

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ARRIS GROUP, INC., ARUBA NETWORKS, INC.,  
HEWLETT PACKARD ENTERPRISE COMPANY, and  
HP, INC.,  
Petitioner,

v.

MOBILE TELECOMMUNICATIONS TECHNOLOGIES, LLC,  
Patent Owner.

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Case IPR2016-00768<sup>1</sup>  
Patent 5,659,891

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Before MEREDITH C. PETRAVICK, SCOTT A. DANIELS, and  
MIRIAM L. QUINN, *Administrative Patent Judges*.

PETRAVICK, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*Inter Partes* Review  
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

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<sup>1</sup> Case IPR2016-00766 has been joined with the instant proceeding.

## I. INTRODUCTION

### A. Background

Aruba Networks, Inc., Hewlett Packard Enterprise Company, and HP Inc. (collectively, Petitioner) filed a Petition requesting *inter partes* review of claims 1–5 of U.S. Patent No. 5,659,891 (Ex. 1001, “the ’891 patent”). Paper 1 (“Pet.”). ARRIS Group, Inc. filed a nearly identical Petition, which was the subject of IPR2016-00766, and we joined IPR2016-00766 to the instant *inter partes* review. See Paper 26.

*Inter partes* review was instituted (Paper 13, “Inst. Dec.”) on the following grounds:

References	Basis	Claims Challenged
Petrovic <sup>2</sup>	§ 102	1–5
Petrovic, Raith, <sup>3</sup> and Alakija <sup>4</sup>	§ 103	5

Patent Owner, Mobile Telecommunications Technologies, LLC, filed a Corrected Patent Owner’s Response on June 12, 2017. Paper 42 (“PO Resp.”). Petitioner filed a Corrected Reply to the Patent Owner’s Response. Paper 44 (“Pet. Reply”).

An oral hearing was held on June 20, 2017. A transcript of the hearing is included in the record. Paper 50 (“Tr.”).

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<sup>2</sup> Ex. 1013, Rade Petrovic, Walt Roehr & Dennis Cameron, *Permutation Modulation for Advanced Radio Paging*, IEEE PROC. SOUTHEASTCON, Apr. 1993.

<sup>3</sup> Ex. 1014, Raith et al., WO 89/08355 (Sept. 8, 1989).

<sup>4</sup> Ex. 1015, C. Alakija & S.P. Stapleton, *A Mobile Base Station Phased Array Antenna*, IEEE INT’L CONF. ON SELECTED TOPICS WIRELESS COMM., 188 (June 1992).

*B. Related Proceedings*

Both parties indicate that the '891 patent is the subject of numerous district court proceedings. Pet. 1–2; Paper 8, 2–4.

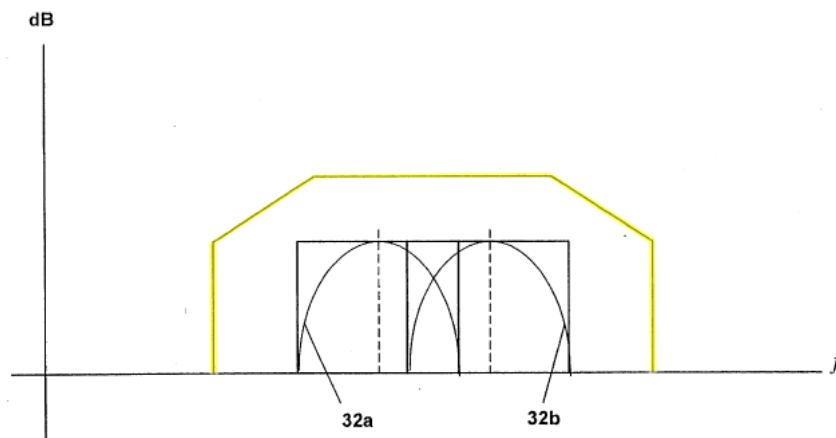
In addition, both parties also indicate that the '891 patent was the subject of other *inter partes* review proceedings. Pet. 2–3; Paper 8, 4. *Juniper Networks, Inc. v. Mobile Telecommunications Technologies, LLC*, Case IPR2017-00640 (PTAB filed Jan. 10, 2017) (“the *Juniper* IPR”) is pending. The following *inter partes* review proceedings were terminated, during trial, pursuant to settlement agreements between the respective parties: *Apple Inc. v. Mobile Telecommunications Technologies, LLC*, Case IPR2014-01035 (PTAB filed June 27, 2014); *T-Mobile USA Inc. v. Mobile Telecommunications Technologies, LLC*, Case IPR2015-00018 (PTAB filed Oct. 3, 2014), and *Samsung Electronics Co., Ltd. v. Mobile Telecommunications Technologies, LLC*, Case IPR2015-01726 (PTAB filed Aug. 13, 2015) (“the *Samsung* IPR”). Institution was denied in *Samsung Electronics Co., Ltd. v. Mobile Telecommunications Technologies, LLC*, Case IPR2015-01727 (PTAB filed Aug. 13, 2015).

