UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIRIUS XM RADIO INC.,
Petitioner,

v.

FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.,
Patent Owner.

Case No. IPR2018-00690
Patent No. 6,314,289

DECLARATION OF DAVID LYON IN SUPPORT OF PETITIONER'S REPLY

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Table of Contents

Page

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I, David Lyon, declare as follows:

1. I have been asked by Defendant Sirius XM Radio Inc. ("Sirius XM") to submit this Declaration in support of Petitioner, Sirius XM Radio Inc. ("Sirius XM"), to provide information and opinions, as set forth in this Declaration, to assist the Board in the determination of whether or not the Board should invalidate one or more claims of Fraunhofer-Gesellschft zur Förderung der angewandten Forschung e.V.'s ("Fraunhofer" or "Patent Owner") U.S. Patent No. 6,314,289 (Ex. 1001, the "'289 Patent"). Specifically, counsel for Sirius XM asked me to reply to the assertions made by Fraunhofer's expert, Dr. Wayne Stark, and Fraunhofer's assertions that Campanella and Smallcomb are not prior art to the '289 Patent.

2. I have personal knowledge of the facts and opinions set forth in this Declaration, and, if called upon to do so, I am prepared to testify competently thereto.

I. The Challenged Claims are Obvious Over Chen With or Without Campanella

3. Fraunhofer's argument that Chen and Campanella do not render the challenged claims obvious relies on two fundamental mistakes: that (1) the claimed "partitioner" must partition the two portions of output bits "into two signals" when the claims recite no such requirement, and (2) a POSITA would not have

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implemented Chen's convolutional coding technique in Campanella's system in order to achieve time and/or space diversity in spite of the fact that Chen explicitly states that "the invention can be implemented in communication system applications which utilize diversity in frequency, time, space, polarization or any other system parameter." Chen at 2:64–67. I address these arguments below.

A. Chen Teaches the Claimed Partitioner

4. I understand Fraunhofer's argument that Chen fails to teach the claimed partitioner to be based on its assertion that the partitioner must not only partition "the second number of output bits into the two portions of output bits" (as recited in each of the challenged claims) but that it also must also partition those bits "into two signals." POR at 28. Fraunhofer also argues that the partitioner must output the two portions of bits "onto two respective bit streams" and output those bit streams must be "output on two respective channels." *Id*. The challenged claims recite no such limitations.

5. Fraunhofer does not argue that Chen fails to teach the partitioner limitation as it is recited in the challenged claims. *See* POR at 25–28. As I previously stated, "Chen discloses "a partitioner" (i.e. the portion of Chen's convolutional encoder that "provides a mapping of code bits to sub carriers") for partitioning the second number of output bits" (i.e. the rate-2/5 code) "into two portions of output bits" (i.e. the bits mapped to the upper and lower sidebands,

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respectively). *See, e.g.*, Chen, 1:62-65; 6:18-23; 6:47-57; Lyon, ¶119.

6. However, even under Fraunhofer's asserted understanding of the partitioner limitation, Chen discloses the partitioner. Chen discloses that its modulator is responsible for "modulating the interleaved symbols onto one or more sub-carriers." Chen at 3:61–69. A POSITA would understand that in order to modulate these interleaved symbols onto separate sub-carriers as disclosed in Chen, the interleaved symbols must be partitioned into two separate bitstreams such that each bitstream can be separately modulated. This is further substantiated by the Chen's description of a preferred embodiment: "The invention provides a mapping of code bits to subcarriers which improves performance relative to conventional mappings…. For example, assume that the two complementary codes from the top line of TABLE 2 are the respective lower sideband and upper sideband half-bandwidth codes…. FIGS. 3A and 3B illustrate the above-described optimal bit assignment strategy for the lower sideband and upper sideband respectively." *See* Chen, 6:18-20; 6:23-26; 6:46-48. And contrary to Fraunhofer's argument, the interleaved bitstream is "partitioned into two signals" by separately modulating the interleaved bitstreams onto separate sub-carriers. I also note that Fraunhofer mistakenly alleges that Chen's **interleaver** "interleaves the upper and lower sideband codes with a carrier signal as part of a single bitstream." POR at 27.

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