



ASX MARKET RELEASE

LIFX Announces World-First Disinfecting Anti-Bacterial Smart Light

SUMMARY

- LIFX Clean is a fully functional white + colour smart light that also uses germicidal antibacterial light to disinfect surfaces and surrounding air
- In a smart lighting world-first, by using 405 nanometre High Energy Visible (HEV) light that is safe for humans, pets and plants, LIFX Clean offers an effortless way to maximise the cleanliness of home environments
- LIFX Clean has passed efficacy testing in laboratory testing conducted by the Department of Chemistry and Biotechnology at Australia's Swinburne University of Technology, as well as IEC and safety testing at UL Verification Services in Guangzhou
- Whilst LIFX Clean is currently in the testing queue for efficacy against the SARS-CoV-2 virus (which can cause the COVID-19 disease), no claim is currently being made that the product is effective in an antiviral capacity of any kind, including on SARS-CoV-2
- Priced at A\$99.99 / US\$69.99 / CA\$79.99 / €69.99 / £59.99, LIFX Clean is an affordable and accessible new anti-bacterial product, providing broad access to consumers in a time of enormous demand for cleaning products. It is expected to be released to the market in calendar Q4.

28 August 2020 - Adelaide, South Australia

Buddy Technologies Limited ("Company") (ASX:BUD), a leader in IoT and cloud-based solutions for making spaces smarter, is proud to announce that it has successfully passed efficacy and safety testing for a brand new product which is expected to launch an entirely new category of smart lighting - a smart, antibacterial disinfecting light called "LIFX Clean".

Built on top of the award-winning and multi-patented* LIFX A19/A60 1200 lumen smart light platform, LIFX Clean offers a fully functional white + colour smart light that includes the mobile app control, internet connectivity and native integration with voice and automation partners such as Amazon Alexa, Apple HomeKit and Hey Google that customers have come to expect.

In a smart lighting world-first however, LIFX Clean also includes additional and specially designed LEDs that emit visible light at a germicidal wavelength of 405 nanometres. At this specific wavelength in the High Energy Visible range, light has a disinfecting effect (called porphyrin excitation) on bacterial microbes on surfaces and in the surrounding air. While the use of UV-C light has a much quicker antimicrobial effect, HEV lighting is safe for use in the

presence of humans, pets and plants and unlike UV-C requires no protective measures for its safe use.

As a consumer antibacterial product, LIFX Clean meets the regulatory requirements to be sold in LIFX's key markets of Australia, New Zealand, the United Kingdom and the European Union. The North American markets of the United States and Canada are subject to different regulatory requirements, and those are currently being progressed. The Company does expect to be able to sell LIFX Clean into all of these markets, including North America, at the time of product launch.



Figure 1. LIFX Clean is the world's first germicidal, antibacterial disinfecting smart light.

The efficacy of any light-based cleaning product is a function of the energy output of the light and the distance of the light from the subject being cleaned. Currently available disinfecting lights targeted at hospital operating theatres and recovery room bathrooms have a typical efficacy of 70% of bacteria killed in 2 hours of light exposure. In a typical desk lamp fixture, or if used in under-cabinet lighting, LIFX Clean has an efficacy of greater than 80% in 2 hours, or more than 99.99% overnight (40cm distance for 8 hours).

Unlike chemical or ultraviolet light (UV - which cannot be used in the un-protected presence of humans, pets or plants) based products which are episodic, LIFX Clean is a non-contact, continuous disinfection product. LIFX Clean can be used as a normal white or colour smart light by day or evening, and then the Clean lighting may be scheduled to come on overnight, or the Clean lighting may be left on continuously (in cleaning mode, LIFX Clean emits a light blue light).

LIFX Clean will initially be sold as a standalone light bulb, but the Company does expect to offer it for sale with a specially designed desk or counter-top fixture that will include a tray to

hold items like keys, mobile phones, wallets and other day to day items that commonly mobilise bacteria.

“LIFX Clean is a ground-breaking product that we believe will help create a whole new category of smart lighting, one that we intend to lead with a combination of innovation and relentless pace. This might be our most important step yet towards making every space smarter”, said David McLauchlan, CEO of LIFX. “When the pandemic that has spread throughout the world first took hold, we asked ourselves, ‘What could our team do to contribute to more hygienic environments?’, and ‘How could we help our customers avoid secondary bacterial infections that would worsen the impact of the pandemic?’. The result is LIFX Clean, and I couldn’t be more proud of the team for developing such an affordable and highly innovative product that will help to meet the enormous and currently unquenchable worldwide demand for cleaning products”.

The LIFX Clean product has been tested to meet the IEC 62471 standard for photobiological safety of lamps at UL Verification Services in Guangzhou, China, which is a globally recognised and accredited certification and testing laboratory. These tests ensure that there are no risks from skin exposure and exposure to eyes (including cornea, conjunctiva and lens). LIFX Clean passed this testing, resulting in placement in the "exempt" classification meaning there is no photobiological hazard from the product. Efficacy testing was performed in laboratories at the Department of Chemistry and Biotechnology at Swinburne University of Technology in Melbourne, Australia (see the Testing & Technology addendum below).

