

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

MOBILE TELECOMMUNICATIONS TECHNOLOGIES, LLC,
Patent Owner.

Case IPR2015-01727
Patent 5,659,891

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

DANIELS, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Petitioner, Samsung Electronics Co., Ltd., filed a Petition to institute an *inter partes* review of claims 1–5 of U.S. Patent No. 5,659,891 (“the ’891 patent”). Paper 3 (“Pet.”). Patent Owner, Mobile Telecommunications Technologies, LLC, timely filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). Upon consideration of the evidence in the Petition and the Preliminary Response, we determine that Petitioner has not established a reasonable likelihood of prevailing on the claims challenged in the Petition. Accordingly, we do not institute an *inter partes* review of any of the challenged claims of the ’891 patent.

B. Additional Proceedings

The ’891 patent is also challenged, currently, by Petitioner in IPR2015-01726. Petitioner states that the ’891 patent is asserted against Petitioner in the U. S. District Court for the Eastern District of Texas, *Mobile Telecommunications Technologies, LLC v. Samsung Electronics Co.*, Case No. 2:15-CV-183. Pet. 1. Petitioner also notes that the ’891 patent is asserted against other parties in at least (1) *Mobile Telecommunications Technologies, LLC v. Apple, Inc.*, Case No. 2:13-CV-258 (“the Apple lawsuit”); (2) *Mobile Telecommunications Technologies, LLC v. Leap Wireless International, Inc.*, Case No. 2:13-CV-885 (“the Leap lawsuit”); (3) *Mobile Telecommunications Technologies, LLC v. T-Mobile USA, Inc.*, Case No. 2:13-CV-886, (“the T-Mobile lawsuit”); and (4) *Mobile*

Telecommunications Technologies, LLC v. AT&T Mobility LLC, Case No. 2:14-CV-897, all in the Eastern District of Texas. *Id.* at 1–2.

Petitioner states further that the '891 patent was also challenged in other *inter partes* review proceedings, namely *Apple Inc. v. Mobile Telecommunications Technologies, LLC*, Case IPR2014-01035 (PTAB filed June 27, 2014); and *T-Mobile USA, Inc. v. Mobile Telecommunications Technologies, LLC*, Case IPR2015-00018 (PTAB filed Oct. 3, 2014).¹ *Id.* at 2.

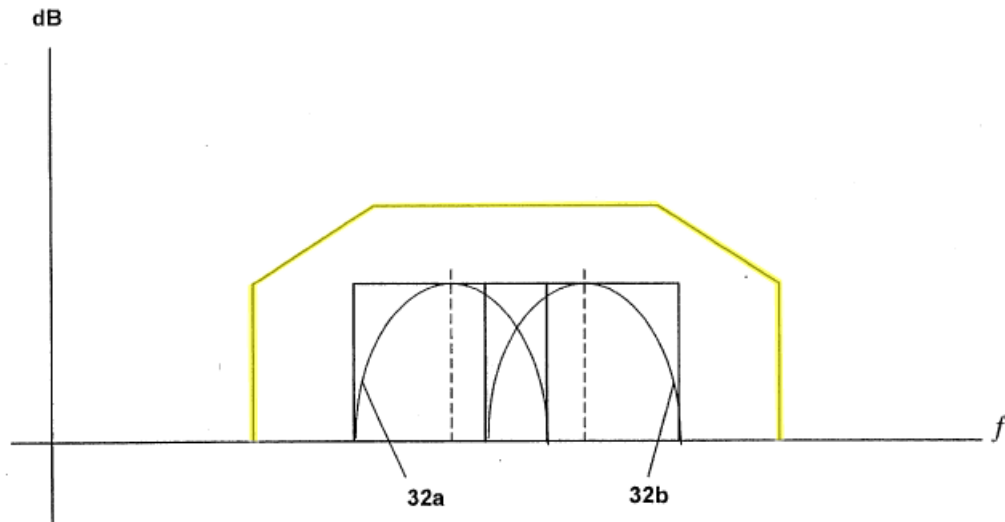
The '891 Patent

The '891 patent (Ex. 1001), titled “Multicarrier Techniques in Bandlimited Channels,” generally relates to a method for multicarrier modulation (“MCM”) 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 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 bandlimiting 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

¹ IPR2014-01035 and IPR2015-00018 were both terminated pursuant to settlement agreements between the respective parties. *See T-Mobile USA, Inc. v. Mobile Telecomms. Techs., LLC*, Case IPR2015-00018 (PTAB filed Oct. 3, 2014) (Paper 14); *Apple Inc. v. Mobile Telecomms. Techs., LLC*, Case IPR2014-01035 (PTAB filed June 27, 2014) (Paper 21).

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.



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 bandlimiting 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.

C. Illustrative Claim

Claims 1, 3, and 5 are independent. Each of dependent claims 2 and 4 depend directly 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.

