and a recipient of the Coulter Award for Innovation and Entrepreneurship. He is an inventor of more than fifty granted U.S. patents. Cirrex is a pioneering photonics company that has engaged in research and development backed by more than \$20 million in venture capital. Cirrex created optical technologies that advanced the fields of healthcare, communications and instrumentation.

11. As disclosed in the patent in suit, Mr. Wach invented a novel system for reducing unwanted longitudinal reflection in optical systems utilizing semiconductor gain mediums. At the time of the claimed inventions, the optical semiconductor industry struggled with minimizing reflections from facets of semiconductor devices. Longitudinal reflections diminished the performance and utility of optical systems, which require precise light emissions. Conventional

methods to suppress unwanted reflections were difficult and expensive to fabricate and produced unwanted light beam behavior and wavelength distortion.

12. Antireflective coatings were attempted to reduce unwanted reflection and longitudinal modes. These coatings were formed by depositing a stack of thin-film layers having high-low and alternating refractive index interfaces between layers set up as a pattern of constructive and destructive interference that minimized reflection from facets. But there were difficulties associated with designing and fabricating these coatings for practical application. In addition, antireflective coatings were inherently difficult for antireflection over a broad spectral band.

13. Another then-conventional solution to the problems of semiconductor facet reflection and unwanted longitudinal modes was to angle one of the facets so that its internal reflections were not cast back towards the other facet. While this might result in reduced longitudinal modes, the solution was difficult to fabricate and inefficient. The optical axis of the emitted beam was bent by the angled facet with respect to the longitudinal axis of the semiconductor gain medium. This resulted in alignment problems and assembly complications.

14. For light emission diode (LED) products, such as Defendants' accused products, conventional solutions to the problems of semiconductor facet reflection and unwanted longitudinal modes produce light that is deteriorated due to residual, unwanted reflection from the facet that is insufficiently repressed.

15. Mr. Wach's company, Cirrex, searched for better solutions. Mr. Wach discovered that unwanted longitudinal reflections and facet reflections could be suppressed and minimized by applying a patterned structure to semiconductor facets. This improved technique also avoided the drawbacks of the conventional solutions at the time. Mr. Wach's inventions satisfied the

need for a system and method that allowed amplification of an optical signal while suppressing light from an optical amplifier.

16. One of the novel patterned structures that Mr. Wach introduced to the facets of semiconductor gain mediums was modeled on the eye pattern of nocturnal insects, such as a “motheye,” which provides a gradual change of the refractive index between the facet’s surface and the neighboring medium. Use of this novel approach resulted in a gradual change that softened the sudden change in the refractive index that caused unwanted surface reflections, thereby considerably reducing the reflectance of the facet.

17. Mr. Wach’s inventions are embodied in U.S Patent No. 6,483,635, titled “Apparatus for Light Amplification,” which issued on November 19, 2002 (the “’635 Patent,” “asserted patent,” or “patent-in-suit”).

18. The ‘635 patent has been cited as prior art by over fifty-five later patents, including patents assigned to 3M and Hewlett-Packard.

19. In addition to the “motheye” patterned structure, the ‘635 patent introduced the use of other patterned structures to control unwanted reflections, including lines, cones, conical posts, holes, grids and microlens arrays. These patterned structures are useful not only for reducing longitudinal modes and facet reflection, but also for mode adaption, mode shaping and beam shaping.

20. Mr. Wach’s inventive use of patterned structures is particularly beneficial because the patterned structures can be formed by relatively cost-effective techniques, such as etching directly into a semiconductor material or other substrate.

21. At the time of Mr. Wach’s inventions, the LED industry was in its infancy. Since then, LED based products, including Defendants’ accused products, have evolved to utilize the

'635 patent to focus visible light emissions, making the LED products more useful for applications such as general lighting, communications and display backlighting.

22. CRX is the owner by assignment of the '635 Patent. The '635 Patent was duly and legally issued by the United States Patent and Trademark Office on November 19, 2002. A true and correct copy of the '635 Patent is included as Exhibit A.

