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Paper 103
Entered: May 22, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AVAYA INC., DELL INC., SONY CORPORATION OF AMERICA,
and HEWLETT-PACKARD CO.
Petitioners

v.

NETWORK-1 SECURITY SOLUTIONS, INC.
Patent Owner

Case IPR2013-00071[1]
Patent 6,218,930 B1

Before JONI Y. CHANG, JUSTIN T. ARBES, and GLENN J. PERRY, *Administrative Patent Judges.*

ARBES, *Administrative Patent Judge.*

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

[1] Cases IPR2013-00385 and IPR2013-00495 have been joined with this proceeding.

I. BACKGROUND

Petitioner Avaya Inc. ("Avaya") filed a Petition (Paper 1) ("Pet.) seeking *inter partes* review of claims 6 and 9 of U.S. Patent No. 6,218,930 B1 (Ex. 1001) ("the '930 patent") pursuant to 35 U.S.C. §§ 311-19. On May 24, 2013, we instituted an *inter partes* review of claims 6 and 9 on two grounds of unpatentability (Paper 18) ("-71 Dec. on Inst.").

This proceeding involves three other Petitioners in addition to Avaya. Subsequent to institution in Case IPR2013-00071, Dell Inc. ("Dell") filed a petition in Case IPR2013-00385 seeking *inter partes* review of claims 6 and 9 on the same grounds on which a trial was instituted in Case IPR2013-00071, and a motion for joinder with that proceeding. *See* IPR2013-00385, Papers 2, 4, 11. We instituted an *inter partes* review and joined Dell as a party to Case IPR2013-00071 in a limited capacity. *See* IPR2013-00385, Papers 16 ("-385 Dec. on Inst."), 17. Specifically, we ordered Avaya and Dell to file all papers, other than motions not involving the other party, as consolidated filings, and permitted Dell to file an additional paper addressing any points of disagreement with each consolidated filing if necessary. *See* IPR2013-00385, Paper 17 at 11. Over the course of this proceeding, Dell did not file any paper disagreeing with any filing made by Avaya.

Sony Corporation of America ("Sony") and Hewlett-Packard Co. ("HP") also filed a similar petition and motion for joinder in Case IPR2013-00495. *See* IPR2013-00495, Papers 3, 7. We instituted an *inter partes* review and joined Sony and HP as parties to Case IPR2013-00071 in a limited capacity. *See* IPR2013-00495, Papers 12, 13.

Avaya, Dell, Sony, and HP are all Petitioners for purposes of this proceeding. For ease of reference, however, we refer herein to arguments as being made by Avaya, the original Petitioner.

Patent Owner Network-1 Security Solutions, Inc. ("Network-1") filed a Patent Owner Response (Paper 44)[2] ("PO Resp."), and Avaya filed a Reply (Paper 56) ("Reply"). Along with its Patent Owner Response, Network-1 filed a Motion to Amend (Paper 43) ("Mot. to Amend"), proposing substitute claim 10 if the Board determines claim 6 to be unpatentable, and substitute claim 11 if the Board determines claim 9 to be unpatentable. Avaya filed an Opposition to the Motion to Amend (Paper 57), and Network-1 filed a Reply (Paper 65).

Avaya filed a Motion for Observation (Paper 80) ("Mot. for Obs.") on the cross-examination testimony of Network-1's declarant, James M. Knox, Ph.D., and Network-1 filed a Response (Paper 90) ("Obs. Resp.").

Avaya filed a Motion to Exclude (Paper 79) ("Pet. Mot. to Exclude") certain testimony of Dr. Knox submitted by Network-1 with Network-1's Reply to Avaya's Opposition to the Motion to Amend. Network-1 filed an Opposition to the Motion to Exclude (Paper 88), and Avaya filed a Reply (Paper 95). Network-1 also filed a Motion to Exclude (Paper 83) ("PO Mot. to Exclude") the expert report of Dr. Melvin Ray Mercer (Exhibit 1042) submitted by Avaya with its Reply to Network-1's Patent Owner Response. Avaya filed an Opposition to the Motion to Exclude (Paper 91), and Network-1 filed a Reply (Paper 94).

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[2] It appears that Network-1 filed two copies of its Patent Owner Response in the Patent Review Processing System (PRPS) as Papers 42 and 44. Paper 42 will be expunged.

An oral hearing was held on January 9, 2014, and a transcript of the hearing is included in the record (Paper 102) ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Avaya has not shown by a preponderance of the evidence that claims 6 and 9 of the '930 patent are unpatentable.

A. The '930 Patent

The '930 patent relates to "the powering of 10/100 Ethernet compatible equipment," specifically "automatically determining if remote equipment is capable of remote power feed and if it is determined that the remote equipment is able to accept power remotely then to provide power in a reliable non-intrusive way." Ex. 1001, col. 1, ll. 13-19. The '930 patent describes how it generally was known in the prior art to power telecommunications equipment, such as telephones, remotely, but doing so had not "migrated to data communications equipment" due to various problems, such as the high power levels required by data communications equipment. *Id*. at col. 1, ll. 22-32. The '930 patent describes a need in the art to power data communications equipment remotely and to "reliably determin[e] if a remote piece of equipment is capable of accepting remote power." *Id*. at col. 1, ll. 42-43.

Figure 3 of the ’930 patent is reproduced below.

