

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HTC CORPORATION and HTC AMERICA, INC.,
Petitioner,

v.

NFC TECHNOLOGY, LLC,
Patent Owner.

Case IPR2014-01199
Patent 7,665,664 B2

Before JAMES B. ARPIN, NEIL T. POWELL, and
BART A. GERSTENBLITH, *Administrative Patent Judges*.

ARPIN, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

HTC Corporation and HTC America, Inc. (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 13 and 29 of Patent No. US 7,665,664 B2 (Ex. 1001; “the ’664 patent”) pursuant to 35 U.S.C. §§ 311–319. Pet. 1. NFC Technology, LLC (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). On February 4, 2015, we issued a Decision on Institution (Paper 10, “Dec. on Inst.”), instituting *inter partes* review of claims 13 and 29 of the ’664 patent. Dec. on Inst. 3. Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), and Petitioner filed a Reply (Paper 23, “Pet. Reply”) thereto.

The parties requested an oral hearing (Paper 27; Paper 28) and appeared before us on November 2, 2015. The record includes a transcript of the oral hearing. Paper 31 (“Tr.”).

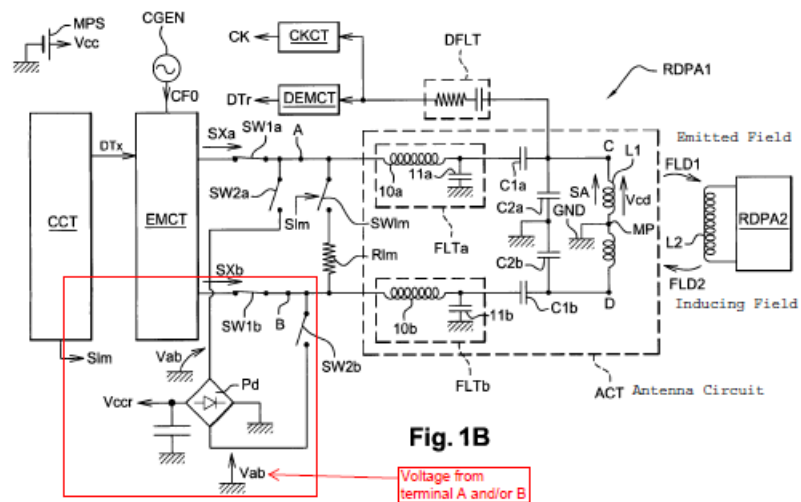
We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, addresses issues and evidence raised during the *inter partes* review. For the reasons that follow, Petitioner demonstrates by a preponderance of the evidence that claims 13 and 29 of the ’664 patent are unpatentable.

B. Related Proceedings

Petitioner indicates that the ’664 patent is the subject of the following co-pending U.S. district court case: *NFC Tech., LLC v. HTC Corp.*, No. 2:13-cv-1058 (E.D. Tex.), filed December 5, 2013. Pet. 1. In addition, at the request of Petitioner, we instituted an *inter partes* review, IPR2014-01198, with respect to a related patent, Patent No. US 6,700,551 B2, against

1, ll. 13–15; col. 3, ll. 33–36; Ex. 1003 ¶ 14. In the active operating mode, antenna coil L1 of antenna circuit ACT of reader RDPA1 emits magnetic field FLD1. Ex. 1001, col. 2, ll. 29–37. For example, claim 13 recites: “when the reader is in the active operating mode, an excitation signal oscillating at the working frequency [is applied to the input terminal of the antenna circuit], so that the antenna coil emits a magnetic field.” *Id.* at col. 16, ll. 51–54. In the passive operating mode, antenna coil L1 of antenna circuit ACT of reader RDPA1 does not emit a magnetic field. *Id.* at col. 3, ll. 34–37. Nevertheless, even in the passive operating mode, RPDA1 uses energy. *See id.* at col. 3, ll. 47–49.

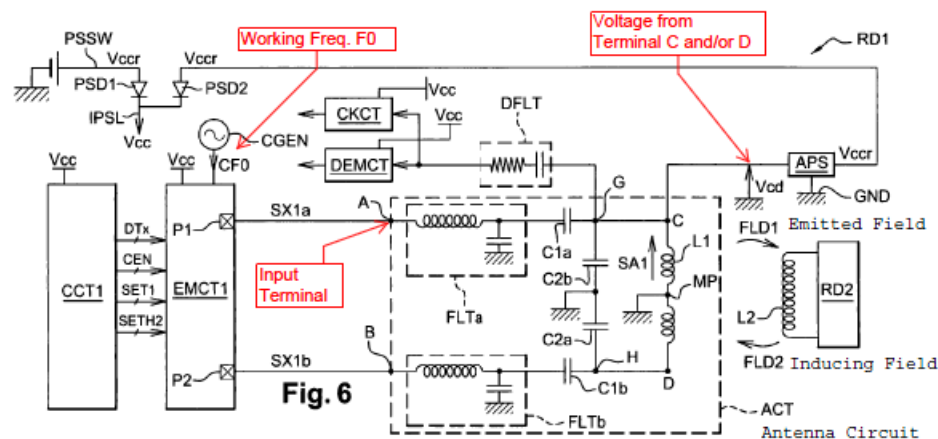
Figure 1B of the '664 patent, including our annotations, is reproduced below:



Referring to Figure 1B, in the passive operating mode, circuit CCT deactivates circuit EMCT and oscillator CGEN, opens switches SW1a and SW1b, and closes switches SW2a and SW2b. *Id.* at col. 7, ll. 24–26. Thus, rectifier Pd is connected to terminals A, B of antenna circuit ACT. *Id.* at col. 7, ll. 27–28; see PO Resp. 7. In the presence of magnetic field FLD2 (“Inducing Field”) emitted by reader RDPA2, rectifier Pd receives

alternating voltage V_{ab} that varies (1) according to the voltage V_{cd} of antenna signal SA induced in coil L1, i.e., the voltage appearing between terminal C of coil L1 and midpoint MP (*id.* at col. 7, ll. 28–33) and (2) according to the impedance of antenna circuit ACT, seen from terminals A and/or B (*id.* at col. 7, ll. 35–36). Voltage V_{cd} also appears between terminal D of the coil and midpoint MP. *Id.* at col. 7, ll. 33–34. Rectifier Pd then supplies an auxiliary supply voltage V_{ccr} by rectifying the voltage V_{ab} . *Id.* at col. 7, ll. 36–38.

Figure 6 of the '664 patent, including our annotations, is reproduced below:



As depicted in annotated Figure 6, reader RD1 is provided with auxiliary supply voltage V_{ccr} that is produced

using an alternating voltage taken off at a higher impedance point of the antenna circuit, preferably using the voltage V_{cd} taken off on the terminals C and/or D of the antenna coil L1, instead of producing the voltage V_{ccr} using the voltage V_{ab} present on the [input] terminals A, B of the antenna circuit.

Id. at col. 8, ll. 27–32; *see* PO Resp. 5, 8. Thus, the auxiliary supply circuit is configured to supply the auxiliary supply voltage, e.g., V_{ccr} , using an

alternating supply voltage induced in the antenna circuit, e.g., at terminal C and/or D, as recited in claims 13 and 29.

D. Challenged Claims

Petitioner challenges independent, apparatus claims 13 and 29 of the '664 patent. Pet. 3. Claims 13 and 29 of the '664 patent are reproduced below with disputed limitations emphasized:

13. An inductive coupling reader having an active operating mode and a passive operating mode, the inductive coupling reader comprising:

an antenna circuit substantially tuned to a working frequency, *the antenna circuit having at least one input terminal*, at least one capacitor, and *an antenna coil having two end terminals*, the capacitor and the coil being chosen so that the antenna circuit is substantially tuned to the working frequency and has, at the working frequency and *as measured with respect to the at least one input terminal, a first impedance*;

an emitter circuit that applies to the input terminal of the antenna circuit, when the reader is in the active operating mode, an excitation signal oscillating at the working frequency, so that the antenna coil emits a magnetic field, and that modulates the excitation signal to send data; and

an auxiliary supply circuit coupled to the antenna circuit and configured to supply an auxiliary supply voltage of the reader using an alternating voltage induced in the antenna circuit by an external magnetic field.

Ex. 1001, col. 16, ll. 40–59 (emphases added).

29. A portable electronic device comprising:

a processor;

a rechargeable battery coupled to the processor; and

an inductive coupling reader having an active operating mode and a passive operating mode, the inductive coupling

reader being coupled to the processor, the inductive coupling reader including:

an antenna circuit substantially tuned to a working frequency, *the antenna circuit having at least one input terminal*, at least one capacitor, and *an antenna coil having two end terminals*, the capacitor and the coil being chosen so that the antenna circuit is substantially tuned to the working frequency and has, at the working frequency and *as measured with respect to the at least one input terminal, a first impedance*;

an emitter circuit that applies to the input terminal of the antenna circuit, when the reader is in the active operating mode, an excitation signal oscillating at the working frequency, so that the antenna coil emits a magnetic field, and that modulates the excitation signal to send data; and

an auxiliary supply circuit coupled to the antenna circuit and configured to supply an auxiliary supply voltage of the reader using an alternating voltage induced in the antenna circuit by an external magnetic field.

Id. at col. 18, ll. 17–41 (emphases added).

E. Relied Upon References, Document, and Declarations

Petitioner relies upon the following references, document, and declarations in support of its grounds for challenging the identified claims of the '664 patent:

Exhibit Nos.	References, Document, and Declarations
1002	Excerpts from Prosecution File History for the '664 patent (U.S. Patent Application No. 11/302,291)
1003	Declaration of Dr. Emmanouil Tentzeris
1005	Patent No. US 7,603,090 B2 to Amtmann <i>et al.</i> (“Amtmann”)

1006	ECMA International, Near Field Communication Interface and Protocol (NFCIP-1) (Dec. 2002) (“ECMA-340”)
1007	Patent Application Publication No. US 2003/0169152 A1 to Charrat <i>et al.</i> (“Charrat”)
1008	Patent No. US 8,384,519 B2 to Kuhl <i>et al.</i> (“Kuhl”)
1011	Rebuttal Declaration of Dr. Emmanouil Tentzeris

F. Grounds Under Review

We instituted *inter partes* review on the following grounds of unpatentability (Dec. on Inst. 17):

Ground	References	Challenged Claims
35 U.S.C. § 103(a)	Amtmann and ECMA-340	13 and 29
35 U.S.C. § 103(a)	Charrat and Kuhl	13 and 29