The Alleged Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable on the following specific grounds.²

References	Basis	Claims Challenged
Cimini ³	§ 103	1–4
Cimini, Raith ⁴ , and Alakija ⁵	§ 103	5

² Petitioner supports its challenge with a Declaration of Dr. Apostolos K. Kakaes, Ph.D. (Ex. 1003, “Kakaes Decl.”). *See infra*.

³ Ex. 1013, Leonard J. Cimini Jr., *Analysis and Simulation of a Digital Mobile Channel Using Orthogonal Frequency Division Multiplexing*, IEEE TRANSACTIONS ON COMM. 665 (1985).

⁴ Ex. 1014, WO 89/08355 (Sept. 8, 1989).

⁵ Ex. 1015, C. Alakija & S.P. Stapleton, *A Mobile Base Station Phased Array Antenna*, IEEE INT’L CONF. ON SELECTED TOPICS WIRELESS COMM., June 1992, at 118.

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 a person of ordinary skill in the art, at the time of the invention, taking into consideration the language of the claims, the specification, and the prosecution history of record because the expired claims are not subject to amendment. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

1. *Single mask-defined, bandlimited channel*

Independent claims 1, 3, and 5 recite a “single mask-defined, bandlimited channel.” According to Petitioner, the term means: “a channel confined to a frequency range.”⁶ Pet. 5. Petitioner urges that we adopt the same construction set forth in other IPR decisions construing this term and as the District Court construed the same term in the *T-Mobile* lawsuit. Patent Owner proposes we interpret the term as a “channel confined to a frequency range and power spectral density mask.” Prelim. Resp. 10.

The '891 patent indicates that a mask-defined bandlimited channel is applied where “[t]he FCC requires signals to be confined within emission limit masks in order to prevent interference caused by signals straying or spilling into adjacent channels.” Ex. 1001, 1:57–59. In the context of the

⁶ In the *Apple* lawsuit, the parties stipulated that a “single mask-defined, bandlimited channel” means, “a channel confined to a frequency range.” Ex. 1006, 76.

'891 patent, a “bandlimited channel” is also where “carriers operating at different frequencies are fit within a single bandwidth allocation in a manner consistent with FCC mask requirements.” *Id.* at 5:15–19. The Specification thus describes this term essentially as a single range of frequencies in the frequency band where a spectral power mask limits the frequency range.

We agree with Patent Owner’s position that one of ordinary skill in the art would have at least a bachelor’s degree in electrical engineering, several years of experience in wireless telecommunications “and would possess knowledge regarding frequency, amplitude, and masks as used in telecommunications.” Prelim. Resp. 10. Because one of ordinary skill in the art understands the concepts and relationship of frequency, channel, bandwidth and mask, Patent Owner’s claim construction is essentially a restatement of the plain meaning of the claim language itself. That is, one of ordinary skill in the art would understand from a reasonable reading of the claim language on its face that a “bandlimited channel” is a single limited frequency range, and that a “mask” is the constraint applied to define that limited frequency range. Petitioner’s claim construction, on the other hand, states that the channel is “confined,” but that does not sufficiently, in our view, account for the term “mask-defined,” as it is recited expressly in the claims. This is consistent with the Specification further explaining that “carriers operating at different frequencies are fit within a single bandwidth allocation in a manner consistent with FCC mask requirements.” Ex. 1001, 5:11–19.

Although both parties have proposed claim constructions for this phrase, on the record before us we are not apprised as to any reason why this phrase needs to be construed apart from the plain language of the claim.

Accordingly, we interpret this phrase according to its plain and ordinary meaning as understood by one of ordinary skill in the art in light of the specification.

2. *Plurality of transmitters*

Independent claim 5 recites a “plurality of transmitters.” According to Petitioner, the term means: “at least two transmitters.” Pet. 5. Patent Owner does not provide a construction.

It is well settled that “‘plurality,’ when used in a claim, refers to two or more items, absent some indication to the contrary.” *Dayco Prods., Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1327-28 (Fed. Cir. 2001) (citing *York Prods., Inc. v. Cent. Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1575 (Fed. Cir. 1996)). Thus, for purposes of this Decision, we interpret “plurality of transmitters” as two or more transmitters.