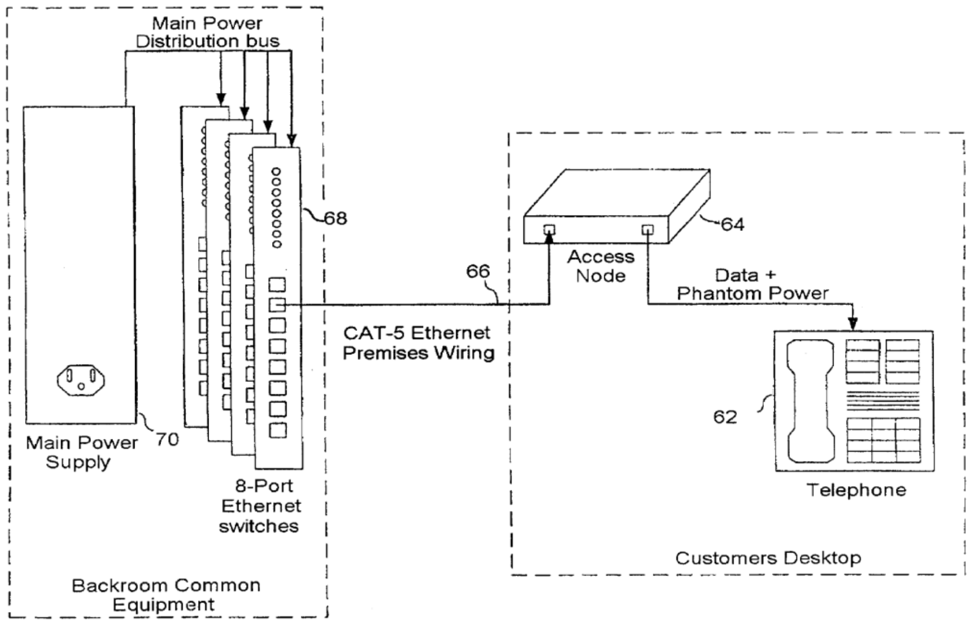


Fig. 3

Figure 3 depicts remote telephone 62 capable of receiving and transmitting both voice and data. *Id*. at col. 3, ll. 60-66. Telephone 62 is connected to access node 64 at the customer’s premises, and access node 64 is connected to one of the ports of Ethernet switch 68 via wiring 66 comprising “a Category 5 Ethernet 100BaseX cable of 4 sets of unshielded twisted pairs.” *Id*. Ethernet switch 68 comprises automatic remote power detector 22 (shown in Figure 1) and remote power supply 34 (shown in Figure 2). *Id*. at col. 4, ll. 1-4.

The preferred embodiment described in the ’930 patent operates as follows. A remote access device, such as the telephone shown in Figure 3, normally is powered by “an [alternating current] ac transformer adapter plugged in to the local 110 volt supply,” but may or may not be capable of being powered remotely. *Id*. at col. 2, ll. 40-44. The system detects whether the access device is capable of being powered remotely by “delivering a low level current (approx. 20 [milliamperes (mA)])” over existing twisted pairs of an Ethernet cable used for data signaling and "measuring a voltage drop in the return path." *Id*. at col. 2, l. 66-col. 3, l. 2; col. 3, ll. 44-48. If there is no voltage drop or a fixed voltage level is detected, the device is not capable of accepting remote power. *Id*. at col. 3, ll. 2-11. If a varying or "sawtooth" voltage level occurs (caused by the access device repeatedly beginning to start up but being "unable to sustain the start up" due to the low current level), the device is capable of accepting remote power. *Id*. at col. 3, ll. 12-22. The system then increases the power being supplied remotely to the access device. *Id*. Once the access device is operating under remote power, the system looks for removal of the access device and decreases the power being supplied when the device is no longer connected. *Id*. at col. 3, ll. 49-58.

B. Challenged Claims

Claims 6 and 9 of the '930 patent are the only claims at issue:

> 6. Method for remotely powering access equipment in a data network, comprising,
>
> providing a data node adapted for data switching, an access device adapted for data transmission, at least one data signaling pair connected between the data node and the access device and arranged to transmit data therebetween, a main power source connected to supply power to the data node, and a secondary power source arranged to supply power from the data node via said data signaling pair to the access device,
>
> delivering a low level current from said main power source to the access device over said data signaling pair,
>
> sensing a voltage level on the data signaling pair in response to the low level current, and

> controlling power supplied by said secondary power source to said access device in response to a preselected condition of said voltage level.
>
> 9. Method according to claim 6, including the step of continuing to sense voltage level and to decrease power from the secondary power source if voltage level drops on the data signaling pair, indicating removal of the access device.

C. Prior Art

The pending grounds of unpatentability in this *inter partes* review are based on the following prior art:

> 1. U.S. Patent No. 6,115,468, filed March 26, 1998, issued September 5, 2000 ("De Nicolo") (Ex. 1007); and
>
> 2. Japanese Unexamined Patent Application Publication No. H10-13576, published January 16, 1998 ("Matsuno") (Ex. 1004).[3]

D. Pending Grounds of Unpatentability

This *inter partes* review involves the following grounds of unpatentability:

Reference(s)	Basis	Claims
Matsuno	35 U.S.C. § 102(b)	6 and 9
De Nicolo and Matsuno	35 U.S.C. § 103(a)	6 and 9

[3] We refer to "Matsuno" as the English translation (Ex. 1004) of the original reference (Ex. 1002). Avaya provided an affidavit attesting to the accuracy of the translation. *See* Ex. 1003; 37 C.F.R. § 42.63(b).

II. ANALYSIS

A. Claim Interpretation

Consistent with the statute and legislative history of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), the Board interprets claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b); *see also* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). There is a "heavy presumption" that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). However, a "claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *Id*. "Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Also, we must be careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) ("limitations are not to be read into the claims from the specification").

1. "Low Level Current"

Avaya did not propose an interpretation for "low level current" in its Petition. Network-1, in its Preliminary Response, argued that the term means "a current at a level that is sufficiently low that it will not (a) operate the access device, or (b) damage an access device that is not designed to accept power through the data signaling pair." Prelim. Resp. 24. In the Decisions on Institution, we interpreted the term to mean a current (e.g., approximately 20 mA) that is sufficiently low that, by itself, it will not operate the access device. -71 Dec. on Inst. 7-10; Paper 21; -385 Dec. on Inst. 8-10. Avaya does not argue in its Reply that this interpretation is incorrect.

Network-1, however, argues in its Patent Owner Response that our prior interpretation should be modified slightly to account for the length of the data signaling pair. PO Resp. 3-4. Network-1 contends that, due to the resistance of the data signaling pair, a particular voltage at the data node could be sufficient to generate enough current to operate the access device if the length of the data signaling pair is very short, and at the same time not be sufficient to generate enough current to operate the same device when the data signaling pair is very long. *Id*. at 3 (citing Ex. 2015 ¶ 63). Therefore, according to Network-1, a "low level current" is one that is sufficiently low that it will not operate the access device "at all reasonable data signaling pair lengths (unless the system specifically precludes certain data signaling pair lengths)." *Id*. at 4. Avaya disagrees with Network-1's proposed interpretation, arguing that the Specification of the '930 patent never mentions the length of the data signaling pair. Reply 2.

We are not persuaded that our previous interpretation of "low level current" is incorrect, and incorporate our previous analysis for purposes of this decision. *See* -71 Dec. on Inst. 7-10; Paper 21; -385 Dec. on Inst. 8-10. Network-1's argument is premised on a particular voltage generating the "low level current," and on that voltage being sufficient to generate a "low level current" for some lengths of the data signaling pair but not for others.