II. ANALYSIS

A. Claim Construction

Consistent with the statute and the legislative history of the America Invents Act (“AIA”), we interpret claims of an unexpired patent using the broadest reasonable interpretation in light of the specification of the patent. Pet. 8; see Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012) (*Claim Construction*); 37 C.F.R. § 42.100(b).¹ Under the broadest reasonable interpretation standard, a claim term is

¹ *In re Cuozzo Speed Techs. LLC*, 793 F.3d 1268, 1278 (“Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA”), 1279 (“the standard was properly adopted by PTO regulation”) (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs. LLC v. Lee*, 84 U.S.L.W. 3218 (Jan. 15, 2016) (No. 15-446).

presumed to have an ordinary and customary meaning as would have been understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A patentee may act as his or her own lexicographer by providing a special definition for a claim term in the specification with “reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Generally, in the absence of such a special definition or other considerations, “limitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. *Confirmation of Previous Constructions*

In its Petition, Petitioner proposed constructions for the following claim terms: (1) active operating mode and (2) passive operating mode. Pet. 7–8. We construed each of these terms for purposes of our Decision on Institution. Dec. on Inst. 8–10. Patent Owner does not contest these constructions in its Patent Owner Response. PO Resp. 2–10; see Paper 11, 2–3 (“The patent owner is cautioned that any arguments for patentability not raised in the response will be deemed waived.”). Consequently, we now confirm our constructions of the claim terms: (1) active operating mode and (2) passive operating mode, as follows:

a. *“active operating mode” (Claims 13 and 29)*

“active operating mode” means “an operating mode where the antenna coil of the antenna circuit emits a magnetic field” (Dec. on Inst. 9); and

b. *“passive operating mode” (Claims 13 and 29)*

“passive operating mode” means “an operating mode where the antenna coil of the antenna circuit does not emit a magnetic field” (*id.* at 10).

2. *Additional Constructions Proposed in Patent Owner Response*

Although neither party contests our previous claim term constructions, in the Patent Owner Response, Patent Owner proposes constructions for additional terms: (1) “at least one input terminal” and (2) “two end terminals.” PO Resp. 6–10. In particular, these terms are recited in each of the challenged claims, and Patent Owner contends that “[i]t is an essential element of the invention of claims 13 and 29 that the antenna circuit’s input terminal is an *electrically distinct* point from the end terminals of its antenna coil.” *Id.* at 1 (emphasis added). Further, Patent Owner contends that “[t]he input terminal is an electrically distinct point that has a claimed ‘first impedance’ that is ‘measured with respect to the at least one input terminal.’” *Id.* at 4 (emphasis omitted). Thus, Patent Owner contends that the claim terms require “an antenna circuit that has at least one input terminal that is separate and different from the end terminals of the antenna coil.” *Id.* at 10–11; *see also id.* at 13 (“Independent claim 13 unambiguously requires that the antenna circuit’s input terminal is separate and different from the end terminals of the antenna coil.”). Petitioner disagrees. Pet. 5–10.

As an initial matter, neither party proposes a construction for the term “terminal” in its submitted papers. At the oral hearing, we asked each party whether it was necessary for us to construe the term “terminal” and, if so, what construction would they propose. Tr. 9:2–20, 19:22–20:15. Petitioner acknowledged that it had not proposed a construction for “terminal,” but indicated that we should construe the term according to its ordinary meaning. *Id.* at 9:6–8. Petitioner argues that the ordinary meaning of

“terminal” is “an end of a particular element.” *Id.* at 9:20; *see* Ex. 2003, 44:12–13 (With respect to Figure 6 of the ’664 patent, Petitioner’s declarant, Dr. Tentzeris, testified that “input *terminal* could be any node or any point.” (emphasis added)). Patent Owner contends that “terminal” should be construed as “a point of entry or exit into a particular circuit element, like a battery’s end terminals.” *Id.* at 20:3–6. A relevant definition of a “terminal” is “[a] screw, soldering lug, or *other point* to which electrical connections can be made. Also known as electric terminal. . . . One of the electric *input or output points* of a circuit or component.” MCGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS 1904 (4th ed. 1989) (emphases added) (Ex. 3001).

Because of its breadth, Petitioner’s proposed construction of this term would render the modifier “end,” in the term “end terminal,” essentially meaningless. “A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.” *Merck & Co., Inc. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Circ. 2005); *see Mangosoft, Inc. v. Oracle Corp.*, 525 F.3d 1327, 1330–31 (Fed. Cir. 2008) (rejecting claim construction that “ascribes no meaning to the term . . . not already implicit in the rest of the claim”). Thus, Patent Owner’s construction of “terminal” is more consistent with the language of the challenged claims and the context, in which the term appears in the Specification (*see, e.g.*, Ex. 1001, col. 2, ll. 8–21), and the ordinary meaning of the term as exemplified by the quoted dictionary definition. Therefore, Patent Owner’s construction is the broadest reasonable interpretation of “terminal.”