*C. The '891 Patent*

The '891 patent (Ex. 1001), titled “Multicarrier Techniques in Bandlimited Channels,” generally relates to a method for multicarrier modulation using geographically co-located transmitters to achieve a higher frequency transmission capacity within FCC emission mask limits. The method provides for a plurality of overlapping subchannels within a single mask-defined, bandlimited channel to provide higher data transmission capacity for a mobile paging system. Ex. 1001, 2:15–59. The technique

involves transmitting a plurality of paging carriers, in corresponding overlapping subchannels, from the same location and within the mask-defined, bandlimited channel, without band-limiting each of the individual subchannels. *Id.* In this way, with the center frequencies of the plurality of modulated carriers within the single bandlimited channel, an optimum transmission capacity is provided and the plurality of carriers may emanate from the same transmission source, i.e., an antenna. *Id.*

An annotated version of Figure 3B of the '891 patent, reproduced below, depicts two adjacent carriers asymmetrically located within a single, mask-defined, bandlimited channel.



“FIG. 3B is a graph depicting the power spectra of two carriers asymmetrically located within a single mask-defined, bandlimited channel.” *Id.* at 3:13–15. The vertical axis represents the power level of the signal in decibels (dB), and the horizontal axis represent the frequency ( $f$ ). As depicted by Figure 3B of the '891 patent, above, two carriers 32a and 32b are shown operating over two subchannels (no reference number) within a band-limiting mask (annotated in yellow) defining the channel. The subchannels are asymmetrically aligned within the mask resulting in partial

subchannel overlap. *Id.* at 4:24–30. The center frequencies of the carriers 32a and 32b are shown by the vertical dashed lines, and, concomitant with the subchannels, carriers 32a and 32b also overlap. According to the '891 patent, geographic co-location of the transmitters reduces interference problems between adjacent subcarriers, thus allowing the spacing between subchannels to be reduced. *Id.* at 4:12–20. The '891 patent explains that the practical implications of such an asymmetrical arrangement are a greater range of operating parameters, essentially because more subchannels can be fit within the bandlimited mask without undue interference. *Id.* at 4:36–46.

#### *D. Illustrative Claim*

Claims 1, 3, and 5 are independent. Claims 2 and 4 depend from claims 1 and 3 respectively. Claim 1 illustrates the claimed subject matter and is reproduced below:

1. A method of operating a plurality of paging carriers in a single mask-defined, bandlimited channel comprising the step of transmitting said carriers from the same location with said carriers having center frequencies within said channel such that the frequency difference between the center frequency of the outer most of said carriers and the band edge of the mask defining said channel is more than half the frequency difference between the center frequencies of each adjacent carrier.

## II. CLAIM CONSTRUCTION

### *A. Legal Standard*

The '891 patent is expired, and “the Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). In this context, claim terms generally are given their ordinary and customary meaning, as understood by

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