

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUGHES NETWORK SYSTEMS, LLC and
HUGHES COMMUNICATIONS, INC.,

Petitioners,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,

Patent Owner.

IPR2015-00059 (Patent 7,916,781)

SUPPLEMENTAL DECLARATION OF HENRY D. PFISTER

I, Henry D. Pfister, declare as follows:

1. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2. I have previously provided a declaration in this matter related to the patentability of U.S. Patent No. 7,916,781 ("the '781 Patent"). Ex. 1010.

II. Background and Qualifications

3. My qualifications have been addressed previously. Ex. 1010 pp. 4-6, 88-97.

III. Scope

4. I understand that the a petition was filed with the United States Patent and Trademark Office for inter partes review of U.S. Patent No. 7,916,781 ("'781 patent"). I further understand that the Patent Trial and Appeal Board (the "Board") has decided to institute inter partes review of claims 1 and 2 of the '781 patent under 35 U.S.C. § 102 based on prior art ("Divsalar").

5. This declaration is a statement of my opinions on issues raised in Patent Owner's opposition (Paper 24) and the supporting Declaration of Dr. Solomon Golomb (Ex. 2024). In reaching these opinions, I have reviewed the Board's Decision on Institution of Inter Partes Review, the

patent owner's response, and the direct and cross-examination testimony of Dr. Solomon W. Golomb.

IV. Legal Understanding

6. My understanding of the legal issues related to this matter were set forth in my original declaration. Ex. 1010 pp. 3-7.

V. Patent Owner's Response

A. Overview

7. The patent owner's response is based primarily on two arguments. First, that the "first encoding operation" described in claim 1 of '781 must include "irregularity". Second, that the "accumulation" in the second encoding operation of claim 1 of '781 must include the "addition of a previously generated parity bit and more than one input bit in order to generate a second parity bit".

8. I disagree that Patent Owner's proposed restrictions on the claim language are appropriate. Claims 1 and 2 contain no language suggesting these restrictions. Instead, it appears that patent owner has attempted to narrow the claim language based on certain embodiments described in the patent specification.

9. Another problem is that the patent owner's interpretation of

claim 1 is undercut by the structure of its dependent claims. In particular, claim 9 depends on claim 1 and can be seen to require irregularity. However, implicitly requiring irregularity in claim 1 renders claim 9 superfluous. On the other hand, interpreting the claims as written does not cause this problem.

B. A Person of Ordinary Skill in the Art Would Not Understand the Claimed “Linear Transform Operation” to Require Irregularity

10. In my opinion, the “linear transform” in claim 1 as understood by a person of ordinary skill in the art is not required to have “irregularity” and an RA code is a special case of an IRA code.

11. A linear transform(ation) is a very well-defined concept in mathematics and engineering. In the context of binary codes, a person of ordinary skill in the art would interpret this term as a binary linear function that maps a vector (say length- k) to another vector (say length- n). The output vector of any binary linear function can be represented as the multiplication of the input vector by a fixed binary matrix with all arithmetic performed modulo-2.

12. For example, the Patent Owner’s expert (Dr. Golomb) admits that a “linear transformation” has an established meaning to persons skilled

in the art, which does not require irregular repetition or scrambling of the input bits being transformed, Ex. 1073 (Golomb Dep. Tr.) at 27:14-29:21.

13. In the parent '032 Patent, the inventors included the limitation “randomly chosen irregular repeats of the message bits” in claim 1. Ex. 1003 at 8:16-17. Similarly, in the grand-parent '710 Patent, the inventors claimed a “first coder operative to repeat said stream of bits irregularly and scramble the repeated bits.”

14. Thus, the inventors clearly understood how to restrict their claims to require irregularity. A person of ordinary skill in the art would understand that, by failing to include that restriction in claim 1 of the '781 Patent, the inventors were intentionally claiming more broadly.

15. Another issue is that claim 9, “[t]he method of claim 6, wherein the information bits appear in a variable number of subsets” restricts the LDGM encoder to have irregularity. If irregularity was already required by claim 1, as Dr. Golomb proposes, then claim 9 would be superfluous.

16. To see this, let $G = [g_{i,j}]$ be the generator matrix of an LDGM code that, as described in claim 6, computes “exclusive-OR summing of bits in subsets of the information bits”. In this case, the definition of a generator

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