Patent Owner's construction of the additional terms is grounded in three bases.² First, the plain language of claims 13 and 29 recites “input terminal” and “end terminals.” It is axiomatic in claim construction that different claim terms recite different claim limitations. PO Resp. 5–6 (citing *CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000)). Nevertheless, the challenged claims do not recite expressly a structural relationship between the “input terminal” and the “two end terminals.” In particular, as Petitioner notes, claims 13 and 29 merely recite “the antenna circuit *having* at least one input terminal, at least one capacitor, and an antenna coil *having* two end terminals.” Ex.1001, col. 16, ll. 44–46, col. 18, ll. 25–27 (emphases added). Specifically, Petitioner argues that the challenged claims broadly recite the three components of the antenna circuit: (1) “at least one input terminal,” (2) “at least one capacitor,” and (3) “an antenna coil having two end terminals”; but the language of these claims does not specify structural connections or relationships with respect to each component or other components recited in the challenged claims. Pet. Reply 7; Tr. 8:6–12, 10:1–24. We agree with Petitioner that the challenged claims do not specify a structural relationship between the recited components, and none is presumed based on this claim language. See Tr. 19:14–17. Thus, according to the plain language of claims 13 and 29, the “at least one capacitor” and the “input terminal” may be separate from or connected to either or neither of the “two end terminals.”

² Patent Owner does not base its constructions in the prosecution history of the '664 patent (see Ex. 1002) or, as noted below, in a declarant's testimony. On this record, the construction of these terms would not differ under the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Second, Patent Owner contends that because the challenged claims recite that “the capacitor and the coil [are] chosen so that the antenna circuit is substantially tuned to the working frequency and has, at the working frequency and *as measured with respect to the at least one input terminal, a first impedance.*” Ex. 1001, claim 16, ll. 46–50, col. 18, ll. 27–31 (emphasis added). In the context of the challenged claims, Patent Owner contends that the two end terminals of the coil and the input terminal must have different impedances, that is, they must be “electrically distinct.” PO Resp. 2–3; see Tr. 23:9–24:18. Although each of claims 13 and 29 recites a “*first impedance*” “measured with respect to the *at least one input terminal,*” neither recites another “impedance.” Instead, claim 14 depends directly from independent claim 13 and recites that the antenna circuit has “a *higher impedance point,*” having an impedance higher than the first impedance; and “the auxiliary supply circuit is coupled to the higher impedance point without going through the input terminal of the antenna circuit.” Ex. 1001, col. 16, ll. 60–67 (emphasis added). Thus, Petitioner argues that

claim 14 in its express language clarifies two things: Number one, the input terminal is distinctive from the end terminals of the claim -- of the claimed antenna coil, using the antenna circuit; number two -- actually three things. Number two is that that first impedance is different from another higher impedance point. And number three, the auxiliary supply circuit is coupled in a very specific manner, that is at the higher impedance point.

Tr. 16:18–25. The recitation of claim 14, however, does not mean that claim 13 *must* be construed to require that the “input terminal” and “two end terminals” have different impedances. Pet. Reply 12–13. While independent claim 13 encompasses the limitations of its dependent claim 14, claim 13 is not limited to those encompassed limitations. Tr. 17:1–24; *cf.*

Pfizer, Inc. v. Ranbaxy Labs. Ltd., 457 F.3d 1284, 1291–92 (Fed. Cir. 2006) (holding a dependent claim in a patent invalid under 35 U.S.C. § 112, ¶ 4, for failure to “‘specify a further limitation of the subject matter’ of the [independent] claim to which [the dependent claim] refers”). Therefore, we are not persuaded that, in view of the recitation of a “first impedance” in claims 13 and 29 and a “higher impedance” in claim 14, we should construe the “input terminal” and “two end terminals” as necessarily separate and “electrically distinct.”

Patent Owner contends that “there is nothing in the challenged claims themselves to suggest that the antenna circuit’s input terminal can be the same electrical point as the separately listed antenna coil’s two end terminals.” PO Resp. 6. For the reasons set forth above, however, there also is nothing in the challenged claims to suggest that the antenna circuit’s input terminal *cannot* be the same electrical point as the separately listed antenna coil’s two end terminals. We conclude that, consistent with our Rule 42.100(b), the language of the claims favors the broader construction that the antenna circuit’s “input terminal” may or may not be the same electrical point as one of the antenna coil’s “two end terminals.” See Tr. 36:23–37:10.

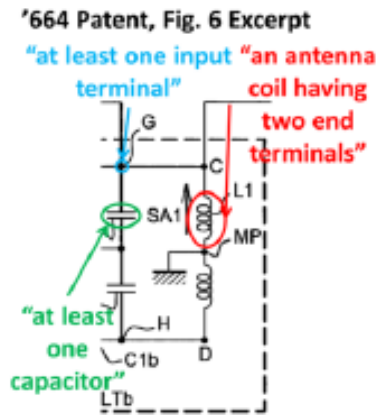
Third, Patent Owner contends that, in the context of the Specification of the ’664 patent, the “input terminal” and “two end terminals” are separate and “electrically distinct.” PO Resp. 6–10. In particular, Patent Owner contends that each of the embodiments disclosed in the Specification describes the “input terminal” and “two end terminals” as separate and “electrically distinct.” *Id.* at 9–10. Petitioner disagrees. Pet. Reply 10–12.

Patent Owner contends that, in each of the embodiments depicted in Figures 1B, 2A, 3A, 4, and 6 of the '664 patent, filters and capacitors are disposed between the “input terminal” and the “two end terminals” of the antenna coils. PO Resp. 9 (“[I]n every instance, points A and B[, i.e., the input terminal,] are electrically distinct points from point C and D[, i.e., two end terminals], having, for instance, a capacitor or a filter between A(B) and C(D).”); *see id.* at 7–8 (reproducing annotated versions of Figs. 1B, 2A, 3A, 4, and 6 of the '664 patent). Nevertheless, the disclosure of the Specification is not limited to the disclosed embodiments. *See* Ex. 1001, col. 4, l. 60–col. 5, l. 9. Petitioner argues that Patent Owner improperly seeks to incorporate limitations from the Specification into claims 13 and 29. Pet. Reply 9–10; *see* Ex. 1011 ¶¶ 26–27. As Dr. Tentzeris testifies,

There is no reference of a filter in the claim. So the presence of this filter could or could not exist in an antenna circuit. The way that the antenna circuit is defined in claims 13 and then the way it's defined in claims 29, does not include the filter.