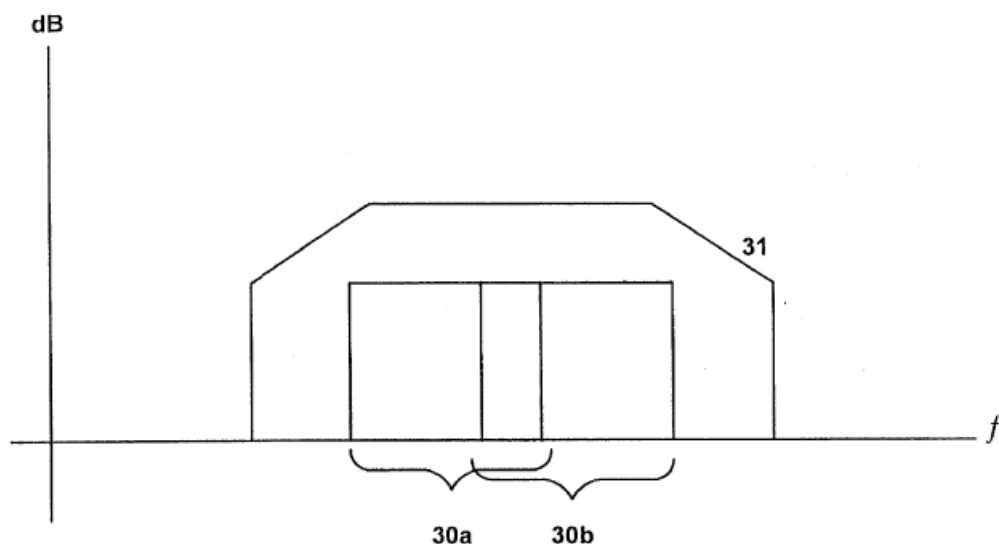
3. *Band edge*

Independent claims 1, 3, and 5 recite the limitation, “the band edge,” without proper antecedent basis. Patent Owner proposes that “the band edge” means “the innermost frequencies at which the mask requires attenuation of the signal.” Prelim. Resp. 14. Petitioner contends that “the band edge” should be construed as “a band edge of the single mask-defined, bandlimited channel.” Pet. 7.

On its face, in each of claims 1, 3, and 5, the limitation reads in context “the band edge *of the mask* defining said channel” (emphasis added), clearly referring to the mask in the “single mask-defined, bandlimited channel” limitation. Patent Owner asserts that the edges of a mask are defined with respect to frequency on the y-axis, not power as shown on the x-axis, for example in Figures 3B and 4 of the '891 patent. Prelim. Resp.

15–17. We agree with this position to an extent, because as we discussed above, one of ordinary skill in the art would have understood a bandlimited channel defined by a mask as essentially a single range of frequencies in the frequency band along the y-axis where a spectral power mask limits the frequency range. Ex. 1001, 5:15–19.

Our review of the Specification reveals, however, no evidence of the term “innermost,” or any persuasive description or definition of “band edge” that portrays the mask having, for instance, innermost and outermost edges. In the Brief Description of the Drawings, the Specification describes the graph in Figure 3A as, “a graph depicting two submasks defining two subchannels *in a single, mask-defined bandlimited channel.*” *Id.* at 3:11–12 (emphasis added). In Figure 3A, below, the single mask-defined bandlimited channel 31 is illustrated by two spaced apart vertical lines ($\Delta y = 0$) extending from the frequency (f) (y-axis) with each vertical line joined by two diagonal lines to a horizontal line ($\Delta x = 0$). *Id.* at 4:24–34.



Because there are no values shown on the x or y axis, Figure 3A in the '891 patent illustrates, somewhat arbitrarily, the boundaries, or edges, in

terms of frequency and power of a “single mask-defined bandlimited channel.”

Keeping Patent Owner’s assertion in mind, i.e. that the band limited channel is specifically the frequency range along the y-axis, (Prelim. Resp. 15–17), than the vertical lines ($\Delta y = 0$) at their intersection with the y-axis depict the frequency boundaries, or edges, of the single mask defined bandlimited channel. The Specification of the ’891 patent explains that an emission mask attenuates the signal at the “band edge”:

The FCC requires signals to be confined within emission limit masks in order to prevent interference caused by signals straying or spilling into adjacent channels. FCC masks typically require the power spectral density of a signal to be attenuated at least 70 dB *at the band edge*.

Ex. 1001, 1:57–61 (emphasis added). The Specification depicts an example of attenuation at 70dB, 10 kHz from the center frequency, in Figure 4, shown below:

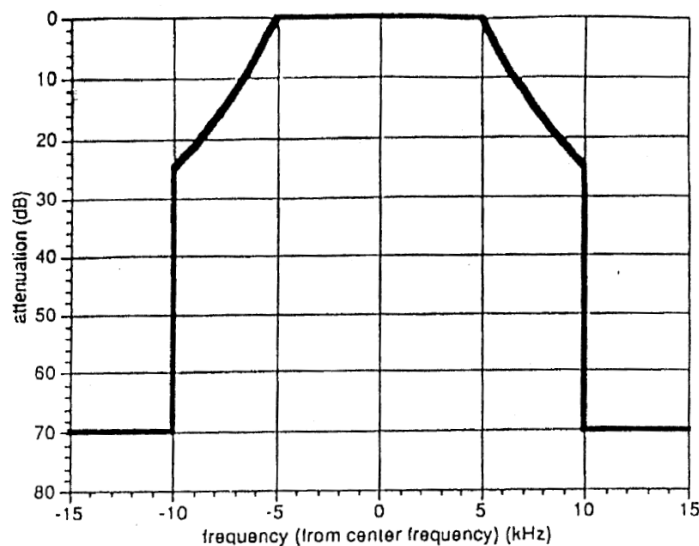


FIGURE 4

Figure 4 is a graph of an FCC emissions mask requiring the power spectral density to be attenuated to at least 70dB within 10 kHz from center frequency. *Id.* at 16–18.

