

# SIMULATION MARK<sup>®</sup> ES 2.0

## SimulationMark ES2.0 –

### The OpenGL ES 2.0 Benchmark for future 3D hardware and designs

Futuremark, creators of world's most widely used benchmarks for handhelds and PCs, has developed a revolutionary new 3D graphics benchmark for mobile device chipmakers and manufacturers called SimulationMark ES2.0. The benchmark is a suite of real world, theoretical and practical workload descriptions that will compare and contrast the performance of future hardware designs prior to the fabrication of silicon. Early access to the benchmark's estimated performance data will permit manufacturers to make educated decisions about their 3D graphics hardware design options.



SimulationMark ES2.0 eliminates the need to rely on unrealistic theoretical polygon and pixel processing data and minimizes misinterpretation of 3D performance. The benchmark has been developed so that professional testers can estimate and calculate the performance on OpenGL ES 2.0 API workloads without investing in physical 3D hardware implementations.

### SimulationMark ES2.0 - Benefits:

- Enables setting requirements for future 3D hardware
- Enables comparison between different graphics hardware and application processor designs
- Easy to produce early estimates about 3D graphics performance without actual silicon
- Tests for both theoretical and practical performance measurements

### About Futuremark

Futuremark's handheld benchmarks are the choice of industry's leading mobile technology companies, including **ARM, ATI, Broadcom, DMP, Freescale, Imagination Technologies, Intel, Mtekvision, NVIDIA, Renesas, Samsung, Symbian** and **Texas Instruments**. The leading handset manufacturers throughout Asia, Europe and the US measure performance with Futuremark products. Operators around the world know that application performance is a key decision criterion for hundreds of millions of customers and are increasingly using Futuremark benchmarks in their handset selection processes.

More information: [www.futuremark.com](http://www.futuremark.com)

## SimulationMark ES2.0 - Overview

### Workloads

The workloads in this product include:

1. Theoretical shader performance measurements
2. Practical shader performance measurements
3. Practical game performance measurements

Of these, tests 1 & 2 are represented as high-level description of shaders and parameters and test 3 is a description for creating a Direct3D trace from Futuremark's desktop benchmark 3DMark.

### Technical Information

- The configurable shader in workloads 1 & 2 is based on the Schlick shading model, which can be considered a Bidirectional Reflectance Distribution Function (BRDF) factorization approximation.
- Theoretical performance measurements will be made with simple vertex and simple pixel shaders, trying to maximize the performance.
- The shader will use a simple quad as a test object. The level of tessellation is planned to be configurable. Most of the shader code can be chosen to be executed in either vertex or pixel shader.
- The test scene will contain two objects with varying (configurable) amount of overlap. This will measure performance of depth solutions such as tiled architecture and hierarchical Z buffer.
- Vertex skinning has been included.
- For the practical game performance measurement, a tracing tool and 3DMark05 Professional version is needed.

### Pricing and Licensing

Product license price is one time fee: €15.000 Euros / License

End-User License Agreement (EULA) has been defined in separate document. Please contact [sales@futuremark.com](mailto:sales@futuremark.com) to receive EULA for your review.

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