Claim 6, however, does not recite or impose any conditions on a voltage generating the "low level current." All that is required is that the current be "low level." In addition, as explained in the Decisions on Institution, "low level current" is a term of degree, and we refer to the Specification of the '930 patent for a standard with which to measure that degree. *See* -71 Dec. on Inst. 7-10. The Specification does not mention the length of the data signaling pair or indicate its importance in connection with determining whether a current is "low level." Accordingly, applying the broadest reasonable interpretation, we interpret "low level current" in claim 6 to mean a current (e.g., approximately 20 mA) that is sufficiently low that, by itself, it will not operate the access device.

2. Other Terms

In the Decisions on Institution in Cases IPR2013-00071 and IPR2013-00385, we interpreted three other claim terms as follows:

Term	Interpretation
"data node adapted for data switching" (claim 6)	a data switch or hub configured to communicate data using temporary rather than permanent connections with other devices or to route data between devices
"data signaling pair" (claim 6)	a pair of wires used to transmit data
"sensing a voltage level on the data signaling pair" (claim 6)	sensing a voltage at a point on the pair of wires used to transmit data

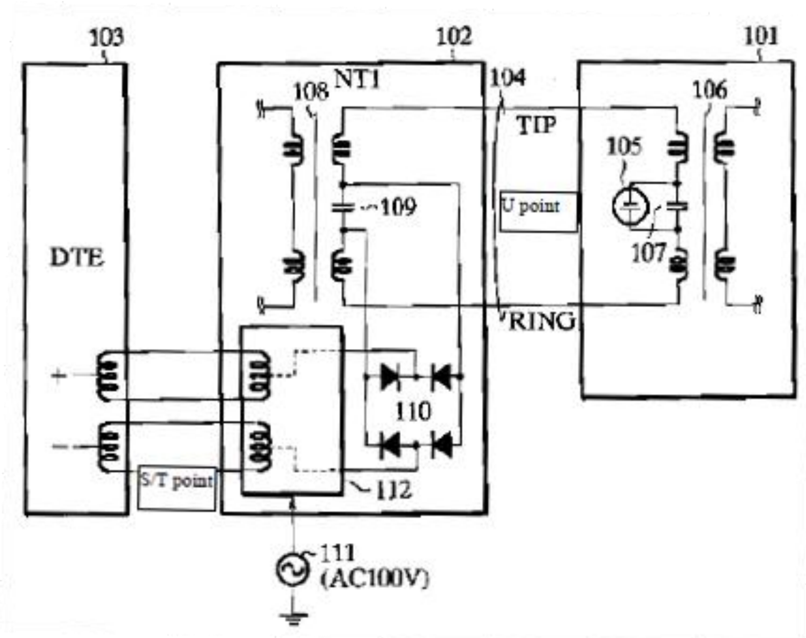
-71 Dec. on Inst. 10-14; -385 Dec. on Inst. 11-13. Further, we did not interpret "main power source" and "secondary power source" in claim 6 as requiring physically separate devices. -71 Dec. on Inst. 13-14. We incorporate our previous analysis for purposes of this decision.

B. Anticipation by Matsuno

With respect to the alleged anticipation of claims 6 and 9 by Matsuno, we have reviewed Avaya's Petition, Network-1's Patent Owner Response, and Avaya's Reply, as well as the evidence discussed in each of those papers. We are not persuaded, by a preponderance of the evidence, that claims 6 and 9 are anticipated by Matsuno under 35 U.S.C. § 102(b).

1. Matsuno

Matsuno discloses a "power supply circuit that switches power supply voltage and supplies the desired power while ensuring safety." Ex. 1004, Abstract. Matsuno describes a prior art "conventional example" of remote power supply in an Integrated Services Digital Network (ISDN), as shown in Figure 11 reproduced below.



Id. ¶ 2. Figure 11 depicts subscriber terminal (DTE) 103, network terminal device (NT1) 102, and power supply circuit 101. *Id*. Power supply circuit 101, having power source 105, is capable of supplying power to NT1 102 over digital subscriber line 104, which comprises a TIP line and RING line. *Id*. ¶¶ 2-3. NT1 102 and DTE 103 may be powered locally by commercial AC power source 111, or may be powered by "station power supply" from power supply circuit 101 when local power is unavailable. *Id*. ¶¶ 3-4. Matsuno discloses the following with respect to Figure 11:

> When the commercial AC power source 111 is functioning normally, for example, an AC current of 100 V is rectified in the phantom power supply part 112 and is converted to a prescribed voltage, for example, a *DC voltage of 40 V*, for use as the local power supply that is supplied to the subscriber terminal 103. Switching to the aforementioned station power supply occurs with shutdown of the commercial AC power supply, and *power sufficient to allow minimal communication on the digital subscriber terminal 103 is thus supplied*.

Id. ¶ 4 (emphasis added).

According to Matsuno, the high voltages required in conventional arrangements of the type shown in Figure 11 cause various safety problems. *Id*. ¶¶ 5-6. To address those problems, Matsuno discloses a particular remote power supply arrangement that "suppl[ies] a prescribed power level while maintaining safety by applying a low voltage during local power supply and a high voltage during station power supply." *Id*. ¶ 6.

Figure 1 of Matsuno is reproduced below.

