Technical Data Sheet

QDot™ LCD SharpGreen Perovskite Film

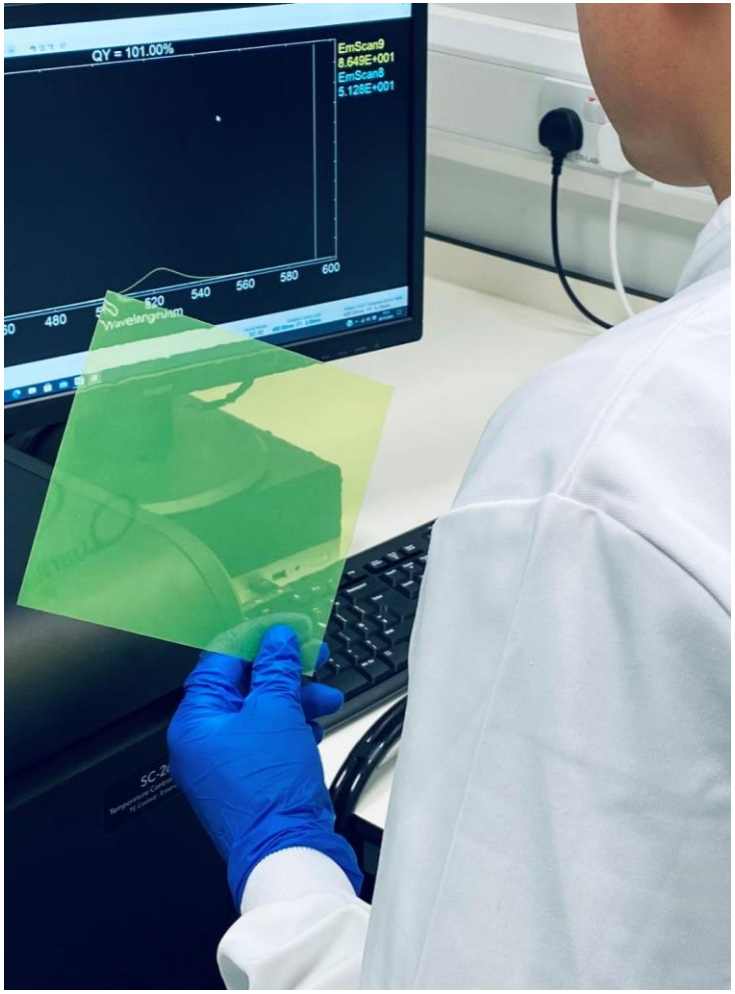
Version 4.0
Revised Date 12/09/2021

Introduction

QDot™ LCD SharpGreen Perovskite Film is the colour enhancement film used in Quantum Dot LCD displays in order to achieve its exceptional wide colour gamut (over 85% of Rec2020 standard) and outstanding brightness. This makes the display images look more lifelike, close to how we perceive images in the real world.

QDot™ LCD SharpGreen Perovskite Film is a polymer composite, with embedded green emitting perovskite quantum dots. The material is RoHS compliant (Restriction of Hazardous Substances Directive) and cadmium free. The film exhibits bright green emissions, centred at 520/525 nm, high photoluminescent quantum yield (PLQY > 80 %) and narrowband emission (FWHM < 20-25 nm).

The material has high reliability under heat, light and humidity. It retains > 50 - 90 % of initial photoluminescence within 1000 hours of exposing by heat (85 °C and blue light 10 mW/cm^2), high humidity (90 % RH at 60 °C) and extreme high flux conditions (blue light 100 mW/cm^2). This ensures that the displays have long lifespans, lasting longer than 30,000 hours.