From the Specification and the drawings, it is a reasonable reading of the written description to understand “the band edge” as the vertical lines at 10 kHz either side of the center frequency. What is not clear from the description, is that “the band edge” is, or includes, the specific frequencies between 5 and 10 kHz along the diagonal line, such that an “innermost” frequency, e.g. 5 kHz from center frequency, is the claimed “band edge.”

Patent Owner contends that construing the band edge as, “the innermost frequencies at which the mask requires attenuation of the signal” is proper because the Specification states that “the frequency difference between the center frequency of each carrier and the *nearest band edge* of the mask is greater than half the frequency difference between the center frequencies of the two carriers.” Prelim. Resp. 18 (quoting Ex. 1001, 4:30–35). We are not persuaded at this point in the proceeding to read such a limitation from the Specification into the claims. As an initial matter, on their face, claims 1, 3, and 5 simply recite “the band edge,” not the “nearest band edge.” Ex. 1001, 6:9, 21, 40–41. *See Phillips*, 415 F.3d at 1314 (“Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claim terms.”). Although understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir.), *cert. denied*, 135 S. Ct. 719 (2014) (“While we read claims in view of

the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.”). The Specification support relied on by Patent Owner is an embodiment relating to asymmetrically located subchannels as shown for example in Figure 3B. It is well-settled that a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment. *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

Additionally, we consider the Specification to understand how one of ordinary skill in the art would have interpreted specific claim terms. *Phillips* 415 F.3d at 1313 (“Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.”). The embodiment disclosed in the Specification of the ’891 patent to which Patent Owner refers does not, however, describe or define the term “nearest band edge” with any specificity. The Specification states:

[i]n accordance with this asymmetry, the frequency difference between the center frequency of each carrier and the nearest band edge of the mask is greater than half the frequency difference between the center frequencies of the two carriers

Ex. 1001 4:30–34. We understand this embodiment to define, in the circumstance of asymmetrically located subchannels, a relative frequency difference between the center frequency and the nearest band edge. But we are not persuaded from the context of the description that one of ordinary skill in the art would have understood that the “nearest band edge” includes merely frequencies along diagonal lines as shown for example in Figures

3A, 3B and 4. Indeed, from a plain reading of the Specification and observing Figure 3B, it is at least as likely from this description that the “nearest band edge” refers to the vertical line depicting the band edge of the mask on the left side of Figure 3B, reproduced below, and its relationship to the center frequency of the left-most carrier 32a, as compared with the vertical line depicting the band edge of the mask, farther away, on the right side of Figure 3B.