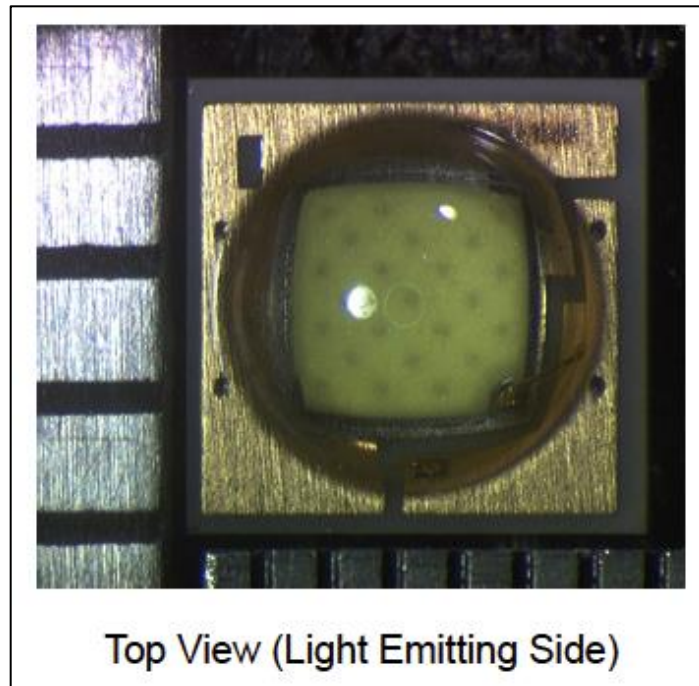
## **COUNT I**

### **INFRINGEMENT OF THE '635 PATENT**

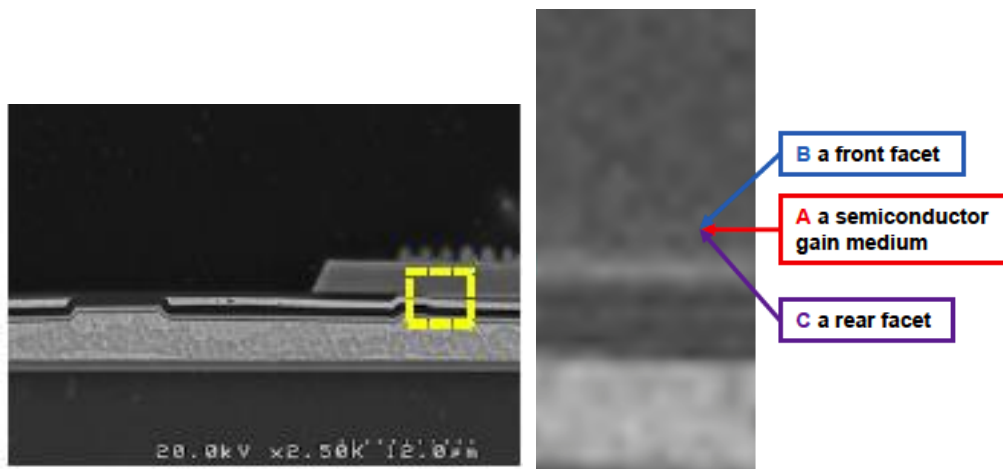
23. CRX references and incorporates by reference paragraphs 1 through 22 of this Complaint.

24. On information and belief, Defendants make, use, import, offer to sell and/or sell in the United States products that infringe various claims of the '635 Patent, and continue to do so. These include without limitation the Samsung High Power Ceramic LED family of products, including, for example, the LH351B, as well as Samsung's LED products including and/or utilizing PSS (Patterned Sapphire Substrate) technology (collectively, the "accused products"). The accused products include, by way of further example, Samsung's LED components, LED modules, displays, televisions and lighting products that include LED dies, products utilizing PSS technology, and/or Samsung's High Power Ceramic LED family of products.

25. On information and belief, the accused products include a system for reducing reflection within an optical system, comprising a semiconductor gain medium comprising a front facet and a rear facet, and the semiconductor gain medium producing light energy when excited. The LH351B accused product, for example, is a light emitting diode that includes a semiconductor gain medium that produces light energy when excited. The light emitting diode for the LH351B is shown below:



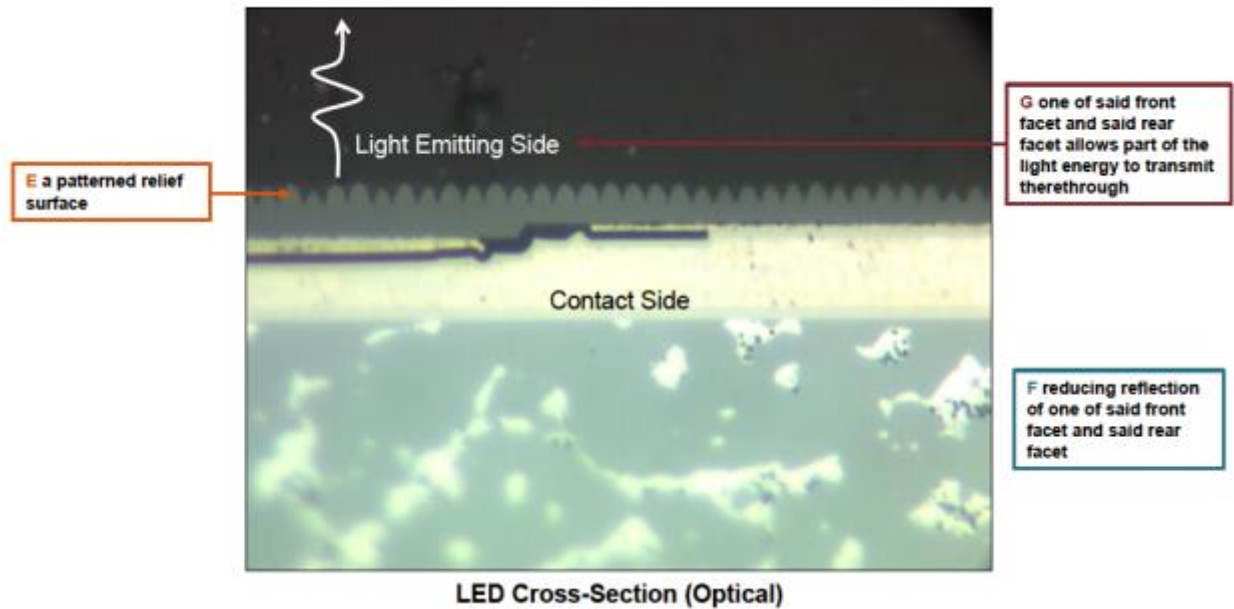
26. The semiconductor gain medium of the accused products includes both front and rear facets. A microscopic cross-section of the LH351B shows these infringing components:



## LED Cross-Section (Cropped and Zoomed SEM)

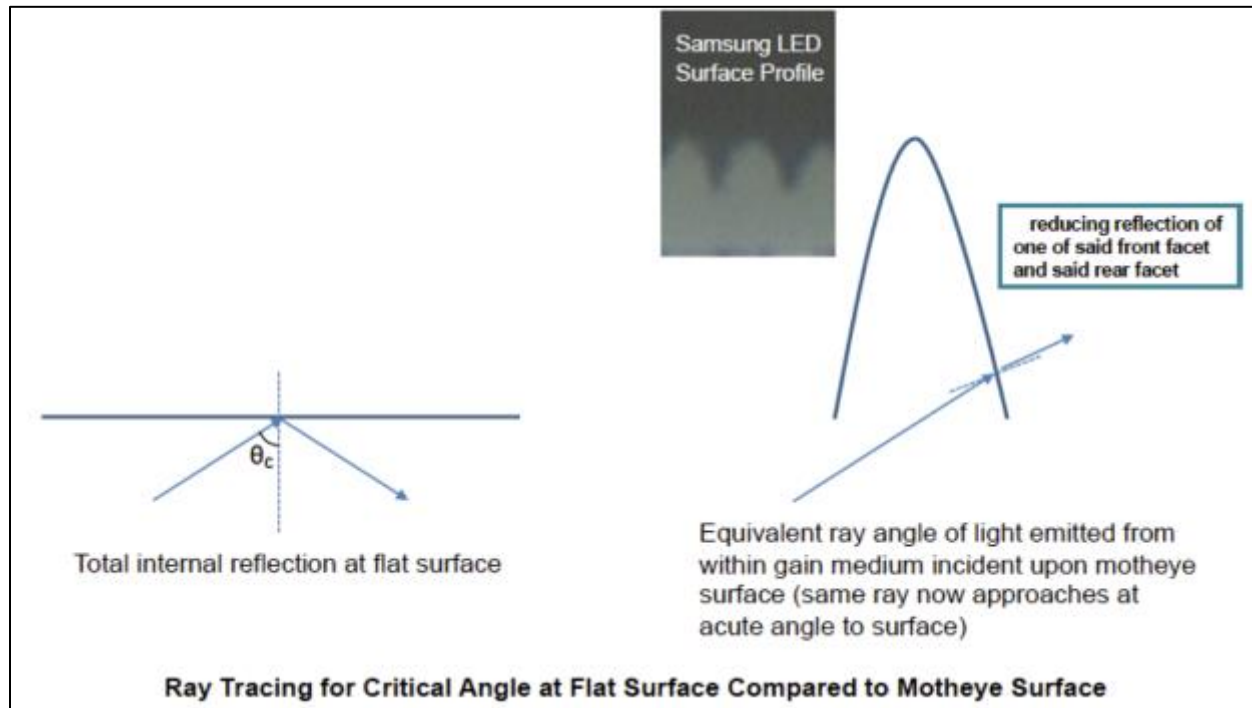
27. The accused products also comprise a patterned relief surface disposed on one of the facets. For example, as shown below, the LH351B accused product includes a “motheye”