Product Highlights for LCD Displays

Enhances Colour Performance
To a record high of over 85 % of Rec2020 colour gamut coverage

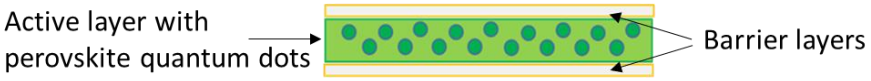
High Reliability
Under heat, humidity and high flux, in compliance with display standards

RoHS compliant
Pb content less 1000 ppm
Cadmium free

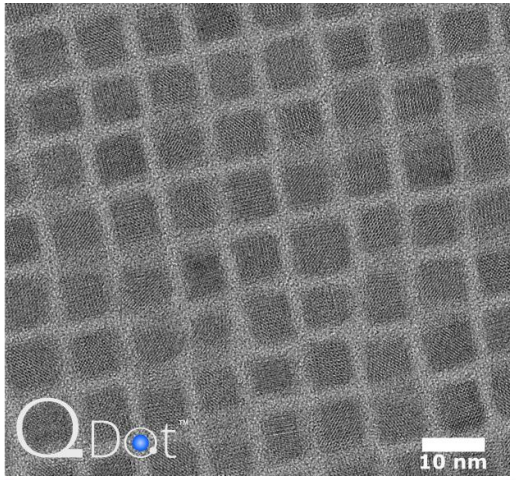
Watch on YouTube

https://www.youtube.com/watch?v=mepObDZ7RMw
https://www.youtube.com/watch?v=mg0fDfcdXUg&t=3s

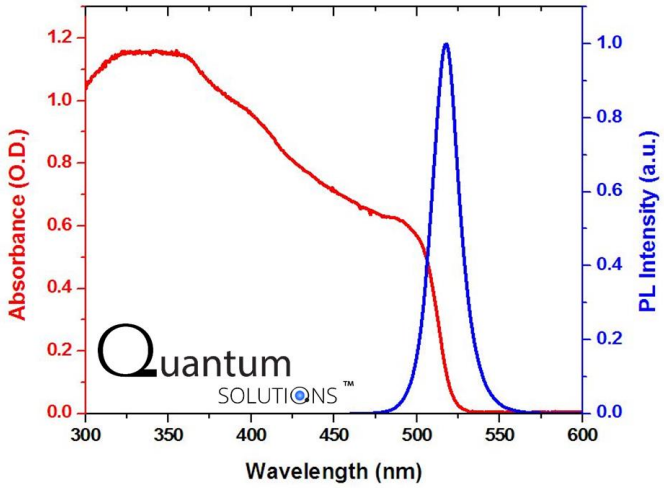
Specification of QDot™ LCD SharpGreen Perovskite Film



Catalogue Number	QDot™ LCD SharpGreen Perovskite Film 520	QDot™ LCD SharpGreen Perovskite Film 525
QDs Type	Perovskite Quantum Dots	Perovskite Quantum Dots
Polymer	Polymer resin	Polymer resin
Appearance	White-greenish transparent film (without light scatter)	White-greenish-transparent film (without light scatter)
QDs concentration	0.5wt% (RoHS compliant: Pb content < 1000 ppm)	0.5wt% (RoHS compliant: Pb content < 1000 ppm)
Emission peak	520 ± 3 nm	525 ± 3 nm
FWHM	≤ 25 nm	≤ 25 nm
PLQY	> 85 %	> 50 %
Film Sizes	up to 15 x 15 cm	up to 15 x 15 cm
Film thickness	300 µm	300 µm