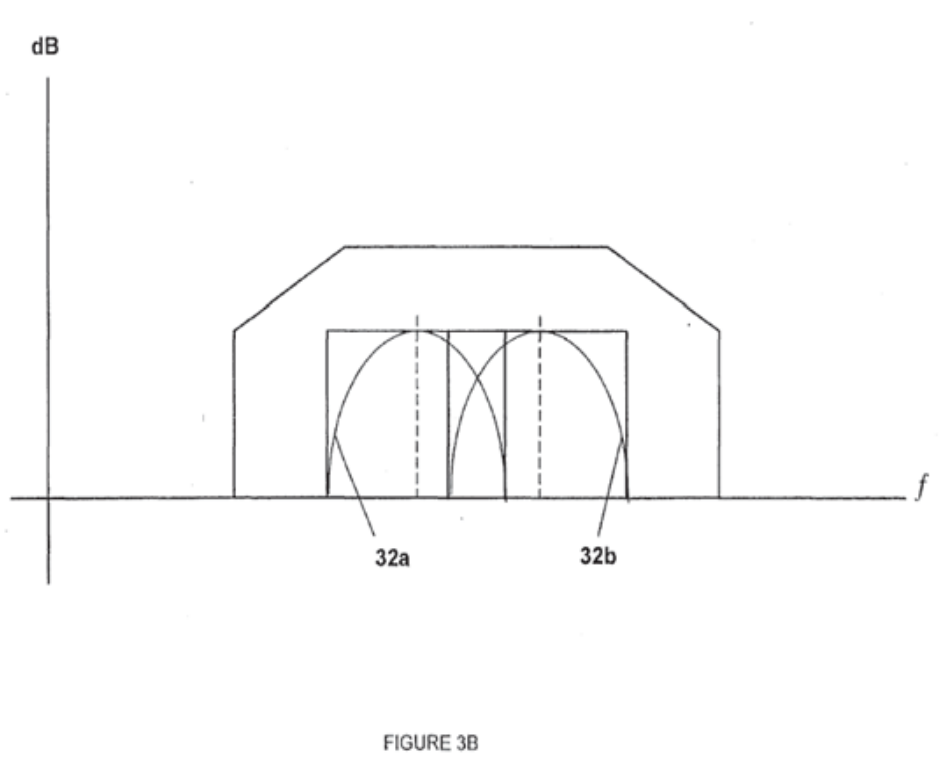


Figure 3B of the '891 patent, above, depicts two carriers 32a and 32b operating over two subchannels (no reference number) within a bandlimited mask (also no reference number) defining the channel.

Additionally, Patent Owner argues that their asserted construction is consistent with the District Court's construction in the *Leap* lawsuit. Prelim. Resp. 17–18. We have reviewed the District Court's Claim Construction Order (Ex. 1007) in the *Leap* lawsuit. At this stage of the proceeding,

however, we recognize that we have not been presented with the same evidence and arguments presented to the District Court.

Nothing in the intrinsic or extrinsic record proffered by Patent Owner, at this point in the proceeding, persuades us that “band edge” should be construed as “*innermost* band edge” or a “nearest band edge” in accordance with Patent Owner’s characterization of an embodiment described in the Specification. Accordingly, we are not persuaded that the evidence supports Patent Owner’s asserted claim construction for the reasons stated above. For purposes of this Decision, “the band edge” means: “a band edge of the single mask-defined, bandlimited channel.”

4. *Each adjacent carrier*

Patent Owner asserts that “each adjacent carrier” should be construed as “every single carrier, two of which having a common endpoint or border.” Prelim. Resp. 28–29. Specifically, Patent Owner relies upon the definition of “adjacent” as meaning “having a common endpoint or border,” from Merriam-Webster’s Online Dictionary. *Id.* (citing *Adjacent*, MERRIAM-WEBSTER, <http://www.merriam-webster.com/dictionary/adjacent>). Petitioner argues that the term should be given its plain and ordinary meaning. Pet. 8.

Upon review, we disagree with Patent Owner that the meaning of “adjacent” as used in the ’891 patent is limited to requiring that adjacent carriers must have a common endpoint or border. When construing claims, our “focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use ‘to particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.’” *Brookhill-Wilk 1, LLC v. Intuitive*

Surgical, Inc., 326 F.3d 1215, 1220 (Fed. Cir. 2003) (alterations in original) (quoting *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001)). Nowhere in the specification or claims do we find the phrase “having a common endpoint or border.” Nor have the parties pointed to any description indicating such a requirement. In the context of the claims, “adjacent” means simply “next to.” Consulting Merriam-Webster’s Online Dictionary from this perspective, we note that “adjacent” is also defined as “immediately preceding or following.” MERRIAM-WEBSTER, <http://www.merriam-webster.com/dictionary/adjacent> (last visited Feb. 10, 2016). This dictionary definition aligns with the claim language and is consistent with use of the term throughout the Specification. The Specification states that:

Moreover, the carriers need not be symmetrically or evenly spaced within the mask defining the channel. That is, the frequency spacings *between adjacent carriers*, while symmetric to each other, can be smaller than the frequency spacings between the band edges of the mask and the nearest respective carrier. Indeed, carrier spacings may be irregular such that the carriers are asymmetrically located within the mask without incurring undue interference.

Ex. 1001, 4:15–23 (emphasis added). We understand in the context of this disclosure that adjacent carriers (i.e., carriers next to one another) may have symmetric frequency spacings with respect to one another, or potentially “irregular” asymmetrical spacing with respect to one another, within the mask. *Id.* Whether the carriers are symmetric or asymmetrically spaced, we find no persuasive intrinsic or extrinsic evidence requiring that adjacent carriers must have a common endpoint or border as Patent Owner asserts.

Consequently, for the purpose of this Decision, we construe the term “adjacent” in the phrase “each adjacent carrier,” according to its plain and ordinary meaning in the context of the claims and Specification, to mean “next to.”

5. Other constructions

We decline to provide explicit constructions for the remaining claim terms provided by the parties. In the case of “paging carriers,” the construction is immaterial to our Decision to Institute, as the parties do not dispute that certain elements are disclosed by the prior art. For the words “operating” and “transmitter,” we do not consider the proffered constructions to provide any clarity over the terms themselves.

III. ANALYSIS

We turn now to Petitioner’s asserted grounds of unpatentability to determine whether Petitioner has met the threshold standard of 35 U.S.C. § 314(a).