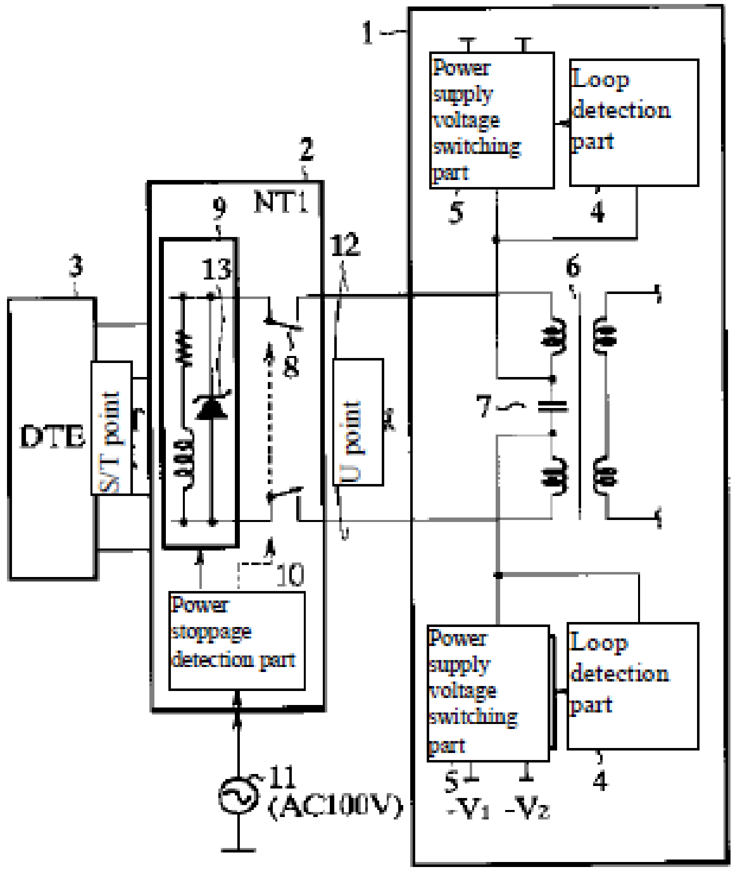


Figure 1 depicts DTE 3 and NT1 2 in communication with power supply circuit 1 in an ISDN "switching station" over digital subscriber line 12. *Id.* ¶ 16. NT1 2 typically is powered by local AC power supply 11, and powers DTE 3. *Id.* ¶ 8. When local power is available, contact breaker point 8 in NT1 2 is OFF, loop detection part 4 in power supply circuit 1 detects no DC loop, and power supply circuit 1 supplies "low voltage V_2" (-48 V) to digital subscriber line 12. *Id.* ¶¶ 7-8, 18-20. When local power stops, the stoppage is detected by power stoppage detection part 10 in NT1 2, contact breaker point 8 turns ON, loop detection part 4 detects the resulting DC loop, and power supply circuit 1 switches to "high-voltage V_1" (-120 V), "thereby allowing the desired power to be supplied from the station." *Id.*

2. Avaya's Contentions Regarding Matsuno

In its Petition, Avaya identifies the following devices in Matsuno as disclosing the various devices recited in claim 6:

Claim Limitation	Identified Device(s) in Matsuno
"data node adapted for data switching"	ISDN switching station (including power supply circuit 1)
"data network"	ISDN network
"access device"	network terminal device (NT1) 2, "either alone or in combination" with subscriber terminal (DTE) 3
"data signaling pair"	subscriber line 12
"main power source"	a power supply of the switching station providing "a standard -48V supply"
"secondary power source"	power supply circuit 1 applying current from -120 V

Pet. 18-24.[4] Avaya's declarant, George A. Zimmerman, Ph.D., identifies the same devices in his declaration served with the Petition. Ex. 1011 ¶¶ 30-37.

As to the step of "delivering a low level current from said main power source to the access device over said data signaling pair," Avaya argues that the ISDN switching station in Matsuno "provides a low level current/voltage ($-V_2$) to an access device (NT1/DTE) over the data signaling pair (subscriber line 12)." Pet. 20-21. Avaya further includes a claim chart citing paragraphs 6, 7, 18, 20, and 22, and claims 1-9, of Matsuno, which describe

[4] Dell's Petition asserts the same ground of unpatentability based on Matsuno and makes the same arguments as Avaya does in its Petition. *Compare* Pet. 18-24, *with* IPR2013-00385, Paper 2 at 17-24.

"low-voltage power supply" V_2 (-48 V). *Id*. at 24. Dr. Zimmerman testifies as follows:

> Matsuno further describes how, in response to providing a low level current, such as -V_2, it detects a resulting voltage or current and, based on that detected voltage or current, it then controls whether to provide a high voltage or a low voltage. See e.g., Matsuno (AV-1004), ¶¶ (0018) - (0020), (0033), (0035), (0036) and (0039). Thus, Matsuno teaches the same general approach to controlling power as claim 6 in the '930 Patent.

Ex. 1011 ¶ 40. Thus, Avaya's position, as argued in the Petition, is that the current generated from low voltage V_2 (-48 V) in Matsuno is a "low level current" as recited in claim 6.

As to the step of "sensing a voltage level on the data signaling pair in response to the low level current," Avaya cites loop detection part 4 in power supply circuit 1, which detects "the voltages at both terminals of the constant-current circuits 21a and 21b" (shown in Figure 2 of Matsuno). Pet. 21, 25 (citing Ex. 1004 ¶ 33) (emphasis omitted).

As to the step of "controlling power supplied by said secondary power source to said access device in response to a preselected condition of said voltage level," Avaya argues that Matsuno controls the power supplied to NT1 2 and DTE 3 by increasing the voltage from low voltage V_2 (-48 V) to high voltage V_1 (-120 V) when local power is unavailable. *Id*. at 21, 25 (citing Ex. 1011 ¶ 40).

3. Analysis

For the reasons explained below, we conclude that Avaya has not shown, by a preponderance of the evidence, that Matsuno discloses "delivering a low level current from said main power source to the access device over said data signaling pair," as recited in claim 6. It is Avaya's burden to establish that Matsuno discloses the "low level current" step. *See* 35 U.S.C. § 316(e); *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1255-56 (Fed. Cir. 1989) ("Anticipation requires that every limitation of the claim in issue be disclosed, either expressly or under principles of inherency, in a single prior art reference."). Avaya's position, as argued in the Petition, is that the current generated from low voltage V_2 (-48 V) in Matsuno is a "low level current." Pet. 20-21, 24. Thus, Avaya must show sufficient proof, amounting to a preponderance of the evidence, that such current is a "low level current," which we interpret to mean a current (e.g., approximately 20 mA) that is sufficiently low that, by itself, it will not operate the access device. Avaya has not done so.

a. Avaya Has Not Shown That Matsuno Expressly or Inherently Discloses the "Low Level Current" Recited in Claim 6

We begin by noting that Avaya does not point to any express statement in Matsuno that the current generated from low voltage V_2 (-48 V) is insufficient by itself to operate the alleged "access device" in Matsuno (i.e., the NT1, either alone or in combination with the DTE). Avaya's declarant, Dr. Zimmerman, acknowledged this lack of disclosure during cross-examination:

> Q. Does Matsuno anywhere expressly state that the 48 volts is insufficient to operate a DTE that requires 40 volts?
>
> A. Matsuno does not expressly state that 48 volts delivered at the U interface point would be insufficient.
>
> . . .

> Q. Does Matsuno disclose that the 48 volts would be insufficient to operate the NT1?
>
> A. He doesn't discuss that at all.

