UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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JUNIPER NETWORKS, INC.,
Petitioner,

v.

BRIXHAM SOLUTIONS LTD.,
Patent Owner.

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Case IPR2014-00431
Patent 7,535,895 B2

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Before MICHAEL W. KIM, KALYAN K. DESHPANDE, and
PETER P. CHEN, *Administrative Patent Judges*.

DESHPANDE, *Administrative Patent Judge*.

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

I.   INTRODUCTION

A. Background

Juniper Networks, Inc. ("Petitioner") filed a Corrected Petition to institute *inter partes* review of claims 5, 6, 14, and 15 of U.S. Patent No. 7,535,895 B2 (Ex. 1001, "the '895 patent"). Paper 5 ("Pet."). Brixham Solutions Ltd. ("Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp."). Pursuant to 35 U.S.C. § 314, we instituted *inter partes* review on August 1, 2014, as to claims 5, 6, 14, and 15 of the '895 patent under 35 U.S.C. § 103 as obvious over Bell,[1] Sierra-1,[2] Sierra-2[3], and Sierra-3.[4] Paper 15 ("Dec.").

Patent Owner filed a Response (Paper 21, "PO Resp.") and Petitioner filed a Reply (Paper 22, "Pet. Reply"). A consolidated oral hearing for IPR2014-00431 and IPR2014-00425, both involving the same Petitioner and the same Patent Owner, was held on March 31, 2015, and the hearing transcript has been entered in the record. Paper 37 ("Tr.").

The Board has 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 discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 5, 6, 14, and 15 of the '895 patent are unpatentable.

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[1] U.S. Patent No. 6,658,579 B1 (Ex. 1004) ("Bell").

[2] Jason Uy, *TSE Core Card Reference Design*, Document ID: PMC-1991247, PMC-Sierra (2002) (Ex. 1006) ("Sierra-1").

[3] Chris Dobos, *TSE (PM5372) Device Driver Manual*, Document ID: PMC-2001402, PMC-Sierra (2001) (Ex. 1005) ("Sierra-2").

[4] Sandy Gunn, *TSE/TBS Open Path Algorithm Application Note*, Document ID: PMC-2002156, PMC-Sierra (2002) (Ex. 1016) ("Sierra-3").

B. Related Proceedings

Petitioner indicates that the '895 patent is the subject of the proceedings in *Brixham Solutions LTD v. Juniper Networks, Inc.*, No. 13-616-JCS (N.D. Cal.). Pet. 1.

Additionally, Petitioner indicates that U.S. Patent No. 7,940,652 is the subject of a request for *inter partes* review, IPR2014-00425, filed on February 11, 2014 by Petitioner. Pet. 1.

C. The '895 Patent

The '895 patent is directed to a network switch that allows for a more efficient use of resources within the network switch. Ex. 1001, 3:29–31. The network switch employs a mid-plane architecture that allows data to be directed between any link interface and any processing engine, regardless of the protocols embodied in the underlying data. *Id*. at 3:31–33, 4:36–40. The '895 patent indicates that an ability to utilize any link interface and any processing engine is an advantage over prior art switches that can over-utilize a processing engine when the network switch receives a disproportionately large percentage of data according to a first protocol, where other processing engines supporting other protocols are under-utilized. *Id.* at 3:15–20.

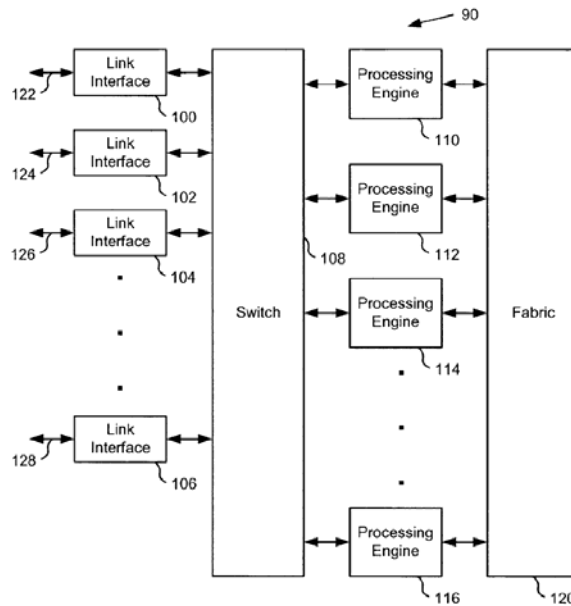Network switch 90 of the '895 patent is illustrated in Figure 1 as follows:

