

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.

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Case IPR2017-00210  
Patent No. 7,116,710

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**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”, EX1001). The Board issued its decision instituting trial (“Decision,” Paper 18) on three of the six 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 to confirm that claims 1-8, 11-17, 19-22, and 24-33 are not unpatentable.

## **II. INTRODUCTION**

The ’710 patent claims 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.

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. Even simple code structures require rigorous simulation and analysis to determine whether they can be practically and reliably encoded and decoded, and

features that may improve performance in one code may have detrimental effects in others.

In arguing that the instituted claims are unpatentable, Petitioner relies on two prior art references: the Frey reference, which discloses an experimental irregular turbocode with inconsistent and poor performance, and the Divsalar reference, which describes a method of encoding using repeat accumulate (RA) codes. But the petition does not establish that Frey is prior art to the '710 patent in the first instance, and all grounds of challenge necessarily fail for that reason alone. Further, neither Frey nor Divsalar discloses every element of the encoding scheme claimed in the '710 patent, comprising irregular repetition, permutation, and accumulation. For example, Frey's convolutional code is not an accumulator and does not have a rate close to one—a fact that undermines the anticipation challenge in view of Frey. And a person of ordinary skill in the art would not have been motivated by Frey to incorporate irregular repetition into Divsalar because Frey's disclosures omit description of critical parameters, and emphasize the unpredictability of the results and the need for further experimentation. In fact, many of Frey's codes were non-functional, and the single functional code identified in the paper exhibited characteristics of a poorly performing code.

In the obviousness challenged, the petition fails to describe how or why a person of ordinary skill in the art would have been motivated by Frey, which

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