Ex. 2016 at 36:24-37:3, 39:6-8. Indeed, throughout its disclosure, Matsuno speaks in terms of voltage, not current. *See*, *e.g.*, Ex. 1004 ¶¶ 4, 7, 18-20. Matsuno discloses, for example, "high-voltage V_1 of -120 V and low voltage V_2 of -48 V," but never discloses the specific amount of current that is generated on digital subscriber line 12 from low voltage V_2 (-48 V). *See id*. ¶ 18; *see also id*. ¶ 19 (stating that "the desired current" is supplied upon the application of high voltage V_1 (-120 V), but not providing a precise amount). Nor does Matsuno disclose the specific amount of current that would be needed for the NT1 or DTE to operate. Thus, we simply cannot compare one level of current to another to determine whether what Avaya identifies as a "low level current" is sufficient.

Similarly, Dr. Zimmerman acknowledged that the current generated from low voltage V_2 (-48 V) is not inherently sufficient or insufficient for at least the DTE to operate. Dr. Zimmerman testified as follows:

> Q. Is it inherent in Matsuno that the 48 volts would be insufficient to operate the DTE?
>
> A. It is not inherent. It is implied.
>
> . . .
>
> Q. Is it the case that, if we have a relatively short subscriber line, that 48 volts would be sufficient to power a DTE?
>
> A. Not necessarily. And Matsuno doesn't really speak to that at all.

Ex. 2016 at 38:17-19, 42:20-24. Avaya's position, therefore, appears to be that, although not expressly stated in Matsuno, it is implicit that the current generated from low voltage V_2 (-48 V) is insufficient by itself to operate the NT1 and DTE.

What Avaya relies on—and what we found in the Decisions on Institution to indicate a reasonable likelihood of prevailing—are two statements that Matsuno makes about how its devices operate. First, paragraph 4 of Matsuno discloses the following:

> When the commercial AC power source 111 is functioning normally, for example, an AC current of 100 V is rectified in the phantom power supply part 112 and is converted to a prescribed voltage, for example, a DC voltage of 40 V, for use as the local power supply that is supplied to the subscriber terminal 103. Switching to the aforementioned station power supply occurs with shutdown of the commercial AC power supply, and *power sufficient to allow minimal communication on the digital subscriber terminal 103 is thus supplied*.

Ex. 1004 ¶ 4 (emphasis added). Avaya did not rely specifically on this language in its Petition, but cites the language in its Reply for the proposition that if "minimal communication" is provided when the high voltage source in Matsuno (120 volts according to Avaya) is in effect, the low voltage source (48 volts according to Avaya) must not generate enough current for the NT1 and DTE to operate. *See* Reply 4; Ex. 1041 ¶ 36.

We are not persuaded that Avaya's assumption necessarily follows from the statement in paragraph 4. The cited statement appears in the context of Matsuno's discussion of the prior art arrangement shown in Figure 11, not the description of Figures 1 and 2 that Avaya relies on as allegedly teaching the method of claim 6. *See* Ex. 1004 ¶¶ 2, 4; Pet. 24. It is not clear that the station power supply in the prior art arrangement is necessarily the same as the high voltage power supply V_1 (-120 V) in the disclosed invention. Matsuno also does not describe in any detail what is meant by "minimal communication," or indicate whether such communication equates with overall operation of the NT1 and DTE. Further, as Dr. Knox points out, just because one power level is sufficient for "minimal communication" does not mean necessarily that a lower power level is not. *See* Ex. 2015 ¶ 120 ("if I said that 10 watts is sufficient to power a device, it is not expressed or inherent that 9 watts, 8 watts, or any other wattage would be insufficient to power the device").

Paragraph 4 of Matsuno cannot necessarily be read in the manner proposed by Avaya for another reason as well. Matsuno's discussion of the Figure 11 prior art arrangement continues in paragraphs 5 and 6:

> The voltage of station power supply for analog subscriber lines is generally -48 V. However, in regard to the voltage for a station power supply for a digital subscriber line 104, in order to provide the prescribed power to the subscriber terminal 103, for example, the line voltage is taken to be about 120 V for the power supply power source 105 of the power supply circuit 101. In addition, because the digital subscriber line 104 runs into the home of the consumer, it is desirable to ensure safety by decreasing the line voltage of the digital subscriber line 104 in the home of the subscriber.
>
> *During station power supply, the line impedance of the digital subscriber line 104 in the network terminal device 102 becomes small, and the line voltage is sufficiently reduced. However, during local power supply, the line impedance of the digital subscriber line 104 is large, and thus the line voltage is, for example, 85 to 105 V.* This type of voltage has been problematic in terms of safety when applied as the line voltage for the digital subscriber line 104 that runs into the homes of subscribers. An object of the present invention is to supply a prescribed power level while maintaining safety by applying a low voltage during local power supply and a high voltage during station power supply.

Ex. 1004 ¶¶ 5-6 (emphasis added). Figure 11 depicts one remote power supply, which is not the 48 volt power supply of the disclosed invention. *See id*. ¶ 2, Fig. 11. When local power is available in Figure 11, the line impedance is large and the line voltage is 85-105 V. *Id*. ¶ 6. Conversely, when station power is being supplied, the line impedance is low and the line voltage is reduced below 85 V. *Id*. Avaya contends that "minimal communication" is permitted upon switching to a 120 V power supply. *See* Reply 4. Paragraph 6 above, however, indicates that a line voltage of less than 85 V available to the NT1 and DTE would be sufficient for operation. *See* Ex. 1004 ¶ 6. Matsuno does not disclose precisely what that line voltage is, but does state that 40 V is sufficient during local power supply. *Id*. ¶¶ 4, 6. Thus, reading the "minimal communication" language in context with the following paragraphs describing the same prior art arrangement, we are not persuaded by Avaya's argument that operation/"minimal communication" is only available based on high voltage V_1 (-120 V).[5]

Second, Matsuno discloses that low voltage V_2 (-48 V) is applied when the NT1 and DTE are operating under local power, but high voltage V_1 (-120 V) is applied if the local power fails. *See* Ex. 1004 ¶¶ 7-8, 18-22. Citing our analysis in the Decisions on Institution, Avaya in its Reply concludes that if the low voltage power supply was sufficient by itself to operate the access device, there would be no need to switch to high voltage when local power is unavailable. Reply 3 (citing -385 Dec. on Inst. 15).

[5] We note that Network-1 presented this argument for the first time at the hearing. *See* Tr. at 36:10-38:7. We exercise our discretion to consider this argument, however, given the fact that Avaya did not make its "minimal communication" argument in the Petition, and only raised the argument for the first time in its Reply.