While LIFX Clean has been tested for safety and efficacy in an anti-bacterial capacity, it has not been tested for any antiviral impact, including impact on SARS-CoV-2. Accordingly, no claim is being made that the product has any effect on SAR-CoV-2, however it is currently in the queue to be tested as such, and once results are known, details will be made available by way of further ASX announcements.

LIFX Clean is expected to be priced at A\$99.99 (inc. GST) / US\$69.99 / CA\$79.99 / €69.99 (inc. VAT) / £59.99 (inc. VAT), will launch shortly via pre-sales on LIFX.com and is expected to be available at retail locations in the fourth quarter of this calendar year.

Webinar

The Company will host an investor webinar to discuss this important new product and its impact on the business, opportunities for expansion into new markets, and early reaction by retailers and customers. The webinar will be held at 11am AEST, Tuesday 1st September 2020 (6pm US-PDT, Monday 31st August 2020), no advance registration will be required, and attendees may participate at <http://bit.ly/LIFXClean>.

For and on behalf of Buddy Technologies Limited,



David P. McLauchlan
Chief Executive Officer
Buddy Technologies Limited.

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Testing & Technology Addendum

Through the research and development of the new LIFX Clean smart light, considerable research, experimentation and testing has been conducted to establish the optimum performance of 405nm wavelength emitting germicidal LEDs mounted on board a LIFX A19 or A60 smart light platform.

The use of 405nm wavelength light for germicidal effect is a reasonably new but well understood technology, having been extensively studied, peer reviewed and discussed in the scientific community over the past 15 years.

- "Inactivation of Bacterial Pathogens following Exposure to Light from a 405-Nanometer Light-Emitting Diode Array"
 - Michelle Maclean, Scott J. MacGregor, John G. Anderson, Gerry Woolsey
 - Applied and Environmental Microbiology Mar 2009, 75 (7) 1932-1937; DOI: 10.1128/AEM.01892-08
 - "This study demonstrates the susceptibility of a variety of medically important bacteria to inactivation by 405-nm light from an array of light-emitting diodes (LEDs), without the application of exogenous photosensitizer molecules. Selected bacterial pathogens, all commonly associated with hospital-acquired infections, were exposed to the 405-nm LED array, and the results show that both gram-positive and gram-negative species were successfully inactivated..."
 - "Detailed investigation of the bactericidal effect of the blue-light treatment on Staphylococcus aureus suspensions, for a range of different population densities, demonstrated that 405-nm LED array illumination can cause complete inactivation at high population densities: inactivation levels corresponding to a 9-log₁₀ reduction were achieved."
- "Bactericidal Effects of 405 nm Light Exposure Demonstrated by Inactivation of Escherichia, Salmonella, Shigella, Listeria, and Mycobacterium Species in Liquid Suspensions and on Exposed Surfaces"
 - Lynne E. Murdoch, Michelle Maclean, Endarko Endarko, Scott J. MacGregor, John G. Anderson
 - The Scientific World Journal, vol. 2012, Article ID 137805, 8 pages, 2012; DOI: 10.1100/2012/137805
 - Abstract: "The bactericidal effect of 405 nm light was investigated on taxonomically diverse bacterial pathogens from the genera Salmonella, Shigella, Escherichia, Listeria, and Mycobacterium. High-intensity 405 nm light, generated from an array of 405-nm light-emitting diodes (LEDs), was used to inactivate bacteria in liquid suspension and on exposed surfaces. L. monocytogenes was most readily inactivated in suspension, whereas S. enterica was most resistant. In surface exposure tests, L. monocytogenes was more susceptible than Gram-negative enteric bacteria to 405 nm light when exposed on an agar surface but interestingly less susceptible than S. enterica after drying onto PVC and acrylic surfaces. The study findings, that 405 nm light inactivates diverse types of bacteria in liquids and on surfaces, in addition to the safety advantages of this visible (non-UV wavelength) light, indicate the potential of this technology for a range of decontamination applications."

Having established that 405nm wavelength light did indeed exhibit bactericidal effects, the LIFX Clean development team built prototypes and began testing those prototypes to evaluate the efficacy of the LIFX implementation of the technology against expectations formed from international scientific research and field studies of the technology.

The Company makes no claim for efficacy by LIFX Clean against viruses, and so accordingly is not subject to regulation by Australia's Therapeutic Goods Administration ("TGA"). However, in the interests of following best practices, the test cultures and media were developed according to TGA testing guidelines:

- Organism: Escherichia coli
 - Source: NCTC 8196
 - Inoculum density: 2x10⁸ - 2x10⁹
- Organism: Staphylococcus aureus
 - Source: NCTC 4163
 - Inoculum density: 2x10⁸ - 2x10⁹
- Media: as per TGA guidelines, further detailed here: <https://www.tga.gov.au/publication/tga-instructions-disinfectant-testing>.

