

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

APPLE INC.,  
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,  
Patent Owner.

---

Case IPR2017-00728  
Patent No. 7,421,032

---

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

**TABLE OF CONTENTS**

I.Introduction ..... 1

II.Claim Construction .....4

III.Ground 1 Fails .....6

    A. Ping in view of MacKay, Divsalar, and Luby97 fails to disclose  
    the irregular repetition of information bits recited in the Tanner  
    graph of claim 18 .....7

        1. Ping already includes the “irregularity” of MacKay..... 9

        2. MacKay fails to teach the modification proposed by Petitioner .....11

    B. There is no rationale for combining Ping with MacKay and  
    Divsalar ..... 12

        1. The combination of Ping with MacKay would have no effect  
        because Ping is already “irregular” .....14

        2. Petitioner’s remaining arguments provide no motivation to combine  
        .....16

    C. Ping in view of MacKay, Divsalar, and Luby97 fails to disclose  
    the additional limitations of dependent claim 20 ..... 18

IV.Conclusion.....21

V.Appendix .....23

## I. INTRODUCTION

The Board should not institute *inter partes* review (IPR) on claims 18-23 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 its sole proposed ground of unpatentability.

The petition fails to establish that the cited references teach or suggest a decoder configured to decode a data stream encoded with irregular repetition and permutation of message bits, as specifically recited in the claims. The cited references do not do so. The petition admits that the primary reference of Ping fails to disclose irregular repetition of message bits as claimed.<sup>1</sup> 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 41.

But Petitioner incorrectly equates the “irregularity” described by MacKay and the 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. 1202 at 1449; Pet. at 41. By

---

<sup>1</sup> See, e.g., Pet. at 43 (“Ping’s outer LDPC code is regular.”); see also, Pet. at 40 (“Divsalar teaches regular repeat-accumulate (RA) codes rather than irregular repeat-accumulate codes as described and claimed in the ’032 patent.”).

erroneously focusing on the buzzword “irregular” without adequately addressing substance of the disclosure, the petition fails to recognize that the “irregularity” disclosed in MacKay is not the same as the claimed irregularity, *i.e.*, irregular repetition of message bits in which at least two different subsets of message bits are repeated a different number of times. 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.

Petitioner further 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.<sup>2</sup> 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 the *irregularity* defined by MacKay, whether represented as a parity check matrix or a Tanner graph.

As such, the sole proposed ground of challenge fails to demonstrate that each feature of claims 18-23 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*.<sup>3</sup>

---

<sup>2</sup> Independent claim 18 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).

<sup>3</sup> 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

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.