Certainly, this reading is one assumption that one might make based on the disclosure of Matsuno. Given the lack of express disclosure in Matsuno as to whether the current generated from low voltage V_2 (-48 V) is sufficient to operate the NT1 and DTE, however, it is not the only possible one. As explained herein, Network-1 has come forward with sufficient evidence and reasoning, particularly with respect to Dr. Knox's testimony, to put that assumption into question. Dr. Knox also provides numerous reasons why the opposite would be true (i.e., high voltage is used even though the NT1 and DTE would operate based on the low voltage). Ex. 2015 ¶ 118. According to Dr. Knox, (1) some devices may need extra power for certain functionality, (2) some devices may operate more efficiently at higher voltages, (3) higher power would allow for additional premises equipment beyond a single DTE, (4) transmitting power at higher voltages would be more cost effective for the telephone company, and (5) higher power would allow devices to operate at full functionality over very long subscriber loop runs. *Id*. Avaya does not argue in its Reply that the reasons cited by Dr. Knox are technically incorrect or not possible, and we find them persuasive.

The fact that Matsuno does not disclose expressly that the current generated from low voltage V_2 (-48 V) is insufficient to operate the NT1 and DTE forces Avaya to attempt to make certain assumptions based on what Matsuno does disclose. Those assumptions, although possible, are not enough to prove by a preponderance of the evidence that Matsuno expressly or inherently discloses the "low level current" recited in claim 6.

b. Dr. Knox's Analysis is Persuasive That the Identified Current in Matsuno is Not a "Low Level Current"

In its Patent Owner Response, Network-1 relies extensively on the testimony of Dr. Knox (Exhibit 2015).[6] PO Resp. 2-14. Dr. Knox describes various disclosures in Matsuno, performs a technical analysis based on the limited detail provided in Matsuno and "conservative" assumptions, and concludes that the current generated from low voltage V_2 (-48 V) would be sufficient to operate the NT1 and DTE in Matsuno. Ex. 2015 ¶¶ 97-120. We find Dr. Knox's analysis persuasive.

First, Dr. Knox cites paragraph 4 of Matsuno, but draws a different conclusion from it than Avaya did. Paragraph 4 reads:

> When the commercial AC power source 111 is functioning normally, for example, an AC current of 100 V is rectified in the phantom power supply part 112 and is converted to a prescribed voltage, for example, *a DC voltage of 40 V*, for use as the local power supply that is supplied to the subscriber terminal 103. Switching to the aforementioned station power supply occurs with shutdown of the commercial AC power supply, and power sufficient to allow minimal communication on the digital subscriber terminal 103 is thus supplied.

Ex. 1004 ¶ 4 (emphasis added); *see* Ex. 2015 ¶ 100. Matsuno discloses in paragraph 4 that the NT1 and DTE, in normal operation, can operate based on a current generated from 40 V (rectified from the 100 V provided by the AC power source).[7] Ex. 2015 ¶ 100. Dr. Knox, therefore, concludes that because the NT1 and DTE are capable of operating based on 40 V, low

[6] It appears that Network-1 filed two copies of Exhibit 2015 in PRPS. The duplicate copy will be expunged.

[7] Dr. Zimmerman agrees that "the only voltage identified in Matsuno that would be potentially needed by a subscriber terminal, a DTE, is the 40 volts." Ex. 2016 at 32:4-8.

voltage V_2 (-48 V) in Matsuno also is sufficient to operate the devices because it can provide more power to a given load than 40 V. *Id*. ¶ 102; *see* PO Resp. 8. Dr. Knox also notes that Matsuno never states that 40 V is the minimum operating voltage—it just indicates that 40 V is sufficient for operation, such that voltages below 40 V may be sufficient as well. *Id*. ¶ 100.

Avaya's response is that "a *local* power source providing 40 V says nothing about the amount of *current* that is required to operate the equipment." Reply 4 (emphasis in original). As explained above, however, Avaya is relying on two voltages at the power supply circuit (48 volts and 120 volts) in arguing that the current generated from low voltage V_2 (-48 V) is insufficient to operate the NT1 and DTE. *See* Pet. 20-21, 24; Reply 3. Again, Matsuno does not speak in terms of current—it only discloses voltages. Thus, even if Dr. Knox's assumptions regarding the disclosed 40 volts are unfounded, so are Avaya's assumptions regarding the 48 volts and 120 volts. At the very least, it is questionable as to what the language in Matsuno means, which does not amount to a preponderance of the evidence in favor of Avaya.

Second, Dr. Knox cites the following statement in Matsuno: "[L]ow voltage is supplied to the digital subscriber line 12. The voltage to ground or the line voltage of the digital subscriber line 12 that runs into the home of the subscriber is thus at *approximately 48 V*, allowing safety to be ensured." Ex. 1004 ¶ 26 (emphasis added). Dr. Knox concludes that, based on this disclosure, when low voltage V_2 (-48 V) is applied by the power supply circuit in Matsuno, the line voltage at the subscriber is approximately 48 volts. Ex. 2015 ¶ 103. Dr. Knox then explains why the approximately 48 V line voltage would be sufficient for operation. *Id*. ¶ 104. When local power is available, the NT1 and DTE operate based on 40 V. *Id*. Polarity guard 110 in Figure 11 causes a voltage drop of approximately 1.2 V, leaving a "headroom" difference of 6.8 V between the supplied 48 V and the required 41.2 V. *Id*. Dr. Knox, therefore, concludes that "the 48 volt current disclosed in Matsuno is sufficient to power the specific access device disclosed in Matsuno that requires a current from a 40 volt source." *Id*. ¶ 103.

Avaya disputes that approximately 48 V is available at the NT1 in Matsuno, relying on the testimony of Dr. Zimmerman. Reply 4-5 (citing Ex. 1041 ¶¶ 32-35). Dr. Zimmerman testifies that only "about 8 V of potential would be available to the NT1/DTE, which . . . would be well below any level of voltage that could operate such an NT1/DTE, and certainly well below the 41.2 volts that Dr. Knox's calculations rely on." Ex. 1041 ¶ 32. Dr. Zimmerman bases his conclusion on the fact that 40 V of potential is lost across the digital subscriber line when providing high voltage power. *Id*. (citing Ex. 1004 ¶¶ 20, 27). According to Dr. Zimmerman, a corresponding amount of potential would be lost when providing low voltage power because the "voltage drop is a function of power supply efficiency (in the NT1) and the resistance seen on the line." *Id*. Also, contrary to Dr. Knox's reading, Dr. Zimmerman interprets paragraph 26 of Matsuno to describe "the situation when the breakers 8 are open so only minimal current flows," and "[w]hen local power is lost and the breakers 8 close, . . . only about 8 V would be available at the NT1/DTE." *Id*. ¶ 35.