A. Claims 1–4 – Obviousness over Cimini in view of the ordinary skill in the art

Petitioner asserts that claims 1–4 would have been obvious over Cimini. Pet. 11. We determine that Petitioner has not established a reasonable likelihood of prevailing on its assertion that claims 1–4 are obvious for the reasons explained below.

1. Overview of Cimini

Cimini is titled “Analysis and Simulation of a Digital Mobile Channel Using Orthogonal Frequency Division Multiplexing,” and relates to problems associated with multi-path signal propagation in a mobile cellular system when carrier signals being transmitted to a mobile unit are scattered,

for example by buildings and other structures. Ex. 1013 § I. Another issue Cimini explains is co-channel interference in a cellular system caused by “mobiles simultaneously using the same channel in different locations.” *Id.* Cimini proposes to improve mobile cellular systems by providing symbols, i.e. carriers, that are transmitted simultaneously in parallel, and rather than being “divided into N *nonoverlapping* frequency subchannels . . . [a] more efficient use of bandwidth can be obtained with a parallel system if the spectra of the individual subchannels are permitted to overlap.” *Id.*; *see also id.* § II. Cimini teaches a modulation scheme using Orthogonal Frequency Division Multiplexing (“OFDM”), for N subcarrier frequencies across a bandwidth Δf . Cimini explains further with respect to the subcarrier bandwidth Δf that:

For orthogonal frequency spacing and strictly band-limited spectra (bandwidth Δf) with $\delta = \frac{1}{2} \Delta f = \frac{1}{2} N \Delta t$, $\beta = \log_2 M$ bits/s/Hz. In reality, however, the spectra overflow this minimum bandwidth by some factor . . .

Id. § II. A.

In Figure 10, below, Cimini depicts a “[d]ata setup used in simulations” illustrating subcarrier group 1, subcarrier group 2, and subcarrier group 3 along with Pilot signals extending across a 7.5 kHz channel or “data window.” *Id.* § III. B.

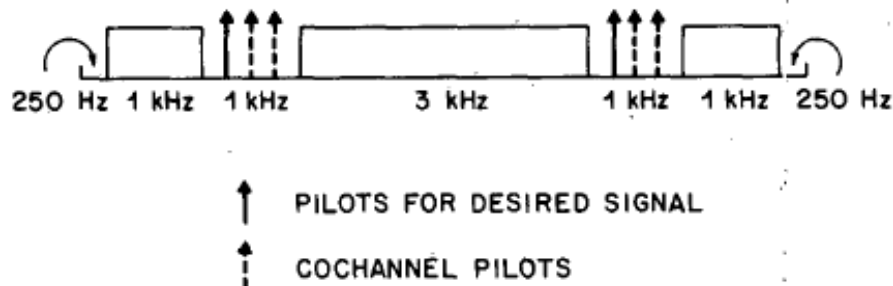


Fig. 10. Data setup used in simulations.

With respect to Figure 10 above, Cimini describes 86 subcarriers across 5 kHz with each subcarrier separated by Δf 58.59 Hz and all within subcarrier groups 1–3. *Id.* § III. C. Pilot carriers account for 2 kHz between the subcarrier groups, and, Cimini further explains that “the design of a mobile telephone system must also include measures to limit adjacent channel interference. This is accomplished by leaving 250 Hz gaps at each end of the band.” *Id.* § III. B.

2. Discussion

As discussed below, claims 1–4 are asserted to be unpatentable over Cimini under 35 U.S.C. § 103(a).

Section 103(a) forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” In *Graham v. John Deere Co.*, 383 U.S. 1 (1966), the Court set out a framework for applying the statutory language of § 103:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Id. at 17. “While the sequence of these questions might be reordered in any particular case, the factors continue to define the inquiry that controls.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007).

For an *inter partes* review, under the statute, any petition must “identif[y] . . . with particularity . . . the grounds on which the challenge to each claim is based.” 35 U.S.C. § 312(a)(3). Petitioner has the burden of

proof to establish that it is entitled to the requested relief. *Id.* § 42.20(c). The Petition must include a full statement of the reasons for the relief requested, including a detailed explanation of the significance of the evidence. *Id.* § 42.22(a). The Petition must include a statement of the relevance of the evidence to the challenge raised. 37 C.F.R. § 104(b)(5). “The Board may exclude or give no weight to the evidence where a party has failed to state its relevance or to identify specific portions of the evidence that support the challenge.” *Id.* “Thus, we will address only the basis, rationale, and reasoning put forth by the Petitioner in the petition, and resolve all vagueness and ambiguity in Petitioner’s arguments against the Petitioner.” *Liberty Mutual Ins. Co. v. Progressive Casualty Ins. Co.*, Case CBM2012-00003, slip op. at 10 (PTAB Oct. 25, 2012) (Paper 8). It is Petitioner’s responsibility “to explain specific evidence that support its arguments, not the Board’s responsibility to search the record and piece together what may support Petitioner’s arguments.” *Dominion Dealer Sols., LLC v. AutoAlert, Inc.*, Case IPR2013-00225, slip op. at 4 (PTAB Oct. 10, 2013) (Paper 15).