Ex. 2003, 46:13–17. Absent a specific reason, limitations from the Specification should not be read into the claims. Pet. Reply 8; *see Van Geuns*, 988 F.2d at 1184.

In addition, Petitioner argues that Figure 6 of the Specification illustrates a capacitor and a coil where “point G is situated between the filter FLTa and the capacitor C1a and would correspond to an input terminal of the antenna circuit if the latter did not have the filter FLTa.” Pet. Reply 3 (citing Ex. 1001, col. 15, ll. 3–9). A portion of Figure 6 of the '664 patent, including Petitioner's annotations, is reproduced below.



Pet. Reply 4 (reproducing an annotated portion of Fig. 6); see Ex. 1001, col. 5, ll. 24–25 (“According to one embodiment, the auxiliary supply circuit is connected to one of the end terminals of the coil.”). As indicated by the annotated portion of Figure 6, Petitioner argues that point G may be the “input terminal” of the antenna circuit and that point G is not electrically distinct from point C, one of the “two end terminals” of coil L1. Thus, Petitioner argues that, contrary to Patent Owner’s contention, all embodiments of the antenna circuit disclosed in the Specification of the ’664 patent do *not* teach that the “input terminal” and the “two end terminals” are separate and “electrically distinct.” Tr. 12:17–13:5.

In response to Petitioner’s arguments, Patent Owner contended, for the first time during the oral hearing, that there is an error in the text of the Specification of the ’664 patent and that Figure 6 may not be interpreted in the manner that Petitioner argues. Tr. 20:21–22:2. Initially, we note that Patent Owner may not present new arguments or evidence for the first time at the oral hearing. See *id.* at 34:23–35:5. As we state in our Office Patent Trial Practice Guide,

[a] party may rely upon evidence that has been previously submitted in the proceeding and may only present arguments

relied upon in the papers previously submitted. *No new evidence or arguments may be presented at the oral argument.* 77 Fed. Reg. at 48,768 (emphasis added). Thus, Patent Owner's contention during the oral hearing that there is an error in Figure 6 is entirely improper.

Upon considering Figure 6 and the corresponding portions of the Specification text, however, we recognize that there appears to be an inconsistency between the drawing and the corresponding text of the '664 patent (Ex. 1001, col. 15, ll. 1–15). Specifically, the Specification text states that “point G is situated *between* the filter FLTa and the capacitor C1a” although Figure 6 depicts both the filter FLTa and the capacitor C1a as situated between point A and point G. At the oral hearing, Patent Owner contended that point G was drawn improperly (*see* Tr. 22:14–25), but it is unclear whether any error lies in the labeling of Figure 6 or in the description in the corresponding portions of the Specification text, or both.³ For example, if point G is situated properly in Figure 6, the textual error may lie in the reference to capacitor C1a, instead of capacitor C2b. Further, even if it had been properly presented,⁴ Patent Owner's modification to Figure 6 would require not only the relocation of point G, but the relocation of the

³ We note that, regarding the relative positions of points A, C, and G, Figure 6 of the '664 patent appears to be identical to Figure 6 of the French parent application. *See* Ex. 1002, 109. Thus, any error appears to have been present as of the priority date of the '664 patent and uncorrected since then. *See* Prelim. Resp. 8.

⁴ During the oral hearing, Patent Owner acknowledged that it had not filed a Certificate of Correction specifically identifying whether the supposed error was in Figure 6 or the text of the Specification and proposing a specific correction. Tr. 22:3–10. Moreover, a request for a Certificate of Correction relating to a patent involved in a trial before the Board must comply with 37 C.F.R. § 42.20. 37 C.F.R. § 1.323.

“classical demodulation circuit DEMCT” (see Ex. 1001, col. 12, ll. 1–4) coupled to point G and extending from the antenna circuit. Finally, each of Figures 1A and 1B of the ’664 patent depicts the “classical demodulation circuit DEMCT” attached to substantially the same point in the depicted reader as that depicted in Figure 6. *Id.* at Figs. 1A, 1B; see *supra* Section I.C. (reproducing Figures 1A, 1B, and 6). Figure 6 of the ’664 patent labels that attachment point “G”; Figures 1A and 1B of the ’664 patent depict the point, but do not label it. None of Figures 1A, 1B, 2A, 3A, 4, and 6 of the ’664 patent depicts a point *between* filter FLTa and capacitor C1a, as proposed by Patent Owner. Therefore, we are not persuaded that the modification proposed by Patent Owner is the proper correction for the inconsistency in the Specification, including Figure 6, of the ’664 patent.⁵

The parties cite no precedent mandating a preference for the text over the figures of the Specification when construing the claim terms, and, on this record, we find no reason here to prefer one over the other. See Tr. 22:3–23:3, 36:23–37:10. As it is, the noted inconsistency bears on the weight given the presented evidence regarding the context of the Specification to the disputed construction of the terms “input terminal” and “two end terminals.” Consequently, for the reasons set forth above, the embodiments disclosed in the Specification, considered together, do not persuade us to

⁵ Patent Owner does not address other potential inconsistencies in the figures of the ’664 patent that may bear on the construction of the term “input terminal” and has not explained or proposed corrections for those inconsistencies. See Tr. 30:3–33:6; see *also* Ex. 1001, Fig. 1B (depicting input terminal A disposed outside the antenna circuit ACT), Fig. 2A (depicting line “A”).

construe the challenged claims to require that the “input terminal” and the “two end terminals” are separate and “electrically distinct.”