patterned relief surface disposed on a facet of the semiconductor gain medium, and at least some light energy transmits through the facet.



28. The accused products' patterned relief surface reduces reflection of one of the facets, and at least one of the facets allows part of the light energy to transmit through it. For example, the patterned relief surface of the LH351B results in more rays of light refracted beyond the surface rather than reflected back into the device. This reduces reflections while still allowing part of the light energy to be transmitted. A comparison of reflection between a flat surface and the motheye pattern of the accused products is depicted below, with reduced reflection and greater refraction shown in the motheye patterned structure:





29. On information and belief, Defendants have directly infringed and continue to directly infringe the '635 Patent by, among other things, making, using, importing, offering for sale, and/or selling the accused products. On information and belief, the accused products infringe one or more claims of the '635 Patent, including at least claim 1.

30. By making, using, importing, offering for sale, and/or selling the accused products that infringe claims of the '635 Patent, Defendants have injured CRX and are liable to CRX for infringement of the '635 Patent pursuant to 35 U.S.C. § 271(a) directly and/or under the doctrine of equivalents.

31. In addition, Defendants actively induce others, including without limitation customers and end users of the accused products and related products, to directly infringe each and every claim limitation, including without limitation claim 1 of the '635 Patent, in violation of 35 U.S.C. § 271(b). Upon information and belief, Defendants' customers and/or end users

have directly infringed and are directly infringing each and every claim limitation, including without limitation claim 1 of the '635 Patent. Defendants have actual knowledge of the '635 Patent at least as of service of this Complaint. Defendants are knowingly inducing their customers and end users to directly infringe claims of the '635 Patent, with the specific intent to encourage such infringement, and knowing that the induced acts constitute patent infringement. Defendants' inducement includes, for example, providing technical and user guides, product data sheets, demonstrations, installation guides, and other forms of support that induce their customers and end users to directly infringe claims of the '635 Patent. Defendants also induce their customers to directly infringe claims of the '635 patent by, *e.g.*, selling infringing products to overseas customers with knowledge and intent that the customer will import, use, sell and/or offer to sell infringing products in the United States.

32. To the extent discovery shows that Defendants' infringement of claims of the '635 Patent is or has been willful and/or egregious, CRX reserves the right to request such a finding at time of trial.

33. As a result of Defendants' infringement of the '635 Patent, CRX has suffered monetary damages for Defendants' infringement, but in no event less than a reasonable royalty for the use made of the invention by Defendants, together with interest and costs as fixed by the Court, and CRX will continue to suffer damages in the future unless Defendants' infringing activities are enjoined by this Court.

34. Unless a permanent injunction is issued enjoining Defendants and their agents, employees, representatives, affiliates, and all others acting or in active concert therewith from infringing the '635 Patent, CRX will be irreparably harmed.

**PRAYER FOR RELIEF**

Plaintiff respectfully requests the following relief from this Court:

- A. A judgment that Defendants have infringed and/or induced infringement of one or more claims of the '635 Patent;
- B. A permanent injunction enjoining Defendants and their officers, directors, agents, affiliates, employees, divisions, branches, subsidiaries, parents, and all others acting in active concert or participation with Defendants, from infringing the '635 Patent;
- C. A judgment and order requiring Defendants to pay CRX damages, costs, expenses, and prejudgment and post-judgment interest for Defendants' acts of infringement in accordance with 35 U.S.C. § 284;
- D. A judgment and order requiring Defendants to provide accountings and to pay supplemental damages to CRX, including, without limitation, prejudgment and post-judgment interest;
- E. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to CRX its reasonable attorneys' fees against Defendants; and
- F. Any and all other relief to which CRX may show itself to be entitled.

**JURY TRIAL DEMANDED**

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, CRX requests a trial by jury of any issues so triable by right.

Dated: August 25, 2017

RUSS AUGUST & KABAT

/s/ Marc A. Fenster

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