Against this general background, we consider the reference, the level of ordinary skill in the art, as well as other evidence and arguments on which Petitioner relies.

a. Claim 1

Petitioner argues that Cimini discloses a plurality of carriers operating in a “narrow-band digital mobile channel.” Pet. 14–15 (quoting Ex. 1013, Abstract). Also, Petitioner contends that, although Cimini describes a mobile cellular network, one of ordinary skill in the art would have known that a pager was “one of the most well-known devices for operation in a

‘narrow-band digital mobile channel’” described by Cimini. *Id.* at 15. Petitioner further asserts that Cimini discloses a “mask-defined bandlimited channel” as recited in claim 1 because Cimini “specifies that the spectra is ‘strictly band-limited’ [and] one of ordinary skill in the art would understand the channel described by Cimini to be mask-defined and bandlimited.” *Id.* at 13 (quoting Ex. 1013, 3 § II.A) (citing Ex. 1003 ¶ 21). Based on this disclosure, Petitioner argues essentially that the 7.5 kHz channel shown in Cimini’s Figure 10, above, is a “mask-defined bandlimited channel.” *Id.* Additionally, Petitioner’s declarant, Dr. Kakaes, states that one of ordinary skill “would have at least a B.S. degree in electrical engineering, computer science, computer engineering, or equivalent education. This person would also need to have at least two years of experience in the design and configuration of wireless paging systems, or other two-way wireless communications systems.” Ex. 1003 ¶ 10.

Patent Owner contends that a person of ordinary skill in the art would have possessed “a bachelor’s degree in electrical [engineering] or its equivalent and about four years working in the field of wireless telecommunications networks and would possess knowledge regarding frequency, amplitude, and masks as used in telecommunications, or equivalent education and work experience.” Prelim. Resp. 10. Based on the level of ordinary skill in the art, upon which the parties essentially agree, we are persuaded by Patent Owner’s contention that one of ordinary skill at the time of filing of the application that became the ’891 patent, would have understood “[a] mask in telecommunications . . . to be an emission mask or power spectral density mask,” and that “the bandlimited channel is defined by a single power spectral density mask.” *Id.* at 10–11.

Based on the level of ordinary skill in the art, as we turn to address the scope and content of the prior art, we are not persuaded by Petitioner's evidence and analysis that Cimini, as understood by one of ordinary skill in the art, discloses either expressly or inherently a "mask-defined bandlimited channel."

As an initial matter, we are not persuaded that the plain reading of the phrase used in Cimini, "strictly band-limited spectra," describes a frequency spectra "mask" as one of ordinary skill in the art would understand it. The "mask," as described in the specification of the '891 patent, is a specific requirement that defines frequency attenuation or emission limit requirements that confines the spectral limits of a signal within a proscribed bandwidth. *See* Ex. 1001, 1:56–61, 2:8–9, 4:24–27, Fig. 3A. Cimini, on the other hand, never discusses, states, or explains any such mask requirement. In Cimini, the phrase "strictly band-limited spectra" understood in context, describes orthogonal frequency spacing, i.e. a minimum bandwidth Δf , between carriers, and the relationship of overlapping carrier frequencies, "[i]n reality, however, the spectra overflow this minimum bandwidth by some factor α ." Ex. 1013, 3 § II.A. According to Cimini the $\Delta f = 58.59$ Hz value is the spacing between each of the 86 carriers that permits some carrier overlap and sufficient transmission efficiency across the three carrier groups. *Id.* § III.C.

The Petition points us to the disclosure in Cimini explaining "that the spectra in which the parallel systems operate are 'strictly band-limited.'" Pet. 12 (quoting Ex. 1013, 3 § II.A.). Cimini, for its part, never discusses *how* the spectra is band-limited. The Petition does not provide any evidence or explanation with respect to Cimini that "strictly band-limited" either

expressly or inherently means that a spectral mask is involved. Indeed, the fact that Cimini describes carrier overlap in the context of “band-limited spectra” indicates that the carrier signals are not confined or attenuated by a mask.

Petitioner turns to its declarant, Dr. Kakaes, for support of its position, and argues further that one of ordinary skill in the art would have understood that Cimini teaches a mask-defined channel. Pet. 13 (citing Ex. 1003 ¶ 21).

Dr. Kakaes states that:

[b]ecause Cimini describes this channel as a 7.5 kHz “data window” (Ex. SAM1013, p. 8, § III(B)) and specifies that the spectra is “strictly band-limited” (Ex. SAM1013, p. 8, § II(A)), one of ordinary skill in the art would have understood the channel described by Cimini to be mask-defined and bandlimited.