“In claim construction, [the Federal Circuit] gives primacy to the language of the claims, followed by the specification. Additionally, the prosecution history, while not literally within the patent document, serves as intrinsic evidence for purposes of claim construction. This remains true in construing patent claims before the PTO.” *Tempo Lighting, Inc. v. Tivoli LLC*, 742 F.3d 973, 977 (Fed. Cir. 2014) (citing *In re Morris*, 127 F.3d 1048, 1056 (Fed. Cir. 1997)). Although we are persuaded that the additional claim terms may be properly construed based on the intrinsic evidence of record, we note that Petitioner’s declarant, Dr. Tentzeris, testifies that a person of ordinary skill in the art would have understood the claims

[to] state a shopping list of well-known and conventional electronic parts to create an antenna circuit in a text-book style configuration that a [person of ordinary skill in the art], or an Electrical Engineering student for that matter, could easily assemble by visiting an electronics store. A [person of ordinary skill in the art] could create the claimed antenna circuit by purchasing and assembling “at least one capacitor, and an antenna coil having two end terminals.” Naturally, any antenna circuit would require “at least one input terminal” to receive or send signals.

Ex. 1011 ¶ 24; *see id.* ¶¶ 22–32, 63 (challenging Patent Owner’s proposed constructions of these additional terms). Dr. Tentzeris testifies that any terminal of Figure 6, including terminals G and H could be input terminals consistent with the language of claims 13 and 29. *See* Ex. 2003, 43:6–48:12. Patent Owner provides no testimonial evidence challenging Dr. Tentzeris’s testimony.

After consideration of the parties' arguments and evidence, we determine that the broadest reasonable interpretation of an "input terminal" is "a point of entry into the antenna circuit" and of the "two end terminals" is "a point of entry into and a point of exit from opposite ends of the antenna coil." The "input terminal" and at least one of the "two end terminals" may be, but are not required to be, separate and "electrically distinct." Further, because the plain language of the challenged claims does not recite an express structural relationship between these limitations or functional relationships that impose structural relationships, we determine that, under the broadest reasonable interpretation of these terms, they describe any structural relationship within an antenna circuit, including, but not limited to, a structural relationship in which the "input terminal" and at least one of the "two end terminals" are not separate or electrically distinct.

3. *Other Claim Terms*

Neither party offers constructions of other terms in the challenged claims. See Pet. 7–8; PO Resp. 2–10. Only terms which are in controversy in this proceeding need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Therefore, no other claim terms require express construction.

III. ANALYSIS

A. Overview

Petitioner argues that claims 13 and 29 of the '664 patent are rendered obvious over Amtmann and ECMA-340 and Charrat and Kuhl. Pet. 3. A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). On this record, Petitioner demonstrates by a preponderance of the evidence that claims 13 and 29 are rendered obvious over Amtmann and ECMA-340 and over Charrat and Kuhl.

1. Person of Ordinary Skill in the Art

Petitioner’s declarant, Dr. Tentzeris, defines a person of ordinary skill in the art as “a person with at least a master’s degree in electrical engineering (or a substantively equivalent degree), in addition to two years of experience with systems that use short-range wireless communication, such as radio frequency identification (RFID) or Near Field Communication (NFC) systems.” Ex. 1003 ¶ 12; *see also* Pet. 7 (adopting this definition). Based on Exhibit 1003 (Attachment A), Dr. Tentzeris meets or exceeds these requirements for qualification as a person of ordinary skill in the art. Patent Owner does not propose an alternative definition or challenge Petitioner’s declarant’s definition. *See supra* Section II.A.2. Moreover, as noted above, Patent Owner does not challenge Dr. Tentzeris’s credentials. *Id.* Therefore,

⁶ Patent Owner does not contend in the Patent Owner Response that secondary considerations are present that would render the challenged claims patentable over the applied references. *See* Paper 11, 2–3.

to the extent necessary, we adopt Petitioner's Dr. Tentzeris's definition of a person of ordinary skill in the art.

2. Obviousness over Amtmann and ECMA-340

Petitioner contends that Amtmann discloses all of the limitations of challenged claims 13 and 29 of the '664 patent. Pet. 28–42. In particular, with regard to claim 13, Petitioner argues that Amtmann discloses “an input terminal,” an “an antenna coil having two end terminals,” and a “first impedance.” See Pet. Reply 14 (citing Ex. 1011 ¶ 38). For example, Amtmann discloses that the “antenna configuration (7) includes a transmission coil (5) connected in parallel to a capacitor (6) to form an oscillating circuit.” Pet. 32 (citing Ex. 1005, col. 5, ll. 29–40; Ex. 1003 ¶ 62); see Pet. Reply 14 (citing Ex. 1011 ¶¶ 38–39). The “[a]ntenna configuration (7) includes two input terminals (3) and (4) . . . [and a] [t]ransmission coil (5) [that] has two winding ends.” Pet. 32 (citing Ex. 1005 col. 5, ll. 11–28, 29–35; Ex. 1003 ¶¶ 63–65); see Pet. Reply 14 (citing Ex. 1011 ¶¶ 38–39). Petitioner further argues that Amtmann discloses the remaining limitations of challenged claims 13 and 29. Pet. 33–38; see *id.* at 38–42 (reciting disclosure of Amtmann corresponding to the limitations of claim 29).

