

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SIRIUS XM RADIO INC.  
Petitioner,

v.

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

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Case IPR2018-00682  
Patent 6,931,084 B1

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Before JEFFREY S. SMITH, STACEY G. WHITE, and GARTH D. BAER,  
*Administrative Patent Judges.*

BAER, *Administrative Patent Judge.*

DECISION  
Denying Institution of *Inter Partes* Review  
*37 C.F.R. § 42.108*

Case IPR2018-00682  
Patent 6,931,084 B1

Sirius XM Radio Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–3 of U.S. Patent No. 6,931,084 (Ex. 1001, “the ’084 patent”). Patent Owner Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (“Patent Owner”) filed a Preliminary Response (Paper 8, “Prelim. Resp.”). In our Institution Decision, we denied institution based on Petitioner’s failure to identify Sirius XM Holdings Inc. (“Holdings”) as an RPI in this proceeding. Paper 12, 7. We also denied Petitioner authorization to amend its mandatory notice to add Holdings without changing the Petition’s filing date. *Id.* Petitioner requested Rehearing (Paper 13), which we granted (Paper 24), finding Petitioner could add Holdings as an RPI without changing the Petition’s filing date.

We now turn to the merits of the Petition. Pursuant to 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless “the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition.” Having considered the Petition and the Preliminary Response, we determine that there is not a reasonable likelihood that Petitioner would prevail in establishing that claims 1–3 of the ’084 patent are unpatentable. Therefore, we decline to institute *inter partes* review.

## I. BACKGROUND

## II. RELATED PROCEEDINGS

The parties assert that the ’084 patent is involved in *Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. v. Sirius XM Radio Inc.*, 1:17-cv-00184 (D. Del. Feb. 22 2017).

### III. THE '084 PATENT

The '084 patent is directed, in general, to “echo phase offset correction in a multi-carrier demodulation system.” Ex. 1001, Abstract, Claim 1. This technology is useful for a mobile receiver of broadcast digital data. *Id.* at 1:20–23. The broadcast may be performed over a radio frequency (RF) signal, modulated on a carrier frequency. Pet. 10–11. Phase modulation (PM) in particular is useful for transmitting digital data on a modulated carrier wave. One PM example is Quadrature Phase Shift Keying (QPSK) that uses four waveforms to represent two-bit symbols. Pet. 13, Fig. 2; Prelim. Resp. 22, 24–25. Digital coding using PM can also map a bit symbol to a difference between the phases of multiple waveforms in a signal. Ex. 1001, 2:57–62; Pet. 20–21; Prelim. Resp. 21–23. In Differential Quadrature Phase Shift Keying (DQSPK) mapping, two bits are encoded as the difference of 0, 90, 180, or 270 degrees between two symbols. Ex. 1001, 2:57–62. For example, the bits 01 can be represented as a symbol of 90 degrees phase followed by a symbol of 180 degrees phase, in which the difference in phases between the two symbols is 90 degrees. Prelim. Resp. 21–23.

In a differential phase keying coding system, multiple symbols from a variety of sources are compared at a receiver to determine the difference between their phases. In a time domain multi-carrier modulation (MCM) approach, the symbols may be presented sequentially in time on one subcarrier frequency of multiple subcarriers. Prelim. Resp. 21–22. An alternative approach to time domain coding is frequency domain coding, shown in Figure 1 of the '084 patent. In a frequency domain MCM embodiment, different symbols are transmitted simultaneously on different subcarriers having different frequencies. Ex. 1001, 1:30–36, 5:10–12, 36–

40. The difference between two symbols that makes up the coding of two bits occurs between symbols on different subcarriers. Pet. 17; Prelim. Resp. 22–23.

The claimed method addresses the problem of erroneous phase offsets in the received and decoded signals, as may be caused by echoes in the received signal. Pet. 1–2, 18–22. Figure 5 of the '084 patent is reproduced below.

