UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.
_____

Case IPR2017-00700
Patent No. 7,421,032

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**PATENT OWNER'S PRELIMINARY RESPONSE
PURSUANT TO 37 C.F.R. § 42.107**

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I. INTRODUCTION

The Board should not institute *inter partes* review (IPR) on claims 11-17 of U.S. Patent No. 7,421,032 ("the '032 patent") because petitioner Apple Inc. ("Petitioner" or "Apple") has not met its burden of showing that it has a reasonable likelihood of prevailing on any of its proposed grounds of unpatentability.

The petition fails to establish that the cited references teach or suggest the irregular repetition and permutation of message bits, as specifically recited in the claims. They do not. The petition admits that the primary reference of Ping fails to disclose irregular repetition of message bits as claimed.[1] Petitioner attempts to cure this deficiency with MacKay, alleging one "would have been motivated to incorporate the irregularity disclosed in MacKay into Ping's code." Pet at 39.

But Petitioner incorrectly equates the "irregularity" of MacKay and irregular repetition in the challenged claims. As acknowledged in the petition, MacKay defines "irregular codes" as codes "whose parity check matrices have nonuniform weight per column." Ex. 1002 at 1449; Pet at 33. By erroneously focusing on the buzzword "irregular" without adequately addressing substance of the disclosure,

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[1] *See, e.g.*, Pet at 51 ("Ping's outer LDPC coder is regular."); *see also*, Pet at 36 ("Divsalar teaches regular repeat-accumulate (RA) codes rather than irregular repeat-accumulate codes as described and claimed in the '032 patent.").

the petition fails to recognize that the "irregularity" disclosed in MacKay is not the same as the irregular repetition of message bits as specifically recited in the challenged claims. MacKay's "parity check matrices [that] have nonuniform weight per column" are completely different than the irregular repetition of message bits, as claimed in the '032 patent.

Moreover, Petitioner fails to recognize that the "irregularity" described in MacKay is already present in Ping, and thus there would be no motivation for a person of ordinary skill to combine MacKay with Ping and such a combination would not lead to the invention claimed in the '032 patent. Ping discloses a code with a parity check matrix $\mathbf{H}$ that is composed of two submatrices, $\mathbf{H^p}$ and $\mathbf{H^d}$. But in arguing that Ping would benefit from the "irregularity" of MacKay, the petition improperly focuses only on submatrix $\mathbf{H^d}$, ignoring Ping's submatrix $\mathbf{H^p}$ and the parity check matrix $\mathbf{H}$ as a whole. Ping's parity check matrix $\mathbf{H}$, however, already illustrates nonuniform weight per column. As such, Ping's parity check matrix already includes the "irregularity" of MacKay, thereby undermining the proffered rationale for combining the references in the first place.

Submitted herewith is a declaration from Dr. R. Michael Tanner, an expert in graphical analysis of codes and the inventor of the "Tanner graph." (Ex. 2001,

¶¶ 1-6); *see also* Ex. 2002.[2] Dr. Tanner confirms that the "irregularity" of MacKay fails to provide the irregular repetition of information bits required by the challenged claims, and further explains how the code of Ping identified by Petitioner as a *regular* code already exhibits *irregularity* as defined by MacKay, whether represented as a parity check matrix or a Tanner graph.

As such, the proposed grounds of challenge fail to demonstrate that each feature of claims 11-17 of the '032 patent is found in the cited art. Moreover, the rationale for combining the references is unsupported and is tainted by Petitioner's misapprehension of the reference disclosures.

Accordingly, institution of *inter partes* review should be *denied*.[3]

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[2] Independent claim 11 recites a Tanner graph. Dr. Tanner's testimony is submitted to explain a deficiency in the petition materials. *See e.g., Arris Group, Inc., et al. v. Mobile Telecomms. Techs., LLC*, No. IPR2016-00765, Paper 12 (PTAB September 21, 2016) (crediting testimony explaining the failure of the petitioner to address or recognize a deficiency in the disclosure of a cited reference).

[3] Petitioner acknowledges that the '032 patent was already "challenged in one petition for *inter partes* review." Pet. at 3. The Board rejected this petition. *See Hughes Network Systems, LLC v. California Institute of Tech.*, Case No. IPR2015-00060, Paper 18 (Apr. 27, 2015). The earlier Hughes IPR similarly presented

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