TEM image of Perovskite Quantum Dots



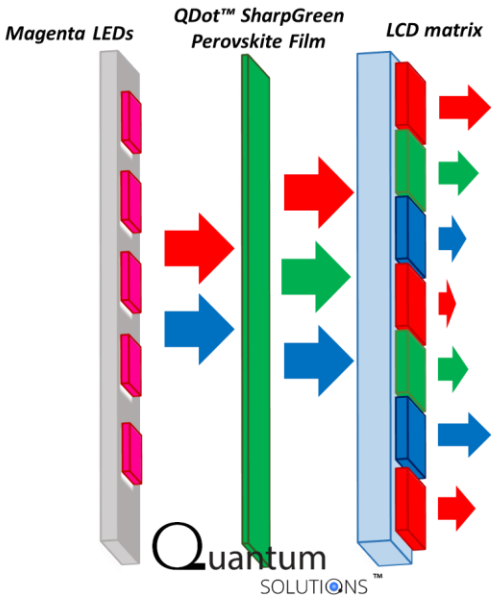
Film absorption and emission spectra

Uniformity of evaluation film samples might vary. Films with customisable sizes (up to 40x40 cm), thicknesses (200-400 µm), with light scatter are available upon request.

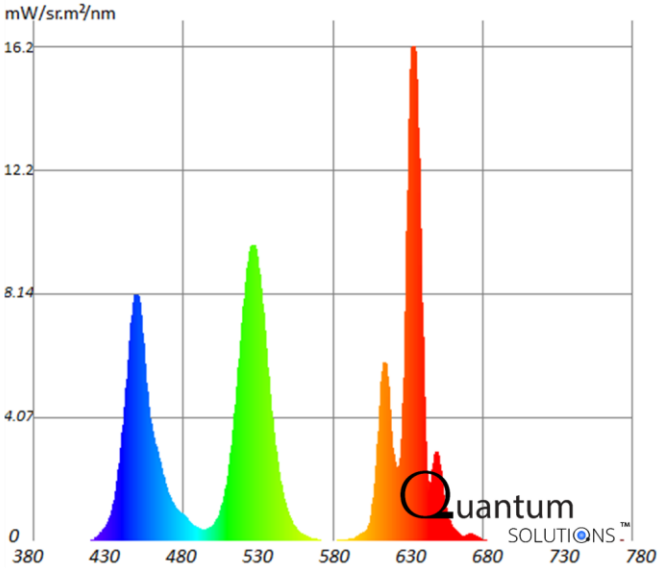
Typical Display Performance with Magenta LEDs Backlighting

Colour Standard	Coverage	Ratio
Rec2020	> 84 %	> 86%
DCI-P3	> 92%	> 115%
sRGB	> 98%	> 158%

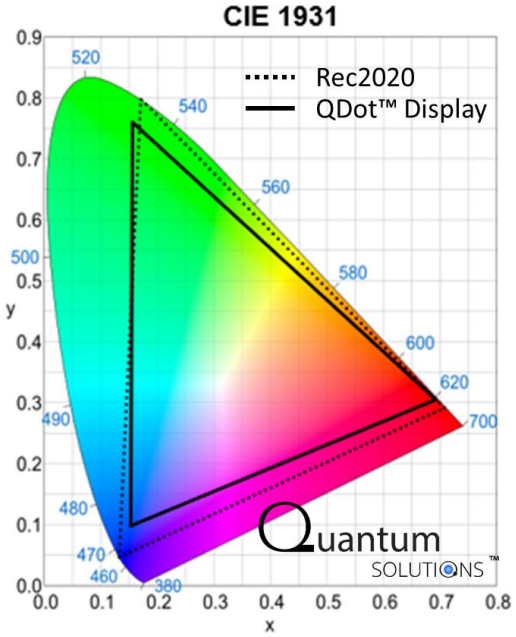
Display configuration



Display spectral emission



Chromaticity Diagram



Reliability of QDot™ LCD SharpGreen Perovskite Film

Test Criteria	Test Conditions	Test Results
High Humidity	95% Relative Humidity/60°C/1000 hours	Maintains > 90 % of its initial luminance Edge ingress < 1.5 mm
High Temperature	85°C/10 mW/cm² (blue 450 nm) /1000 hours	Maintains > 60 % of its initial luminance Edge ingress < 1.5 mm
High Flux	100 mW/cm² (blue 450 nm)/1000 hours	Maintains > 50 % of its initial luminance Edge ingress < 1.5 mm

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