Ex. 1003 ¶ 21. Dr. Kakaes’s testimony cites to the term “data window” likening this term to “strictly band-limited” and simply concludes that these terms mean, to one of skill in the art, a “mask.” Dr. Kakaes provides no further justification, technical explanation or evidence to support the conclusion that one of ordinary skill in the art would understand a connection or association between the terms “data window,” “band-limited spectra,” and “mask.” On this issue, Dr. Kakaes’s bare testimony that a “data window” is understood as a spectral mask, without more, is entitled to little weight. Indeed, Dr. Kakaes’s testimony does not define or explain a “mask,” at all, but simply states in his Declaration that Cimini describes a “7.5 kHz mask-defined, bandlimited channel.” *See Id.* at ¶ 22.

Our review indicates that the term “data window” in Cimini is used once in the asserted reference as a synonym for “channel.” *See* Ex. 1013, §III. B. We are not apprised of any evidence in Cimini itself, or provided

any cogent explanation or additional evidence from Dr. Kakaes's testimony, that a "data window" is a term of art or would be understood by one of ordinary skill in the art, as a mask. Neither are we persuaded, as discussed above, by a plain reading of Cimini that "strictly bandlimited" means, or infers, a mask.

Addressing Cimini's disclosure of a 7.5 kHz channel as shown in Figure 10, Patent Owner argues that "a bandlimited spectrum of a channel is just a set of values or frequencies of the channel and does not read on a single mask-defined, bandlimited channel." Prelim. Resp. 39. We agree with this position to an extent. The Specification of the '891 patent clearly explains that "[t]he FCC requires signals to be *confined within emission limit masks* in order to prevent interference caused by signals straying or spilling into adjacent channels." Ex. 1001, 1:57–59 (emphasis added). Claim 1 does not recite merely a "bandlimited channel," but a "mask-defined bandlimited channel." The term "mask-defined" cannot be read out of the plain and ordinary meaning of the claim. *See Stumbo v. Eastman Outdoors, Inc.*, 508 F.3d 1358, 1362 (Fed. Cir. 2007) (denouncing claim constructions that render phrases in claims superfluous). *Bicon Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006) ("claims are interpreted with an eye toward giving effect to all terms in the claim"). The plain meaning of the claim, on its face, includes the "mask-defined bandlimited channel" limitation, as it is the mask that tells the reader specifically *how* the channel is bandlimited.

We are not persuaded, on the record before us that Petitioner has provided sufficient evidence showing that it would have been obvious to a person of ordinary skill in the art that Cimini discloses or teaches a "mask-defined, bandlimited channel" as recited in claim 1. Accordingly, for the

reasons above, Petitioner has not established a reasonable likelihood of prevailing on the ground of unpatentability of claim 1 as obvious over Cimini.

b. Claim 3

Petitioner advances essentially the same arguments for independent claim 3, as asserted with respect to claim 1. *See* Pet. 18–21.

For its part, Patent Owner argues that claim 3 is not obvious for the same reasons as claim 1. *See generally* Prelim. Resp. 33.

For the reasons provided above, we are not persuaded that Petitioner has established a reasonable likelihood of prevailing on the ground of unpatentability of independent claim 3 as obvious over Cimini under 35 U.S.C. § 103.

c. Claims 2 and 4

With respect to claims 2 and 4, Petitioner explains that the additional limitation of subchannel “overlap” recited in those claims is also found in Cimini. Pet. 17–18, 21–22. Patent Owner asserts that claims 2 and 4 are not obvious over Cimini because their respective base claims 1 and 3 are not obvious, and because claims 2 and 4 recite additional features. Prelim. Resp. 50.

Based upon our analysis, above, we agree with Patent Owner that dependent claims 2 and 4 have not been shown to be obvious over Cimini, because claims 1 and 3, from which they depend, have not been shown to be obvious over Cimini.

B. Claim 5 – Obviousness over Cimini, Raith, and Alakija

Petitioner has not established a reasonable likelihood of prevailing on its assertion that claim 5 is obvious for the reasons explained below.

Petitioner alleges for substantially the same reasons as for claim 1 that Cimini “specifies that the spectra is ‘strictly band-limited’, which one of ordinary skill in the art would understand as being mask-defined.” Pet. 23 (quoting Ex. 1013 § II.A). As discussed, we do not find these arguments and evidence persuasive, and Petitioner does not explain how Raith nor Alakija cure this defect with respect to the claimed “mask-defined, bandlimited channel” recited in claim 5.

Accordingly, based on the record before us, Petitioner has not established a reasonable likelihood of prevailing on the ground of unpatentability of claim 5 as obvious over Cimini, Raith, and Alakija.

IV. SUMMARY

For the forgoing reasons, we do not institute *inter partes* review of the '891 patent on the alleged grounds of unpatentability.

V. ORDER

After due consideration of the record before us, it is:

ORDERED that the Petition is denied and no trial is instituted.

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Patent 5,659,891

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