News extra:
A lighting lab in the palm of your hand

A Taiwanese company reckons its smartphone-based lighting measurement device can give more expensive meters a run for their money

One of the most exciting products on show at October's Hong Kong International Lighting Fair was not a lamp, luminaire or even a control system, but a gadget that lets you measure light with your smartphone.

Before you roll your eyes and turn the page, this is not a gimmicky app that tries to use your phone's camera or built-in light sensor to make hopelessly off-the-mark measurements.

Lighting Passport, created by three-year-old Taiwanese firm Asensetek, is a separate piece of hardware, with its own sensor and patented spectral engine, that clips on to the end of an Apple or Android phone (or you can carry it around separately, as long as the battery lasts and you keep your phone within Bluetooth range). Download the free app, and you're good to go.

The device can measure all the key things – colour temperature, colour rendering (for colours R1-R15), light output, peak intensity, and illuminance. There are settings for measuring single or multiple light sources, or for continuous measurements over a period of time.

You can assess uniformity, check for blue light hazard, compare spectral composition to a reference source, and export or email data to share the results. Your colleagues can download the free app so they can examine the numbers too – even if they don't have a Lighting Passport themselves.

You can compare colour data to either the International Electrotechnical Commission's MacAdam ellipses or, for the US market, the standard Energy Star binning chart.

And to keep track of what you measured, you can save a photo of each light source you measure.

On the inside

At the heart of the gadget is a patented micro-spectral engine based on a microelectronic mechanical system (MEMS), explains Asensetek's founder and CEO, Aeron Wang. This means the spectral engine can be mass produced more cheaply and easily than many of the more expensive portable devices on the market, plus it's smaller and has no moving parts. Equally important, it can give them a run for their money when it comes to accuracy.

Lighting Passport takes advantage of the enormous advances in smartphones over the past few years to make it portable – after all, why cobble together your own processor, screen, user interface and battery when Apple, Samsung and HTC have done it for you?

Wang says: 'Tapping into the computing power and interface of another device is not new – in my last company, we had a spectrometer that could connect to a PC. But we found out that much is changing. The requirement to measure on site is bigger and bigger. And the mobile platform lets us realise our vision right now.'

Checking the numbers

Wang says: 'There are 2,400 exhibitors here at the Hong Kong show. Everybody has sample products, they all send their things for testing. But not many buyers test the spec. They just ask, 'How much?' I go round sometimes and check people's numbers. They are stunned!'

He created Lighting Passport, he says, to fill 'communication gaps' in the LED lighting industry.

'From a vendor's point of view, I think there are a few figures that show good lighting has been achieved: 170lm/W, 200lm/$,

> **"Everybody who uses lighting deserves to understand this stuff. People need it"**

CEO Aeron Wang demonstrates Lighting Passport at Hong Kong

CRI of >80… then you're satisfied.' On the production side, companies that make LED packages or chips all use different bins, but when they make an end product, it's expressed the same to their customer, for example 3000K or CRI 80… but they all look different.'

'R&D people usually have an integrating sphere, but that doesn't help in the field, and the results are not quick. Integrating spheres can't be used in a mass production line – they're only for R&D people.'

But how do the results from Lighting Passport compare with the results from a sphere in terms of accuracy? It's a question Wang is familiar with. All Lighting Passports are calibrated using equipment that meets the standards set by the US National Institute of Standards and Technology for traceability of measurements.

Asensetek guarantees accuracy of ±0.002 for chromaticity, ±3 per cent for illuminance and ±2 per cent for colour temperature. The optical resolution is eight to 10 nanometers. The product is certified by labs in China, Taiwan and Switzerland, says Wang.

'The measurement results are different because the measurement conditions are different – in a sphere, light is totally reflected and uniform, while Lighting Passport measures the true ambient light of a light source where it is. On-site measurement results are really important for what people will actually perceive. We don't want to replace the integrating sphere. It's a different technology. My previous employer made very good integrating spheres, but that's not what we chose to do.'

'We called it Lighting Passport, because it lets people in,' says Wang. 'Everybody who uses lighting deserves to understand this stuff. People need it. They shouldn't be lied to or perplexed.'

Something for everyone

Three models of Lighting Passport are available – the cheapest costs US$1,500 (€1,200), but to use it you'll also need a compatible device – an iPod Touch, iPhone, iPad or recent Android device.

A version with more powerful hardware and software costs US$2,000 (€1,600), and the top-of-the range model (with the iPod Touch thrown in) will set you back US$2,500 (€2,000) – still a lot cheaper than most of the handheld light meters on the market.

Asensetek sees the device not as a tool but a 'platform'. The company has created several apps for different applications, and provides a software development kit so third parties can make Lighting Passport work for them – there are already apps for moviemakers and plant growers (see box).

Lighting designers including the UK's Light Projects are working with the gadget, and Serena Tellini and Francesco Iannone of Milan

Lighting Passport turns your phone into a spectrometer

5 THINGS TO DO WITH A LIGHTING PASSPORT

Lighting Passport is not just for lighting industry people, says Wang, it's for 'anyone who cares about the quality of lighting and how good their product or service looks'. For instance…

1 Farmers can use Lighting Passport to help tune artificial light to encourage optimum plant growth.

2 Luxury retailers are showing an interest in the product to assess lighting in their stores – Asensetek says it is already in talks with one of the top brands in Europe.

3 TV broadcasters can use Lighting Passport to check the quality of light on set. Japan's national broadcaster NHK is already a customer.

4 Hollywood moviemakers hope to cut post-production costs by making sure they get the light quality right first time. The Academy of Motion Picture Arts and Sciences has developed an app, and major producers of cameras, filters and lighting are also Lighting Passport fans.

5 Apple uses the Lighting Passport tool to check lighting quality in its Apple Stores in the US – presumably its compatibility with the iPhone was part of the attraction.

Consuline enthusiastically endorsed it after using it for a recent project at Monza Cathedral treasury museum near Milan. Iannone praised its portability, speed and ease of use, calling it 'fantastic, a good tool for our job'.

Wang says the company has already sold 'several thousand' Lighting Passports, and thinks that figure could rise to 50,000-100,000 in the next few years.