Nevertheless, each of the challenged claims recites that

the antenna circuit is substantially tuned to the working frequency and has, at the working frequency . . . , a first impedance [and that] an emitter circuit that applies to the input terminal of the antenna circuit, when the reader is in the active operating mode, an excitation signal oscillating at the working frequency.

Ex. 1001, col. 16, ll. 47–53 (Claim 13), col. 18, ll. 28–35 (Claim 29). With respect to these limitations Petitioner argues that

[b]ecause the Amtmann antenna circuit controls a communication operation according to the NFC ECMA-340 standard, the Amtmann antenna circuit is tuned to a working frequency that is defined by the NFC ECMA-340 standard and needed for communications that comply with the NFC ECMA-340 standard. Ex. 1003, ¶ 65. Thus, capacitor (5) and coil (6) are chosen so that antenna configuration (7) is substantially tuned to the working frequency, e.g. a frequency in the NFC ECMA-340 standard. Ex. 1003, ¶ 65.

Pet. 33; see Ex. 1005, col. 1, ll. 31–35; Pet. Reply 14. Further, Petitioner argues that “[a]s measured with respect to input terminals (3) and (4), the parallel combination of coil (5) and capacitor (6) has an impedance”

Pet. 34 (citing Ex. 1003 ¶ 67); see Ex. 1011 ¶¶ 38–39.

Although the ’664 patent does not discuss the NFC ECMA-340 standard, Petitioner contends that

[a person of ordinary skill in the art] would have understood that coil (5) and capacitor (6) of Amtmann’s oscillating circuit are chosen so that Amtmann’s oscillating circuit operates at a working frequency. In addition, it would have been obvious to a [person of ordinary skill in the art], in referring to the ECMA-340 document, which describes the ECMA-340 NFC standard used in Amtmann, that Amtmann’s “working frequency” is the communication carrier frequency specified by the ECMA-340 NFC standard.

Pet. 43 (citing Ex. 1003 ¶ 84; Ex. 1005, col. 1, ll. 16–18).

Further, Petitioner explains that

[b]ecause ECMA-340 describes the particular NFC standard that is referenced in Amtmann as the standard used by Amtmann’s devices to perform contactless communication, a [person of ordinary skill in the art] would have naturally turned to the teachings in ECMA-340 to provide details of how to implement the NFC ECMA-340 standard that is specified in Amtmann. Ex. 1003, ¶ 86. In doing so, a [person of ordinary skill in the art] would have recognized that the “oscillating

circuit” in Amtmann should operate at a particular center frequency of 13.56 MHz, as specified in ECMA-340, in order to be compatible with other devices using the same NFC ECMA-340 protocol. *Id.* Therefore, the combination of Amtmann and ECMA-340 discloses “an antenna circuit substantially tuned to a working frequency” and “an emitter circuit that applies to the input terminal of the antenna circuit, when the reader is in the active operating mode, an excitation signal oscillating at the working frequency, so that the antenna coil emits a magnetic field, and that modulates the excitation signal to send data,” as well as all other features of Claims 13 and 29

Pet. 44–45 (emphasis added). Thus, Petitioner argues that Amtmann discloses all of the limitations of claims 13 and 29 and that a person of ordinary skill in the art, knowing that the Amtmann devices operate at the working frequency and according to the ECMA-340 standard, would have recognized that the “oscillating circuit” in Amtmann should operate at center frequency, as specified in ECMA-340, in order to be compatible with other devices using the same standard. *Id.* at 42–45. We agree with and adopt Petitioner’s analysis discussed above. *See KSR*, 550 U.S. at 421 (“When there is a design need . . . to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.”). Therefore, Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Amtmann and ECMA-340 and the combination of the teachings of Amtmann and ECMA-340 would achieve the apparatus recited in claims 13 and 29 of the ’664 patent. Pet. 45.

Patent Owner does not dispute Petitioner's argument that there was reason to combine the teachings of Amtmann and ECMA-340.⁷ Instead Patent Owner contends that, in view of its proposed constructions of the terms: "input terminal" and "two end terminals," the combination of Amtmann and ECMA-340 fails to teach or suggest all of the limitations of claims 13 and 29. PO Resp. 10–13. In particular, Patent Owner contends that

[i]n every instituted ground, HTC's alleged antenna input terminal is the same as HTC's alleged coil end terminals. *HTC does not identify an antenna circuit that has at least one input terminal that is separate and different from the end terminals of the antenna coil.* Because independent claims 13 and 29 require these features, claims 13 and 29 are patentable over the applied references.

Id. at 10–11 (emphases added). As noted above, however, we do not construe claims 13 and 29 to "require" the at least one input terminal of the recited antenna circuit to be separate and different, i.e., "electrically distinct" from the end terminals of the antenna coil. *See supra* Section II.A.2. Therefore, we are not persuaded by Patent Owner's contentions.