Avaya's arguments are not persuasive, as they would require us to ignore the express language in Matsuno. Matsuno states plainly that "the line voltage of the digital subscriber line 12 that runs into the home of the subscriber is thus at approximately 48 V." Ex. 1004 ¶ 26. Indeed, Dr. Zimmerman testified as follows:

> Q. Is it your understanding that in the Matsuno reference, it discloses that the 48-volt low-level current will provide 48 volts to the subscriber at his home?
>
> A. It says "approximately 48 volts," but yes.

See Ex. 2016 at 28:4-8. Matsuno does not state that the line voltage at the subscriber *is* 48 V, but rather that it is "approximately" 48 V (most likely slightly less than 48 V due to the line resistance). Dr. Knox's explanation as to the line voltage of "approximately" 48 V is persuasive. *See* Ex. 2015 ¶¶ 103-104.

Third, Dr. Knox performs a set of calculations to determine whether the NT1 and DTE in Matsuno would be capable of operating based on the 48 volts applied at the power supply circuit. Ex. 2015 ¶¶ 105-14. In doing so, Dr. Knox makes a number of "conservative" "worst case assumptions" due to the limited detail available in Matsuno:

(1) The 40 V applied to the NT1 and DTE is the "minimum voltage" for operation, even though Matsuno does not state that to be the case and a reference book (Nick Burd, THE ISDN SUBSCRIBER LOOP 126 (1997) ("Burd") (Ex. 2019)) indicates that NT1 devices of the time required only 28 V;

(2) The 40 V represents the voltage presented internal to the NT1, not the voltage at the U-feed;

(3) The NT1 alone consumes 500 mW of power when active (based on Burd), additional power is required for the DTE, and the NT1 and DTE together consume 1.1 watts in "emergency" conditions. Dr. Knox refers to a "Cisco Unified IP Phone 6945" specification, which "does not give the actual power requirement, but under Class 1 it

> can use no more than 3.84 watts," and "[t]his reasonably allows the [Voice over Internet Protocol] VoIP phone and NT1 to fall within the 1.1 watt emergency power feed when local power is not available."; and
>
> (4) "Standard telco subscriber line wiring is 24 gauge (although some older lines do use 26 gauge). The American Wire Gauge guide gives the resistance for 24 gauge solid copper wire as 25 ohms per 1000 feet (under standard temperature = 20 degrees C)."

Id. ¶ 106-110, 112. Assuming the 1.1 watt maximum for both devices and the actual 40 V disclosed in Matsuno, Dr. Knox calculates that the current on the digital subscriber line would be 27.5 milliamps, and "[t]his current would be the same at all points along the subscriber line, regardless of line loop distance." *Id.* ¶ 111. Dr. Knox further testifies:

> If we use the previously calculated value of 41.2 volts needed at the NT1 U-feed interface to power both the NT1 and the DTE, the voltage drop which will sustain that is 6.8 volts. From ohms law this equates to:
>
> R = E / I = 6.8 / 0.0275 = 247 ohms.
>
> At 25 ohms per 1000 feet, this produces run of 9,890 feet of 24 gauge wire, or (twisted pair) a subscriber loop of 4,945 feet from the last telco power supply to the subscriber. This means that, at the lowest voltage provided from the telco as disclosed in Matsuno, *every NT1 (with a valid DTE) within 4,945 feet of the telco power (station or repeater) would be operational*. Put into other terms, an average suburban lot in the United States is frequently given as 75' x 120' (although many are much smaller in more crowded areas). Using the above figures, the Matsuno invention, as disclosed, would successfully operate approximately 8,500 homes with NT1/DTE installations based on the lower voltage of 48 volts without any additional or higher power. The number of NT1/DTE installations could theoretically be much higher (for example, if an office building is located within the operating radius which could incorporate many NT1/DTE installations).

Id. ¶ 114 (emphasis in original).

Avaya and Dr. Zimmerman dispute the assumptions made by Dr. Knox in his analysis. For example, Avaya contends that Dr. Knox's assumption for line resistance (247 ohms) and subscriber service area (4945 feet) are lower than the ISDN standards for North America (1300 ohms and 18,000 feet, respectively). Reply 2 (citing Ex. 1041 ¶¶ 18-23). Dr. Knox, however, explains in his declaration how he calculated the line resistance and subscriber service area, based on figures from Matsuno itself and other assumptions that Avaya does not challenge. Ex. 2015 ¶¶ 111-14. Avaya does not explain sufficiently why the identified standards would apply necessarily to the system disclosed in Matsuno. Further, Matsuno does not disclose the actual length for its digital subscriber line. Thus, some assumption must be made, and we are not persuaded that Dr. Knox's assumptions are unreasonable under the circumstances.

Avaya further argues that Dr. Knox's assumption of a maximum power requirement of 1.1 watts for the NT1 and DTE is unreasonable because it is based on a specification for a Cisco "Class 1" device not introduced until 15 years after Matsuno. Reply 2 (citing Ex. 1041 ¶¶ 24-25). In addition, Avaya contends that Dr. Knox admitted on cross-examination that Cisco "Class 2" or "Class 3" devices would not be "guaranteed" to operate based on Matsuno's low voltage power supply. *Id*. at 2-3 (citing Ex. 1041 ¶¶ 27-31; Ex. 1028 at 54:12-24). Although Dr. Knox bases his "conservative" power requirement assumption on a device introduced later in time, we cannot say that the assumption is incorrect or unfounded given the lack of detailed disclosure in Matsuno. Again, because Matsuno does not state expressly the power required by the NT1 and DTE, some assumption must be made. Avaya does not explain sufficiently why the "Class 2" and "Class 3" devices would be any better for making that assumption than the "Class 1" device identified by Network-1. Nor did Avaya and Dr. Zimmerman include any such analysis in the Petition and initial declaration.