FIG. 1

Figure 1 illustrates that network switch 90 can be any type of network switch that includes link interfaces 100, 102, 104, and 106. *Id.* at 5:45–6:1. Switch 108 is coupled to the link interfaces and switch fabric 120. *Id.* Processing engines 110, 112, 114, and 116 are coupled to both switch fabric 120 and switch 108. *Id.* Switch 108 switches data between link interfaces and processing engines. *Id.* at 6:6–8. Fabric 120 is a switched fabric that switches packets between processing engines. *Id.* at 6:8–10.

In operation, data flows in through an ingress link interface to switch 108, where the data is switched to an ingress processing engine. *Id.* at 6:13–17. The ingress processing engine processes the data and forwards the data to an egress processing engine through switch 120 by, for instance, employing Layer 2 and Layer 3 protocol lookups. *Id.* at 6:17–21. The egress processing engine then forwards the data to switch 108 where the data is switched to egress link interface

for transmission onto a medium. *Id.* at 6:21–24. The medium can include an interface to a cathode ray tube display or liquid crystal display. *Id.* at 19:27–29.

Processing engines 110, 112, 114, and 116 deliver the services provided by switch 90. *Id.* at 6:42–43. Each processing engine supports multiple Layer 2, Layer 3, and higher level protocols, which allows any processing engine to service data from any medium coupled to a link interface in switch 90. *Id.* at 6:43–48. The services provided by processing engines can include Layer 2 and Layer 3 switching, traffic management, traffic policing, statistics collection, and operation and maintenance functions. *Id.* at 6:48–52. Ingress link interfaces 100, 102, 104, and 106 can utilize tables maintained by switch 90 with entries to map the incoming data into frames using the identified protocols. *Id.* at 10:39–63.

In addition, the ingress processing engine, the egress processing engine, and the egress link interface can also extract data from the data packet received, and map the data packet into virtual channel time slots based on the tables maintained by switch 90. *Id.* at 11:40–64, 12:5–25, 12:37–66. The '895 patent discloses several methods of mapping the data into data structures that subsequently can be read and further mapped. *Id.* at 13:44–14:49.

D. Illustrative Claim

Petitioner challenges claims 5, 6, 14, and 15 of the '895 patent. Independent claim 5 is illustrative of the claims at issue and follows:

> 5. A network switch comprising:
> a plurality of link interfaces;
> a plurality of processing engines;
> a switch fabric coupled to said plurality of processing engines; and
> a switch coupling said plurality of link interfaces to said plurality of processing engines, wherein switch is configured to:

map data from a first link interface in said plurality of link interfaces to multiple processing engines in said plurality of processing engines; and

map data from multiple link interfaces in said plurality of link interfaces to a first processing engine in said plurality of processing engines,

wherein said switch is configured to map data from a first link interface and map data from multiple link interfaces in response to mapping information maintained in said network switch, and

said network switch is configured to modify said mapping information in response to a failure of at least one link interface in said plurality of link interfaces;

wherein at least one processing engine in said plurality of processing engines receives data to be processed by said at least one processing engine according to a first protocol within a layer and data to be processed by said at least one processing engine according to a second protocol within said layer and said first protocol is different than said second protocol.

E. Claim Construction

The claims of an unexpired patent are interpreted using the broadest reasonable interpretation in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, No. 2014-1301, 2015 WL 4097949, at *7–8 (Fed. Cir. July 8, 2015) ("Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA," and "the standard was properly adopted by PTO regulation."); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). There is a presumption that claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the specification. *See In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An applicant may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In*

re Paulsen, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Although Petitioner has argued for the construction of specific terms (*see* Pet. 9–14), we have determined only the following claim construction is required for the purposes of this decision.