Actual efficacy testing:

- Was conducted on 1 cm × 1 cm sterile polystyrene surfaces which were used to spot bacterial suspension
- The tested organisms *S. aureus* (ATCC 25923) and *E. coli* (ATCC 25922) were grown on nutrient broth overnight at 37° C and then overnight cultures were adjusted to 106 CFU/mL
- 25 µL of adjusted bacterial suspension was spotted on the plastic surface.
- For each set of tests, two different conditions were used for HEV emitting lights, which were either lights with an affixed diffuser or lights without an affixed diffuser, or, lights with an affixed diffuser and lights with an affixed clearer diffuser
- A fixed distance was maintained for each set of tests between these two conditions
- Antimicrobial activity was measured for different time intervals using surface spread method and each experiment was performed in triplicate
- Light sources were successfully tested with a combination of diffusers and no diffusers, at a variety of distances and beam angles.

Further testing is being conducted to expand the Company's understanding of the efficacy of LIFX Clean on other kinds of microbes, including efficacy against moulds and viruses and in particular, SARS-CoV-2.

LIFX Clean was further tested to meet IEC standard #62471, the "Photobiological safety of lamps and lamp systems" by UL Verification Services (Guangzhou) Co., Ltd.

- General testing information: "Model A19CLL3AE26 is a Wi-Fi connected lamp, including HEV mode and white + colour light modes. This product is not only intended for general lighting service but also intended for germicidal service. The measure of the white light mode was carried out at the distance of 500 lux from the detector, in the direction of maximum light output according to IEC 62471 (the test at the product max brightness setting)
- The measure of the HEV mode was carried out at the distance of 200 mm from the detector, in the direction of maximum light output according to IEC 62471 (the test at the product max brightness setting).

All tests relevant to the LIFX Clean product, as according to the IEC standard #62471, were met with a verdict of "pass".

Intellectual Property Addendum

While LIFX makes no claim of intellectual property ownership with respect to the germicidal effects of 405nm wavelength light, nor on the individual LEDs that generate this wavelength of light, there are a number of existing patents held by the Company in a range of global regions that provide intellectual property protection against other smart light implementations of a product like LIFX Clean. The Company's intellectual property with respect to LIFX Clean includes, but may not be limited to, the following patents.

- US Patent & Trademark Office: #9,198,262
 - "Directional Lighting System & Method"
 - "The method of spatial lightbulb operation includes determining the position of the lightbulb relative to a physical space, detecting a contextual event, determining a spatial lighting pattern associated with the contextual event, and selectively controlling lightbulb light emitting elements based on the position of the lightbulb and the spatial lighting pattern. A lightbulb including: a plurality of individually controlled light emitting elements mounted in fixed, predetermined positions on the substrate; a light sensor mounted to the substrate; a wireless communication module; and a processor configured to: index each light emitting element; progress each of the plurality of light emitting elements through an orientation pattern; associate a reference point on the lightbulb with an external reference point; and selectively operate individual light emitting elements of the plurality according to lighting instructions, based on a relationship between the reference point on the lightbulb and the external reference point"
- US Patent & Trademark Office: #9,635,737
 - "Directional Lighting System & Method"
 - As above
- US Patent & Trademark Office: #9,883,563
 - "Directional Lighting System & Method"
 - As above
- US Patent & Trademark Office: #10,375,789
 - "Directional Lighting System & Method"
 - As above

- China Patent & Trademark Office: #ZL 2015 8 00269701
 - "Directional Lighting System & Method"
 - As above
- European Patent Office: EP3146254
 - "Directional Lighting System & Method"
 - As above
 - Specific regions: Germany, France, England.
- US Patent & Trademark Office: #10,440,794
 - "Lighting System & Method"
 - "A controllable dynamic lighting system including a lighting element device with a set of controllable zones and a controlling means. A method for controlling a lighting system including: receiving lighting system operation inputs, determining operation instructions for one or more controllable zones based on the operation inputs, and controlling controllable zone operation based on the respective operation instructions."
- US Patent & Trademark Office - Publication no. #US-2019-0380186-A1
 - "Lighting System & Method"
 - As above.

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About Buddy

Buddy Technologies Limited (BUD.ASX) helps customers of any size “make every space smarter”. Buddy has two core businesses – its Commercial Business and Consumer Business. **Buddy Ohm** and **Buddy Managed Services** are the company’s core Commercial offerings that empower its customers to fully leverage digital technologies and their impact in a strategic and sustainable way. Buddy Ohm is a resource monitoring and analytics solution that provides energy monitoring, reporting and auditing services for commercial and industrial customers. Buddy Managed Services licenses Buddy’s technology platforms to customers for integration into their own products.

Buddy’s Consumer Business trades under the **LIFX** brand and has established a leading market position as a provider of smart lighting solutions. The company’s suite of Wi-Fi enabled lights are currently used in nearly one million homes, viewed as second only to lighting giant Philips Hue. LIFX products are sold in over 100 countries worldwide, directly and via distribution and sales partnerships with leading retailers and ecommerce platforms including Amazon, Google, Apple, JB Hi-Fi, Bunnings, Officeworks, MediaMarkt, Saturn and Best Buy (in both the US and Canada).

Buddy is headquartered in Adelaide, Australia, with offices in Melbourne (AU), Seattle (US), Dublin (IE), Shenzhen (CN) and Silicon Valley (US).

For more information, visit www.buddy.com and www.lifx.com.

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