RoHS Exemptions Evaluation
C/o Yifaat Baron
Öko-Institut e.V.
Institute for Applied Ecology
PO Box 17 71
79017 Freiburg
Germany

22nd September, 2022

Dear Ms. Baron,

In response to your request for further information relating to Pack 15 Task 5 "Assessing three exemption requests for the use of cadmium in quantum dot applications in displays and lighting", please find herein some additional information that may be relevant to the current review.

Cadmium-free technology has dominated the QD TV market since 2016, with over 90 % of the current market share,[1] attesting to its high performance. It is our understanding that Samsung, the biggest QD TV manufacturer, is solely focussed on Cd-free QD products. In 2022, Samsung also launched 2nd generation "QD OLED" technology using Cd-free QDs,[2] which may enable displays with improved efficiency, colour, viewing angle and contrast. The technology is also available in Sony TVs and Alienware monitors. To the best of our knowledge, no equivalent Cd-based QD products implementing this 2nd generation technology have been launched.

Nanoco is not aware of any on-chip QD display products on the market. We cannot comment on the status of Cd-based QDs for on-chip lighting.

We are not aware of any applications where Cd-based QDs could provide benefits to the environment, health and/or to consumer safety.

In terms of substitutes for Cd-based QDs, in addition to indium-based materials such as InP, we are aware that research into perovskite-based QDs has accelerated in recent years, with significant progress being made in this area. While the most technologically advanced of such perovskite QDs contain Pb, it is our understanding that manufacturers are working to develop display products with a Pb content well within the RoHS limit.

Based on our understanding of Cd-free QD technology and the market, we strongly believe that an exemption to allow the use of Cd-based QDs in display applications is no longer justified.

Yours sincerely,

Nathalie Gresty
Intellectual Property & Grants Manager

[1] Quantum Dot Technologies, Supply Chain, Market Forecast – 2021 Report, *Touch Display Research*, 2021
[2] https://www.cnet.com/tech/home-entertainment/samsung-qd-oled-tv-tech-explained-welcome-quantum-dot-era/