> 1. "*at least one processing engine in said plurality of processing engines receives data to be processed by said at least one processing engine according to a first protocol within a layer and data to be processed by said at least one processing engine according to a second protocol within said layer and said first protocol is different than said second protocol*" (the "multiprotocol" limitation)

Petitioner argues this limitation means a processing engine that receives data to be processed according to "two or more of 'Ethernet, ATM, Frame Relay' [that] constitute a first and second protocol within a layer." Pet. 25 (citing Ex. 1014, 60). Patent Owner argues that this "multiprotocol limitation" requires that "a processing engine must be capable of processing data according to at least two of the afore-referenced protocols."[5] PO Resp. 2.

The '895 patent describes that the claimed switch can be "any type of network switch in various embodiments," and in one embodiment the switch is a network edge switch that provides "Frame Relay, Gigabit Ethernet, Asynchronous

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[5] Patent Owner argues that a "forwarding card" is not a "processing engine," but rather a "processing engine" must be limited to the "ingress chip" contained in the "forwarding card." This issue is not presented in any of the substantive pleadings, however, and instead was first raised substantively during the Oral Hearing. Therefore, we consider this is an improperly raised new argument, and we will not consider it for the purposes of this Decision. Tr. 62:4–65:7, 69:16–70:19; Ex. 2002, 13:6–57:25; *see* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,768 (Aug. 14, 2014) ("No new evidence or arguments may be presented at oral argument.").

Transfer Mode ("ATM"), and Internet Protocol ("IP") based services." Ex. 1001, 5:54–58. Also, the '895 patent describes that "[e]fficiency is greatly increased when each processing engine supports all protocols used in switch 90 at the OSI model layers supported by the processing engines." *Id.* at 14:50–52. The '895 patent further describes an embodiment that includes the link interfaces and processing engines coupled to a control bus, where the control bus "is a 100 Base-T Ethernet communications link . . . [that] employs the 100 Base-T Ethernet protocols for carrying and formatting data," and in another embodiment the control bus "is a star-like switched Ethernet network." *Id.* at 17:23–38.

We agree with Petitioner's construction of this limitation, to mean "two or more of 'Ethernet, ATM, Frame Relay' [that] constitute a first and second protocol within a layer," is consistent with the specification that describes the network switch to provide "Frame Relay, Gigabit Ethernet, Asynchronous Transfer Mode ('ATM'), and Internet Protocol ('IP') based services." Pet. 25; Ex. 1001, 5:54–58. This construction is also consistent with the construction proffered by Patent Owner, requiring that "a processing engine must be capable of processing data according to at least two of the afore-referenced protocols." PO Resp. 2. Accordingly, we agree with Petitioner that, under the broadest reasonable construction, the "multiprotocol" limitation means "two or more of 'Ethernet, ATM, Frame Relay' that constitute a first and second protocol within a layer" and we further agree with Patent Owner that a "processing engine" is capable of processing data according to at least two of the afore-referenced protocols.

II.   ANALYSIS

A.   Obviousness of Claims 5, 6, 14, and 15 over Bell, Sierra-1, Sierra-2, and Sierra-3

Petitioner contends that claims 5, 6, 14, and 15 are unpatentable under 35 U.S.C. § 103 as obvious over Bell, Sierra-1, Sierra-2, and Sierra-3. Pet. 28–31.

1. Bell (Ex. 1004)

Bell discloses a network device and a method of operating the network device. Ex. 1004, 2:23–60. The network device can be a network switch, a router, or other types of computer systems. *Id.* at 8:4–10. Bell describes that the utilization of software modularity in the network device involves functionally dividing a software system into individual modules or processes that are designed and implemented independently. *Id.* at 7:16–19. The individual modules carry out inter-process communication by passing messages in accordance with well-defined application programming interfaces (APIs). *Id.* at 7:19–22.

The network device includes redundant, synchronous central timing subsystems (CTSs) and local timing subsystems (LTSs). *Id.* at 2:3–5. Each LTS includes control circuits for automatically selecting between reference signals received from the CTSs, which allows each LTS to quickly switch over from a failing or failed reference timing signal to a good reference timing signal. *Id.* at 2:7–10. The LTSs' ability to make quick switchovers prevents data corruption errors that may result during slow switchovers where a failing or failed reference signal is used for a longer period of time prior to switch over. *Id.* at 2:10–14. The LTS may further include a synchronization circuit for providing a local timing reference signal synchronous with a selected first or second timing reference signal. *Id.* at 2:61–64.

