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March 17, 2015

U.S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE
Washington, DC 20590

Re: Amendment to Industrial Skyworks' Exemption Request Under
Section 333 of the FAA Reform Act, 49 U.S.C. § 44701(f), and Part 11
of the Federal Aviation Regulations (Docket No. FAA-2014-1060)

Dear Sir or Madam:

On behalf of our client, Industrial Skyworks (USA), Inc. ("Skyworks"), we write to amend the operating conditions set forth in Skyworks' petition for exemptions pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") ("Section 333"), Subsection (f) of 49 U.S.C. § 44701, and 14 C.F.R. Part 11, submitted on December 15, 2014 ("Exemption Request"). Since Skyworks' Exemption Request, the FAA has granted Section 333 exemptions that permit small unmanned aircraft systems ("sUAS") operations within 500 feet of nonparticipating person on certain conditions that Skyworks would like to apply to its Exemption Request and believes such operations and conditions would result in an equivalent level of safety. In addition, in light of the FAA's recent sUAS Notice of Proposed Rulemaking ("NPRM"),¹ Skyworks believes that the operating conditions set forth in its Exemption Request constitute "reasonable mitigation" for nighttime operations that would ensure that Skyworks maintains an equivalent level of safety and requests that the FAA consider such mitigation to grant Skyworks' Exemption Request and permit Skyworks' nighttime flights. The information below is intended to amend and supplement Skywork's exemption request.

¹ See FAA, Operation and Certification of Small Unmanned Aircraft Systems, Notice of Proposed Rulemaking at 70 (Feb. 15, 2015). As noted in Skyworks' Exemption Request, Skyworks' reserves the right to amend its operations to avail itself of the permitted operations under FAA's final rules for commercial sUAS operations, 14 C.F.R. Part 107. See Exemption Request, at 7.

In the Exemption Request, Skyworks requested the necessary exemptions on the condition that Skyworks' operations be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures (*See* Appendix C, No. 20). As the FAA permitted in other Section 333 exemption grants,² Skyworks requests the FAA grant Skyworks' Exemption Request with the amended condition that Skyworks may conduct flight operations less than 500 feet from nonparticipating persons if barriers or structures are present that sufficiently protect nonparticipating persons from the sUAS and/or debris in the event of an accident. In addition, Skyworks shall ensure that nonparticipating persons remain under such protection and if a situation arises where nonparticipating persons are no longer under such protection and are within 500 feet of the sUAS, Skyworks shall cease the flight operations immediately. As recognized by the FAA, such operating conditions will ensure that nonparticipating persons are protected to an equivalent level of safety given the sUAS's size, low weight, and restricted operating footprint.

In the NPRM, the FAA acknowledged a willingness to consider "any reasonable mitigation which would ensure that an equivalent level of safety is maintained while operating in low-light areas."³ While Skyworks acknowledges and shares the FAA's concerns regarding low-light operations,⁴ Skyworks believes that the operating conditions set forth in its Exemption Request constitute reasonable mitigation that would provide an equivalent level of safety achieved during daylight operations and the FAA should permit Skyworks' nighttime flights.⁵

Skyworks' operations include strict controls to ensure that the sUAS will be seen at all times and the operator will be able to avoid other airspace users. The operating area will consist of a limited virtually-fenced operating, take-off, landing, and transit areas within visual line-of-sight ("VLOS") of the operator. This area will be illuminated. As discussed further below, Skyworks' nighttime sUAS – the SkyRanger – must also be operated with lights at all times. These lights are visible up

² *See e.g.*, Asymmetric Technologies, Inc., Grant of Exemption, Docket No. FAA-2014-0816, at 20 (Feb. 10, 2015).

³ *See* FAA, Operation and Certification of Small Unmanned Aircraft Systems, Notice of Proposed Rulemaking at 70 (Feb. 15, 2015).

⁴ *Id.* at 70-71.

⁵ Skyworks currently operates at night in Canada and there have been no incidents causing risk to other airspace users or persons on the ground.

to distances of 5,000 feet,⁶ well beyond the distance from which the operator will be controlling the sUAS. Therefore, the operator will be able to maintain sight of the lit sUAS in an illuminated, limited footprint, controlled-access operating area.

Concurrently, Skyworks' nighttime operations will also require a visual observer ("VO") to monitor the sUAS airspace and surrounding airspace to assist the operator with avoiding other airspace users. The VO will not only be able to monitor other aircraft in the area by identifying their required lighting, but audibly monitor the airspace during a time with reduced ambient noise. The VO will also be able to verbally communicate with the operator, providing immediate warnings of other airspace users that requires avoidance action by the sUAS operator.

The sUAS will also be operating below 400 feet above ground level ("AGL"), lower than the minimum altitude for other airspace users with a 100 foot buffer. The ability of manned aircraft to "see-and-avoid" sUAS will rarely be required if the manned aircraft is appropriately flying above the required 500 feet AGL. Skyworks' nighttime sUAS – the SkyRanger – is equipped and will operate with lighting for the identification of the sUAS' location. In addition, airspace users will have knowledge of Skyworks' nighttime operations and limited operating footprint through Skyworks' submitted NOTAM.

To avoid posing a risk to persons on the ground at nighttime, Skyworks will only operate the SkyRanger in a controlled and limited footprint with controlled access and barriers/protection for nonparticipating persons. The operating area will be illuminated so that the operator and VO can see any persons on the ground. If there is an incursion, the flight must terminate immediately with the operator able to determine that the sUAS can land safely, having the ability to scan the landing area with an infrared camera for any potential persons.

Skyworks believes that its nighttime operations under the conditions discussed above and with the lights on the SkyRanger sUAS will be at least as safe as those with manned aircraft with an airworthiness certificate. Given the unique multi-directional and slow-speed operation of the sUAS, lights that can be seen up to almost one mile on all four rotor arms will provide ample visibility of the sUAS to other airspace users in all directions without the need for position lights or anticollision lights on the sUAS. With the use of an infra-red camera, an illuminated operating area, and sUAS

⁶ Skyworks' Exemption Request noted 2,500 feet. As indicated in Skyworks' Company Operations Manual, the sUAS lighting is visible beyond 5,000 feet.

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lighting, the operator will also be able to ensure that any take-off and landing area is clear of any persons, achieving an equivalent level of safety achieved by taxi or landing lights. In addition, Skyworks will be obliged to give the right-of-way to all other aircraft that will be fully aware of Skyworks' limited-footprint operations through Skyworks' NOTAM.

Nighttime flights are a critical factor to Skyworks' intended commercial operation—roofing and building façade inspections—and provide a direct safety benefit. As an alternative to using sUAS, the roofing industry must have persons traverse rooftops using infrared cameras at night, posing a significant fall risk. In addition, using manned aircraft during nighttime hours at low altitudes poses an equally significant risk that is overcome by the safety benefits of operating UAS limited in size and weight at night. If the FAA believes that the “see-and-avoid” and persons on the ground risks require further mitigating steps, Skyworks is looking forward to working with the FAA to establish a framework for safe nighttime operations.

We look forward to working with the FAA towards granting Skyworks' requested Section 333 exemptions. Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth P. Quinn". The signature is fluid and cursive, with a large loop at the end.

Kenneth P. Quinn

CC: Michael Cohen, Industrial Skyworks
Lance Lehman, Industrial Skyworks