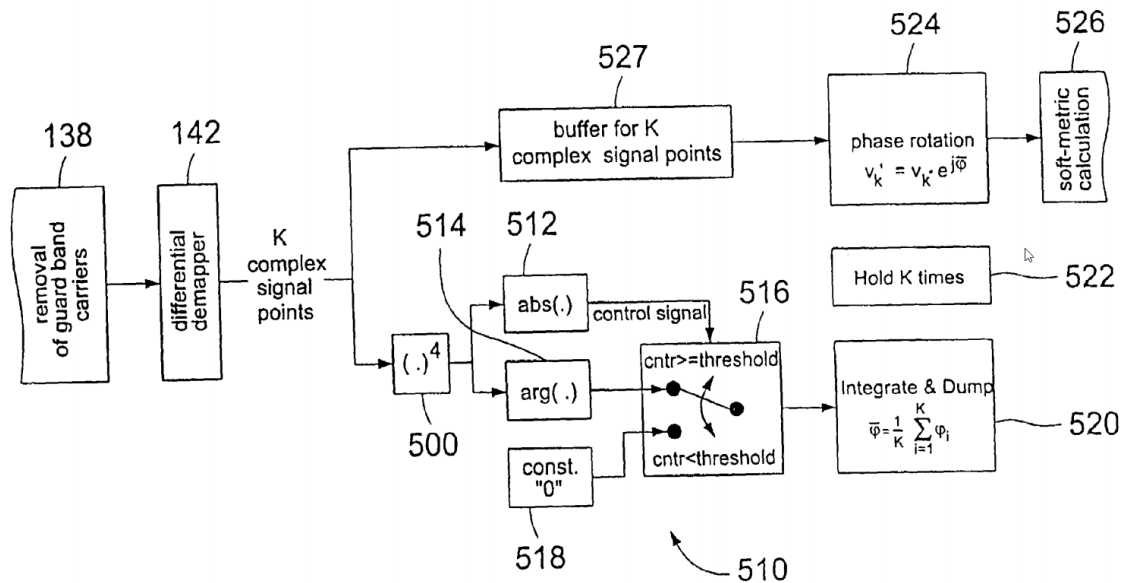


FIG.5

Figure 5 illustrates a “schematic block diagram of an embodiment of an echo phase offset correction device according to the present invention.”

Ex. 1001, 6:65–67.

#### IV. ILLUSTRATIVE CLAIM

Of the challenged claims, only claim 1 (reproduced below) is independent.

1. A method of performing an echo phase offset correction in a multi-carrier demodulation system, comprising the steps of:
  - differential phase decoding phase shifts based on a phase difference between simultaneous carriers having different frequencies;

determining an echo phase shift offset for each decoded phase shift by eliminating phase shift uncertainties related to the transmitted information from said decoded phase shift;

averaging said echo phase offsets in order to generate an averaged offset;

correcting each decoded phase shift based on said averaged offset; and

further comprising a step of comparing an absolute value of a symbol associated with a respective decoded phase shift with a threshold, wherein only phase shifts having associated therewith symbols having an absolute value exceeding said threshold are used in said step of averaging said echo phase offsets.

Ex. 1001, 15:16–35.

#### V. ASSERTED GROUNDS OF UNPATENTABILITY

Petitioner asserts the following grounds of unpatentability. Pet. 6.

Claims Challenged	35 U.S.C. § <sup>1</sup>	References/Basis
1–3	103	Tsujishita <sup>2</sup> , Moose 1990 <sup>3</sup>
1–3	103	Tsujishita, Moose 1990, Koslov <sup>4</sup>

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<sup>1</sup> The Leahy-Smith America Invents Act (“AIA”) amended 35 U.S.C. § 103. *See* Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011). As the application that issued as the ’299 patent was filed before the effective date of the relevant amendments, the pre-AIA version of § 103 applies.

<sup>2</sup> U.S. Patent No. 6,341,123 B1 (issued Jan. 22, 2002) (Ex. 1006, “Tsujishita”).

<sup>3</sup> P.H. Moose, “Differential Modulation and Demodulation of Multi-Frequency Digital Communications Signals” (1990) (Ex. 1007, “Moose 1990”).

<sup>4</sup> U.S. Patent No. 5,940,450 A (issued Aug. 17, 1999) (Ex. 1009, “Koslov”)

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