Paper No. ___
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case IPR2017-00219
Patent No. 7,116,710

PATENT OWNER'S RESPONSE
PURSUANT TO 37 C.F.R. § 42.120

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I. STATEMENT OF PRECISE RELIEF REQUESTED

Apple, Inc. ("Petitioner") filed a petition for *inter partes* review of claims 1-8, 10-17, and 19-33 of U.S. Patent No. 7,116,710 (the "'710 patent", EX1201). The Board issued its decision instituting trial ("Decision," Paper 17) on two of the four petitioned grounds and with respect to all but two of the challenged claims, claims 10 and 23. The patent owner ("PO" or "Caltech") hereby requests that the Board now issue a final written decision rejecting all grounds of challenge still remaining, and confirming that claims 1-8, 11-17, 19-22, and 24-33 are not unpatentable.

II. INTRODUCTION AND OVERVIEW OF ARGUMENT

The '710 patent is one of four Caltech patents that resulted from research performed by the inventors, Drs. Jin, Khandekar, and McEliece, in 1999-2000. The patents claim inventions directed to a revolutionary class of error-correction codes, dubbed "irregular repeat and accumulate codes," or "IRA codes," which rivaled and surpassed the performance of the best known codes at that time. No other code known at the time could boast linear encoding, linear decoding, and performance near the theoretical Shannon limit.

The IRA codes described in the '710 patent were the culmination of more than a year of research and analysis by the inventors into different code structures. As even Petitioner's expert acknowledges, the field of error correction coding is a

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complex and highly unpredictable one. Design of new error correction codes typically requires extensive experimentation by experts in the field in order to identify a viable code structure, create useable encoders and decoders, and demonstrate the capabilities of the code's performance. New code structures require rigorous simulation and analysis to determine whether they can be reliably encoded and decoded. Features that may improve performance in one code may have detrimental effects in others, and results were unpredictible.

In arguing that the instituted claims are unpatentable, Petitioner relies on a combination of two prior art references: the Divsalar reference, which describes a method of encoding using repeat accumulate (RA) codes, and the Luby reference, which describes a set of codewords that are based on application of irregular bipartite graphs to Gallager's LDPC codes. Neither reference discloses the limitation of irregularly repeating information bits, which is required by all of the '710 claims, and a person of ordinary skill in the art would not have been motivated by Luby to incorporate irregular repetition into Divsalar.

The petition fails to describe how or why a person of ordinary skill in the art would have been motivated by Luby, which describes *graphs* in which the degree of the *codeword* is irregular, to make the repetition of the information bits in the encoding described in Divsalar irregular. Luby does not even describe an encoding process, and thus does not describe information bits. Petitioner does not point to

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