For the reasons explained above, we find Dr. Knox's analysis persuasive. We also note, as a final matter, that none of the points raised by Dr. Zimmerman in his reply declaration (Exhibit 1041) were made in his initial declaration (Exhibit 1011) served with the Petition, or in the Petition itself. Unlike Dr. Knox, Dr. Zimmerman did not analyze the disclosure of Matsuno in detail and prepare a technical analysis explaining why the identified current is or is not a "low level current."[8] We have reviewed Dr. Zimmerman's new analysis only to determine whether it refutes the points made by Dr. Knox in his declaration. We have not considered it as part of Avaya's attempt to make out a *prima facie* case of unpatentability of the challenged claims. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012); Rules of Practice for Trials Before the Patent Trial and Appeal Board and Judicial Review of Patent Trial and Appeal Board Decisions; Final Rule, 77 Fed. Reg. 48,612, 48,620 (Aug. 14, 2012) ("Oppositions and replies may rely upon appropriate evidence to support the positions asserted. Reply evidence, however, must be responsive

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[8] Dr. Zimmerman states in his reply declaration that, in forming his opinion that Matsuno discloses a "low level current," he "applied the Board's broadest reasonable construction" from our Decision on Institution in this proceeding. Ex. 1041 ¶ 16. Dr. Zimmerman, however, did not provide an interpretation for "low level current" in his initial declaration, and our Decision on Institution was entered after Avaya filed Dr. Zimmerman's initial declaration.

and not merely new evidence that could have been presented earlier to support the movant's motion.").

c. Conclusion

Matsuno does not expressly or inherently disclose that the current generated from low voltage V_2 (-48 V) is a "low level current," i.e., a current (e.g., approximately 20 mA) that is sufficiently low that, by itself, it will not operate the access device. Avaya and Dr. Zimmerman rely on various statements in Matsuno not directly disclosing the identified current, and based on those statements conclude that the identified current is insufficient. In response, Network-1 provides persuasive evidence to the contrary, or, at the very least, evidence showing that Avaya's conclusions are not the only ones that can be drawn from the language of Matsuno. Upon review of all of the evidence, we do not find the disclosure in Matsuno to be sufficiently clear to allow a determination that the identified current is a "low level current." Therefore, Avaya has not shown, by a preponderance of the evidence, that claim 6, and claim 9 depending therefrom, are anticipated by Matsuno.

C. Obviousness over De Nicolo and Matsuno

With respect to the alleged obviousness of claims 6 and 9 over De Nicolo and Matsuno, we have reviewed Avaya's Petition, Network-1's Patent Owner Response, and Avaya's Reply, as well as the evidence discussed in each of those papers. We are not persuaded, by a preponderance of the evidence, that claims 6 and 9 are unpatentable over De Nicolo and Matsuno under 35 U.S.C. § 103(a).

In its Petition, Avaya relies on De Nicolo as teaching the "providing" step of claim 6, including the claimed devices of a data node, access device, data signaling pair, and power sources. Pet. 36-42. Avaya relies on Matsuno as teaching the remaining steps, including "delivering a low level current from said main power source to the access device over said data signaling pair." *Id*. at 36-43. Avaya does not contend that delivery of a "low level current" would have been obvious in view of the combination of De Nicolo and Matsuno. For the reasons explained above in Section II.B, we are not persuaded that Matsuno teaches delivery of a "low level current." Therefore, Avaya has not shown, by a preponderance of the evidence, that claim 6, and claim 9 depending therefrom, would have been obvious over De Nicolo and Matsuno.

D. Network-1's Motion to Amend

In its Motion to Amend, Network-1 proposes substitute claim 10, "[i]f the Board determines that Claim 6 is unpatentable as issued," and substitute claim 11, "[i]f the Board also determines that Claim 9 is unpatentable as issued." Mot. to Amend 2. As explained herein, we do not determine that claims 6 and 9 are unpatentable and, therefore, dismiss Network-1's Motion to Amend as moot.

E. Avaya's Motion for Observation on Cross-Examination

The majority of Avaya's Motion for Observation on the cross-examination testimony of Dr. Knox pertains to Dr. Knox's testimony regarding the proposed substitute claims in Network-1's Motion to Amend. It is unnecessary to consider these observations, or Network-1's responses, given our disposition of the Motion to Amend. To the extent Avaya's Motion for Observation pertains to testimony allegedly impacting Dr. Knox's credibility, we have considered Avaya's observations and Network-1's response. *See* Mot. for Obs. 8-9; Obs. Resp. 6-7.

F. Motions to Exclude

Avaya moves to exclude certain testimony of Dr. Knox submitted by Network-1 with its Reply to Avaya's Opposition to the Motion to Amend. Pet. Mot. to Exclude 1-2. Because we do not reach the merits of Network-1's Motion to Amend, we also do not reach the merits of Avaya's Motion to Exclude, and dismiss the motion as moot.

Similarly, Network-1 moves to exclude the expert report of Dr. Melvin Ray Mercer (Exhibit 1042) submitted by Avaya with its Reply to Network-1's Response. PO Mot. to Exclude 1. Avaya relied on Dr. Mercer's report to rebut Network-1's argument regarding recognition by those of skill in the art as a secondary consideration of nonobviousness. *See* PO Resp. 54-56; Reply 14. As explained above, we are not persuaded by Avaya's arguments that Matsuno discloses the "low level current" step recited in claim 6. Therefore, we need not reach the merits of Network-1's arguments regarding secondary considerations of nonobviousness, or Avaya's purported rebuttal of the same, and dismiss Network-1's motion as moot.

G. Reexamination Stay

On December 26, 2012, we entered an Order (Paper 9) staying Reexamination Control No. 90/012,401, an *ex parte* reexamination of claims

6, 8, and 9 of the ’930 patent. As noted in the Order, the reexamination is based on different prior art than that presented in this proceeding, and involves an additional claim (claim 8). We determine in this proceeding that claims 6 and 9 of the ’930 patent have not been shown to be unpatentable. Under the circumstances, we are persuaded that the stay should be lifted before the time for any appeal in this proceeding has expired and any appeal has terminated.

III. ORDER

Avaya has not demonstrated, by a preponderance of the evidence, that claims 6 and 9 are anticipated by Matsuno under 35 U.S.C. § 102(b) or that claims 6 and 9 are unpatentable over De Nicolo and Matsuno under 35 U.S.C. § 103(a). Claims 1-5, 7, and 8 of the ’930 patent are not subject to the instant *inter partes* review.

In consideration of the foregoing, it is hereby:

ORDERED that claims 6 and 9 of the ’930 patent have not been shown to be unpatentable;

FURTHER ORDERED that Network-1’s Motion to Amend, Avaya’s Motion to Exclude, and Network-1’s Motion to Exclude are *dismissed* as moot;

FURTHER ORDERED that Paper 42 is expunged from the record of this proceeding;

FURTHER ORDERED that the duplicate copy of Exhibit 2015, filed on August 7, 2013, is expunged from the record of this proceeding; and

FURTHER ORDERED that the stay of Reexamination Control No. 90/012,401 is lifted so that any necessary action that is consistent with the Board's orders in Case IPR2013-00071 can be taken.

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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