For the reasons set forth above, Petitioner demonstrates by a preponderance of the evidence that claims 13 and 29 are unpatentable over Amtmann and ECMA-340.

3. *Obviousness over Charrat and Kuhl*

With regard to Charrat and Kuhl, Petitioner maps Charrat onto each of the limitations of claims 13 and 29, except for an auxiliary supply circuit in an inductive coupling reader. Pet. 46, 49–56, 57–60. Further, Petitioner

⁷ See Paper 11, 2–3 ("The patent owner is cautioned that any arguments for patentability not raised in the response will be deemed waived.").

argues that Kuhl teaches or suggests the auxiliary supply circuit recited in claims 13 and 29. *See id.* at 46–49, 56–57. Finally, Petitioner argues that a person of ordinary skill in the art would have reason to combine the teachings of Charrat and Kuhl to achieve the devices recited in claims 13 and 29. *Id.* at 46–47, 47–48.

Petitioner argues that “Kuhl describes several *problems* encountered by users of RFID reader devices that rely solely on a separate power supply (such as Charrat’s reader device (RD1), which relies on an internal power supply (Vcc)).” *Id.* at 47–48 (emphasis added) (citing Ex. 1008, col. 44, ll. 4–19; Ex. 1007 ¶ 82; Ex. 1003 ¶ 120). Specifically, Petitioner notes that in situations in which the power supply of the RFID reader device either is not available or is not allowed to be used, Kuhl explains that such an RFID reader device may not be functional at all. *Id.* at 48 (citing Ex. 1008, col. 7, ll. 55–64; Ex. 1003 ¶ 120). In addition, Kuhl teaches a configuration that allows an RFID reader device to detect automatically when an internal power supply is not available, and to switch automatically to an auxiliary supply circuit and extract power from a received electromagnetic field. Ex. 1008, col. 7, ll. 26–35; *see* Ex. 1003 ¶ 121. Specifically, Kuhl teaches that, “[d]epending on the capability of the RFID tag reader unit 200, the antenna is adapted to communicate with a RFID tag in passive communication mode and with another RFID tag reader device 600 in active communication mode.” Ex. 1008, col. 7, ll. 32–35; *see* Ex. 1003 ¶ 121. Petitioner argues that a person of ordinary skill in the art would have recognized that these benefits would have been useful in Charrat’s reader, and, thus, a person of ordinary skill in the art would have had reason to combine the teachings of Kuhl’s auxiliary supply circuit with the teachings

of Charrat's reader. See Ex. 1003 ¶ 120. We agree with and adopt Petitioner's analysis discussed above. See *KSR*, 550 U.S. at 421.

Patent Owner does not dispute Petitioner's argument that there would have been a reason to combine the teachings of Charrat and Kuhl.⁸ Instead, Patent Owner contends that, in view of its proposed constructions of the terms: "input terminal" and "two end terminals," the combination of Charrat and Kuhl fails to teach or suggest all of the limitations of claims 13 and 29. PO Resp. 13–15. In particular, Patent Owner contends that

Independent claim 13 unambiguously requires that the antenna circuit's input terminal is separate and different from the end terminals of the antenna coil. Charrat's alleged antenna circuit's input terminal, in contrast, is the same as its alleged antenna coil's end terminals.

Id. at 10–11 (emphasis added). As noted above, however, we do not construe claims 13 and 29 to "require" the at least one input terminal of the recited antenna circuit to be separate and different, i.e., "electrically distinct" from the end terminals of the antenna coil. See *supra* Section II.A.2. Therefore, we are not persuaded by Patent Owner's contentions.

For the reasons set forth above, Petitioner demonstrates by a preponderance of the evidence that claims 13 and 29 are unpatentable over Charrat and Kuhl.

4. *Observations on Cross-Examination of Dr. Tentzeris*

Petitioner argues that, even if we accept Patent Owner's proposed constructions of the terms: "input terminal" and "two end terminals," the combination of Amtmann and ECMA-340 or of Charrat and Kuhl teaches or suggests all of the limitations of claims 13 and 29. Pet. Reply 19–20

⁸ See *supra* 23 n.5.

(Amtmann and ECMA-340), 23–24 (Charrat and Kuhl). Petitioner relies on the Declaration of Dr. Tentzeris in support of these alternative arguments. *See, e.g.*, Pet. Reply 19 (citing Ex. 1011 ¶¶ 49–50), 23 (citing Ex. 1011 ¶¶ 57–59). Patent Owner cross-examined Dr. Tentzeris regarding these alternative arguments and, in its Motion for Observation (Paper 26), challenges the testimony of Dr. Tentzeris in support of Petitioner’s arguments. *See also* Paper 30 (Petitioner’s Response to Patent Owner’s Motion for Observation). Because we do not construe the terms: “input terminal” and “two end terminals,” as proposed by Patent Owner; we do not reach Petitioner’s alternative arguments. Although we considered Patent Owner’s Motion for Observation, in view of our claim constructions, we find those observations to be moot.

IV. CONCLUSION

Petitioner demonstrates by a preponderance of the evidence that claims 13 and 29 of the ’664 patent are unpatentable.

V. ORDER

For the reasons given, it is

ORDERED that claims 13 and 29 of the ’664 patent are unpatentable as

1. rendered obviousness over Amtmann and ECMA-340, and
2. rendered obviousness over Charrat and Kuhl; and

FURTHER ORDERED that, because this is a final decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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