2. Sierra-1 (Ex. 1006)

Sierra-1 discloses a transmission switch element ("TSE") Core Card reference design that is a building block for scalable and redundant SONET/SDH switch fabrics. Ex. 1006, 13. This reference design can be used with any combination of line and service cards that bandwidth and ports permit. *Id.* Typical applications for the TSE Core Card are SONET network elements such as multi-service add/drop multiplexers, broadband digital cross-connects, and terminal multiplexers. *Id.* The TSE Core Card is a time-space-time switch fabric with 40 Gb/s bandwidth, which performs non-blocking permutation switching with STS-1 granularity on sixty-four STS-12 ingress ports. *Id.* at 17.

The broadband digital cross-connect application is illustrated in Figure 2, as follows:

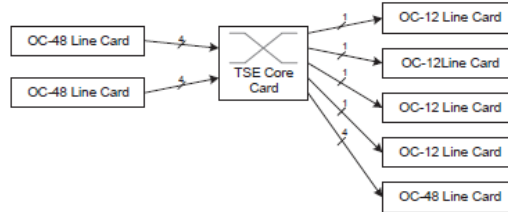Figure 2 Digital Cross-connect (Partially Populated)

Figure 2 illustrates a single TSE Core Card forming a broadband digital cross-connect with grooming for 768 STS-1 streams. *Id.* In this application, any STS-1 payload from an ingress card or port can be switched to any STS-1 timeslot on any egress card or port. *Id.* Bi-directional connections can be simultaneously added, which would greatly increase the switch possibilities. *Id.*

3. Sierra-2 (Ex. 1005)

Sierra-2 discloses functions, data structures, and architecture of a TSE device driver. Ex. 1005, 2. Some specific TSE driver functions described include time slot interchange and space switching; reporting of port alarm, status, and

statistics; reporting of device alarm, status, and statistics; configuration of device level modes; configuration of ports; and capability to force certain errors on the 8b/10b ports. *Id.* at 15–18. The TSE driver time slot mapping is illustrated in Figure 8, as follows:

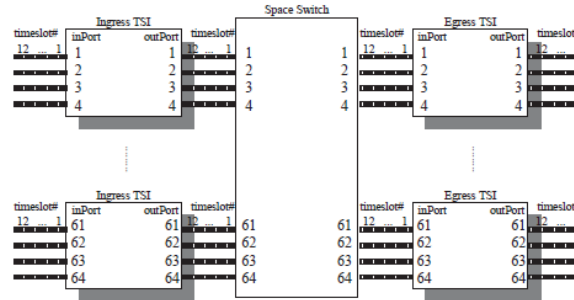Figure 8: Time Slot Interchange and Space Switch Model

Figure 8 illustrates the TSE, or space switch, having sixteen time slot interchange units (TSI) for time slot mapping on the ingress and egress. *Id.* at 29–30. Each ingress TSI and egress TSI has four in ports and four out ports. *Id.* Mapping is defined at STS-1 granularity; however, a valid mapping must still fit into the required time slot map in a manner mandated by the data rate of the channel. *Id.* The process of Figure 8 maps source space time slot to destination space time slot through both the ingress TSI and the space switch, and out the egress TSI. *Id.* This is equivalent to establishing a one-to-one mapping or one-to-many mapping between the source slots and the destination slots, depending on whether the connection is unicast or multicast. *Id.*

4. Sierra-3 (Ex. 1016)

Sierra-3 describes an Open Path Algorithm that provides the basis for scheduling connections through the rearrangeably non-blocking architecture of CHESS™ Set switching fabrics. Ex. 1016, 9. Open Path Algorithm determines how a call is routed through the fabric from an input port of an input device to an output port of an output device. *Id.* According to Sierra-3, an advantage of

utilizing Open Path Algorithm is that multicast can be made to look like unicast, which allows Open Path Algorithm "to schedule multicast deterministically in zero speedup." *Id.* at 17. Sierra-3 describes an approach to the multicast problem that provides the ability to recast multicast as unicast for a restricted set of multicast requirements. *Id.*

