Deliverable Report

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Executive summary:

The document illustrates and briefly describes the third-generation 894 nm VCSEL sample delivered to project partner VTT for the incorporation into the atomic clock demonstrator.

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Document Approvals

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1. VCSEL sample description and delivery

1.1 Third-generation 894 nm VCSEL

A VCSEL sample with a new type of surface gratings (as explained in D38) and the flip-chip-bondable design (sample H) has been manufactured and delivered to project partner VTT. It is to be integrated with LTCC submounts and afterwards in the MEMS atomic clock demonstrator. The sample has 3 mm x 3 mm size and contains two 894.6 nm wavelength lasers which are suitable for elevated temperature operation at, e.g., 80 °C. In addition, the sample contains twelve lasers with wrong wavelength to test the gold stud bumping process. The substrate is thinned to less than 200 µm. Moreover, the bondpad fabrication sequence has been optimized. Wire-bondability has now been achieved, which gives more freedom for laser packaging in, e.g., TO-cans.

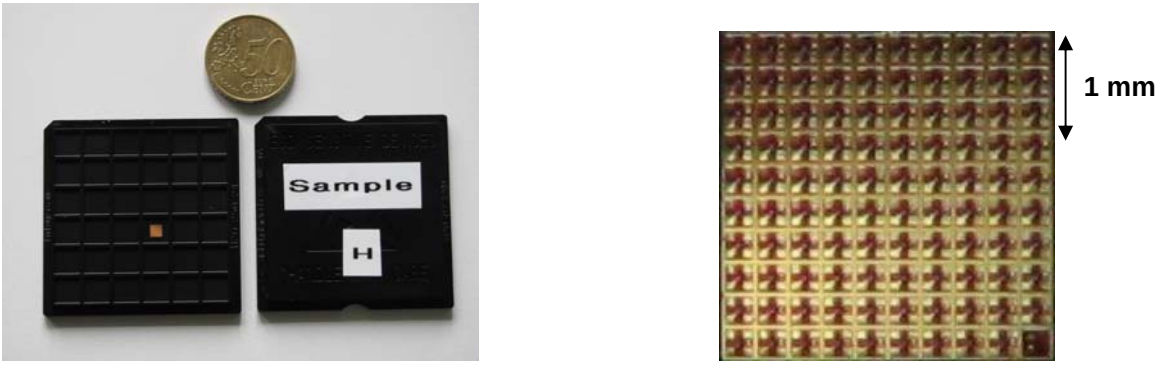

Figure 1: Photograph of the flip-chip bondable VCSEL sample in a chip carrier (left) and zoomed view (right).