



VIA EMAIL AND FEDERAL EXPRESS

January 8, 2016

Managing Director of Khronos
Khronos Group
9450 SW Gemini Drive
#45043
Beaverton, OR
97008-6018

RE: Disclosure Certificate for Vulkan

Dear Sir or Madam:

Apple submits this disclosure certificate in response to the emails dated December 3, 2015 and December 4, 2015, starting a Ratification Review Period for the Vulkan 1.0 Specification and related specifications and extensions, consisting of the following:

1. Vulkan 1.0 specification and the WSI extensions
2. KHR_vulkan_glsl extension
3. SPIR-V GLSL Extended Instructions for GLSL specification

Apple's disclosure certificate identifies in Exhibit A those patent assets that Apple believes contain one or more claims that if issued would likely be Necessary Patent Claims and identifies in Exhibit B a non-exhaustive list of patent assets that might become Necessary Patent Claims depending on how future versions of Vulkan evolve.

To the extent any patents or patent applications set forth in Exhibits A or B or owned by Apple now or in the future, or any amendments, continuations, divisionals, continuations-in-part, re-issues or foreign counterparts thereof, contain Necessary Patent Claims, Apple does not agree to make available a Reciprocal License to such Necessary Patent Claims for the Vulkan 1.0 Specification or any other version of the Vulkan Specification. Exhibit B contains a non-exhaustive list of patent assets that depending on future versions may contain one or more claims that if issued may be necessarily infringed by future versions of Vulkan.

To be clear, Apple reserves all rights in its intellectual property and does not agree to grant any license relative to any version of Vulkan.

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Any questions regarding this communication should be directed to:

BJ Watrous
Vice President and Chief IP Counsel
Apple Inc.

Very truly yours,

BJ Watrous
Vice President and Chief IP Counsel
Apple Inc.



EXHIBIT A

U.S. Patent, App., Or Pub #	Technology	Applicable Vulkan Sections
US20150347107	Unified Intermediate Representation	Vulkan 1.0 + WSI Extensions – A Specification: Sections 1, 2, 4, 5, 6, and 14.
US20150347108	Language, Function Library, and Compiler for Graphical and Non-Graphical Computation on a Graphical Processor Unit	Vulkan 1.0 + WSI Extensions – A Specification: Sections 1, 1.1, 2, 4, 5, 6, 9, and 14.
US20150348225	Unified Application Programming Interface and Model	Vulkan 1.0 + WSI Extensions – A Specification: Sections 1, 2, 2.1.2, 4, 5, 6, 9, and 14.
US20150348224	Graphics Pipeline State Object And Model	Vulkan 1.0 + WSI Extensions – A Specification: Sections 1, 2, 2.1.2, 4, 5, 6, 9, 14.
US20150347199	Manipulating Shaders with Object-Oriented Programming	Vulkan 1.0 + WSI Extensions – A Specification: Sections 1, 2, 2.2, 4, 5, 6, 9, and 14.



EXHIBIT B

U.S. Patent, App., Or Pub #	Technology
US20150347105	This application relates generally to optimizing a GPU.
US20150074435	This application relates generally to optimizing a GPU.
US20150074668	This application relates generally to optimizing a GPU.
US20150070367	This application relates generally to optimizing a GPU.
14/482,828 (unpublished)	This application relates generally to graphics processing.
62/172,113 (unpublished)	This application relates generally to graphics processing.
62/172,114 (unpublished)	This application relates generally to graphics processing.
14/732,754 (unpublished)	This application relates generally to graphics processing.