> 5. *Analysis*

Petitioner contends that Bell discloses all of the limitations of claim 5, except for the limitation that the switch is configured to "map data from multiple link interfaces in said plurality of link interfaces to a first processing engine in said plurality of processing engines." Pet. 28. Petitioner further contends that if Bell does not explicitly or inherently disclose the switch is configured to "map data from multiple link interfaces in said plurality of link interfaces to a first processing engine in said plurality of processing engines," then Sierra-1, Sierra-2, and Sierra-3 disclose this limitation. Pet. 29–30. Petitioner specifically argues that Sierra-1 discloses flexible data transmissions that allows for time slots of data to be mapped from any port card to any forwarding card and Sierra-2 discloses a "'connection map' that is used to map data from the link interfaces to the processing engines." Pet. 29–30 (citing Ex. 1006, 14, Fig. 2; Ex. 1005, 29–30). Sierra-1 further discloses multicast is supported as an output and can sample data from any input. Ex. 1006, 14, Fig. 2. Petitioner argues that it would have been obvious to combine Sierra-1, Sierra-2, and Sierra-3 with the Bell architecture, because Bell specifically mentions the use of Sierra's cross-connection component. Pet. 30–31 (citing Ex. 1003 ¶ 261); Ex. 1004, 51:56–65.

Patent Owner argues that the combination of Bell, Sierra-1, Sierra-2, and Sierra-3 fails to teach or suggest the "multiprotocol" limitation. PO Resp. 2–5. Patent Owner argues that the "multiprotocol" limitation allows for "efficient

resource use by allowing data to be directed to any processing engine regardless of the protocol embodied in the underlying data." *Id*. at 4. In particular, Patent Owner argues that Bell discloses a single processing engine capable of processing data according to an Ethernet protocol, or an ATM protocol, or a Frame Relay protocol, but the single processing engine cannot process data according to more than one of these protocols. *Id*. at 3. Patent Owner argues that even under Petitioner's construction of the "multiprotocol" limitation, that requires the processing of two or more protocols, Bell fails to disclose the "multiprotocol" limitation. *Id.*

We are not persuaded by Patent Owner's arguments. As discussed above, we construe the "multiprotocol" limitation to mean a processing engine that receives data to be processed according to "two or more of 'Ethernet, ATM, Frame Relay' [that] constitute a first and second protocol within a layer" and "a processing engine must be capable of processing data according to at least two of the afore-referenced protocols." *See* Section I.E.1. The "multiprotocol" limitation does not require that a processing engine would process data in serial, or that a processing engine cannot process data using a particular protocol for a certain period of time such that it would need to be reprogrammed to process data using a different protocol. *See* Tr. 56:17–23. Rather, the "multiprotocol" limitation only requires that the processing engine must be *capable* of processing data according to at least two protocols. *See* Section I.E.1.

As argued by Petitioner, Bell discloses a telecommunications network device that includes forwarding cards, which transfer network packets, and the forwarding cards process "paths" of network data. Pet. 16–18; Pet. Reply 4 (citing Ex. 1004, 49:35–42); Ex. 1004, 1:13–23. Bell further discloses that each network path or stream may transmit data according to a different protocol. Pet. Reply 4

(citing Ex. 1004, 53:50–64). Accordingly, "processing engine," under the broadest reasonable construction, includes Bell's forwarding cards because Bell's forwarding cards receive data to be processed according to two or more protocols within a layer, and the "forwarding cards" are capable of processing data according to two or more protocols. *See* Ex. 1003 ¶ 60, 62, 107–108; Ex. 1004, 53:50–64. Therefore, we determine that Bell teaches or suggests processing engines within the meaning of the '895 patent.

We have reviewed the Petition and supporting evidence and find that Petitioner has shown that the combination teaches or suggests all of the remaining limitations of the challenged claims. *See* Pet. 28–31. We further agree with the rationale for this combination of references articulated by Petitioner. *See* Pet. 30–31 (citing Ex. 1003 ¶ 261).

B. Motion to Exclude

Patent Owner filed a Motion to Exclude Evidence (Paper 23, "Mot. to Exclude") and a Supplemental Motion to Exclude Evidence (Paper 26, "Supp. Mot. to Exclude"). Petitioner filed an Opposition (Paper 30, "Opp.") to Patent Owner's motions, and Patent Owner filed a Reply (Paper 31, "PO Reply.") in support of its motions to exclude.

