

# Independent Validation Opinion

DNV Business Assurance Korea Ltd. (hereafter referred to as "DNV") has been commissioned by Samsung Electronics Co., Ltd. Device Solutions (hereafter referred to as "Samsung Semiconductor") to perform validation of Product Carbon Footprint Calculation and its Reporting System (hereafter referred to as "DS-PCF System<sup>1</sup>") for memory and foundry products that are manufactured by Samsung Semiconductor's domestic<sup>2</sup> and overseas<sup>3</sup> operation sites.

## Scope of Validation

The validation assesses the DS-PCF System of Samsung Semiconductor that was developed in accordance with principles and requirements of carbon footprint calculation considering life cycle assessment (hereafter referred to as "LCA") of the products, and the DS-PCF System consists of following criteria:

- Functional Unit
  - FAB: wafer (per 8" and 12" wafer) and chip
  - PKG: component and module
- Process: semiconductor manufacturing process
- System Boundary: Cradle-to-Gate
- Impact Category: Global Warming Potentials (GWP100)
- Impact Assessment Methodology: Recipe 2016-Midpoint(H)

## Validation Criteria

The DS-PCF System based on LCA was developed by Samsung Semiconductor in accordance with the principles and requirements of 'ISO 14040:2006', 'ISO 14044:2006', 'ISO 14067:2018' and "LCA Report"<sup>4</sup>. DNV's validation was performed in accordance with the Greenhouse Gas (GHG) validation principles of ISO 14064-3:2019 (Part 3: Specification with guidance for the verification and validation of greenhouse gas statements). DNV assessed the validity of the data input (gathering and processing activity data), conversion (procedures for PCF calculation) and output (result for PCF calculation and its reporting) by assessing actual data in 2023 such as amount of raw materials input, energy use, and waste, etc.

## Limitations

The engagement is limited to the DS-PCF System described in the "LCA Report" by Samsung Semiconductor, hence it does not guarantee reliability of PCF result of the DS-PCF System. The engagement includes validation of the data input/output provided and demonstrated by Samsung Semiconductor at limited scope on a sampling basis. DNV does not offer the guarantee of reliability if any material changes of the DS-PCF System occurs after the validation.

## Conclusions

DNV assessed the DS-PCF system's validity for the data input, conversion and output based on the LCA Report. On the basis of the work undertaken, nothing comes to our attention to suggest that the assumptions, methods and approach in establishing the DS-PCF system have material errors, and therefore it is our opinion that the DS-PCF system was established on a rational basis.

28 June 2024  
Seoul, Korea

### DNV Business Assurance Korea

Country Representative

J.S. Jang, S.W. Lee



### Responsibilities of the Directors of Samsung Electronics and DNV

The Directors of Samsung Electronics have sole responsibility for the preparation of the product carbon footprint calculation and reporting system DS-PCF system. Our opinion represents our independent opinion and is intended to inform all related stakeholders.

DNV was not involved in the preparation of any statements or data included in the LCA Report by Samsung Electronics except for this validation opinion.

DNV's assurance engagement is based on the assumption that the data and information provided by the client to us as part of our review have been provided in good faith. DNV expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Independent Validation Opinion.

### Competence and Independence

DNV's established policies and procedures are designed to ensure that DNV, its personnel and, where applicable, others are subject to independence requirements (including personnel of other entities of DNV) and maintain independence where required by relevant ethical requirements. This engagement work was carried out by an independent team of GHG assurance professionals.

DNV applies its own management standards and compliance policies for quality control, which are based on the principles enclosed within ISO/IEC 17029:2019 - Conformity Assessment Requirements for validation and verification bodies, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

### DNV - Business Assurance

DNV Business Assurance Korea Ltd. is part of DNV Group, a global provider of certification, verification, assessment and training services, assisting customers to achieve sustainable business performance.

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<sup>1</sup> The title for Carbon Footprint Calculation and its reporting system may be changed.

<sup>2</sup> Giheung, Hwaseong, Pyeongtaek, Onyang and Cheonan sites in Korea

<sup>3</sup> Samsung China Semiconductor (SCS), Samsung Electronics Suzhou Semiconductor (SESS) sites in China, Samsung Austin Semiconductor (SAS) site in USA

<sup>4</sup> LCA Report was made by Samsung Semiconductor