Patent Owner argues that Exhibits 1003 and 1020 (Declarations of Petitioner's expert witness, Dr. Tal Lavian) should be excluded due to the "general evasiveness" of Dr. Lavian and "interference of counsel" during Dr. Lavian's deposition. Supp. Mot. to Exclude 1. Petitioner argues that Dr. Lavian's responses were not evasive but were proper, and Petitioner's objections to the "content" and "form" were proper under 37 C.F.R. § 42.53(f)(8). Opp. 11–15. Petitioner further argues that Patent Owner's Motion to Exclude and Supplemental Motion to Exclude are flawed procedurally, because Patent Owner "failed to timely preserve

an objection under 37 C.F.R. § 42.64(b)(1)" and Patent Owner failed to "seek Board authorization" prior to filing its motions. *Id.* at 4–6. Patent Owner responds that it "seeks to exclude the entirety of Dr. Lavian's declaration . . . because of the behavior of the witness and his counsel *at the deposition.*" PO Reply 1.

Although we agree with Petitioner that Patent Owner's motion is procedurally defective for the reasons argued by Petitioner (*see* Opp. 4–6), we also agree with Petitioner that Dr. Lavian's responses were not "evasive" and highlight this argument for emphasis. For example, Patent Owner's argument directs us to specific portion of the deposition where Dr. Lavian was asked "did you add that element, 548b?" Supp. Mot. to Exclude 2 (quoting Ex. 2002, 34:18). We agree with Petitioner that Dr. Lavian answered this question to the best of Dr. Lavian's ability. Opp. 13 (citing Ex. 2002, 34:20–35:2). Furthermore, Patent Owner was able to rephrase the same question and elicit an additional response that Patent Owner did not determine to be "evasive." *See* Ex. 2002, 36:6–20. Although Patent Owner directs us to an additional example where Dr. Lavian was allegedly "evasive" and generally concludes that "this type of evasiveness pervaded the entirety of the deposition," based on our review of Ex. 2002, Patent Owner has not persuaded us that Dr. Lavian did not respond to the questions to the best of his ability.

We further agree with Petitioner that Petitioner's objections were proper. *See* 37 C.F.R. § 42.53(f)(8) ("Any objection to the content, form, or manner of taking the deposition, including the qualifications of the offier, is waived unless made on the record during the deposition and preserved in a timely filed motion to exclude."). Based on our review of Ex. 2002, Petitioner's objections were directed to the content, form, or manner of taking the deposition, and, therefore, were proper under 37 C.F.R. § 42.53(f)(8). We are also not persuaded that the behavior

of opposing counsel, alone or "in combination with the occurences at the deposition" (Supp. Mot. to Exclude 4) is a sufficient basis to exclude Exhibit 1003 or Exhibit 1020. Such a remedy is incongruous and disproportional to any alleged harm suffered by Patent Owner during deposition. Accordingly, Patent Owner's Motion to Exclude Exhibit 1003 and Exhibit 1020 is *denied*.

In addition, Patent Owner argues that Petitioner has submitted a second declaration from Dr. Lavian (Ex. 1020) that includes information that is outside of the scope of the Petition, and, therefore, Exhibit 1020 should be excluded. Mot. to Exclude 2–4. We, however, did not rely on Exhibit 1020 or the documents identified by Patent Owner as outside the scope of the grounds instituted for review. Accordingly, Patent Owner's argument that Exhibit 1020 includes information outside of the scope of the Petition is moot and Patent Owner's Motion to Exclude Exhibit 1020 is *denied* for thie reasons discussed above.

III.   CONCLUSION

We conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 5, 6, 14, and 15 would have been obvious over Bell, Sierra-1, Sierra-2, and Sierra-3.

IV.   ORDER

Accordingly, it is hereby:

ORDERED that claims 5, 6, 14, and 15 of U.S. Patent No. 7,535,895 B2 are unpatentable.

FURTHER ORDERED that Patent Owner's Motion to Exclude Exhibit 1003 and Exhibit 1020 is denied.

FURTHER ORDERED that this is a Final Written Decision of the Board under 35 U.S.C. § 318(a), and parties to the proceeding seeking judicial review of

this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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