EXHIBIT A Part 1

Carnegie Mellon University's Presentation on Willfulness and Enhanced Damages – Dkt. 790 and Dkt. 805

May 1 – 2, 2013

Carnegie Mellon

Marvell's Infringement Was Objectively Willful

Marvell's Infringement Was Objectively Willful

Marvell Ignores the Applicable Law

CMU Demonstrated Marvell's Objective Willfulness

Marvell's Litigation-Inspired Defenses Are Demonstrably Baseless

Marvell's Infringement Was Objectively Willful

Prelitigation conduct is relevant to the objective prong

The objective prong is met if "the infringer *acted despite an objectively high likelihood* that its actions constituted infringement of a valid patent."

In re Seagate Tech. LLC, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (en banc)

"[I]n ordinary circumstances, willfulness will depend on an infringer's *prelitigation conduct*."

In re Seagate Tech. LLC, 497 F.3d 1360, 1374 (Fed. Cir. 2007) (en banc)

The Court's inquiry under the objective prong should focus on whether Marvell acted objectively recklessly *at the time of infringement*.

i4i Ltd. P'ship v. Microsoft Corp., 670 F.Supp. 2d 568, 581-582 (E.D. Tex. 2009) aff'd 598 F.3d 831, 860 (Fed. Cir. 2010); *see also Univ. of Pittsburgh v. Varian Med. Sys., Inc.*, 877 F. Supp. 2d 294, 306-07 (W.D. Pa. 2012); *CSB-Sys Int'l Inc. v. SAP Am., Inc.*, No. 10-2156, 2012 WL 1439059, at *4 (E.D. Pa. April 25, 2012)

Marvell's Infringement Was Objectively Willful

Objective willfulness is *not* a blank slate

The objectively-defined risk of infringement accounts for the circumstances at the time of infringement

- **To hold otherwise, would preclude consideration of the hallmark of willfulness—pre-suit knowledge of the patents**

The objective standard accounts for "the *risk apparent* to the actor, his capacity to meet it, and the *circumstances under which he must act*."

Restatement (Second) of Torts § 283 (1965)

Marvell's Infringement Was Objectively Willful

Objective willfulness is based on the "totality of the circumstances," including:

Knowledge of the patent and failure to conduct any investigation

See Great Dane Ltd. P'ship v. Stoughton Trailers, LLC, No. 3:08-89, 2011 WL 318092, at *4-5 (M.D. Ga. Jan. 28, 2011); *Krippelz v. Ford Motor Co.,* 670 F. Supp 2d. 806, 809, 811-812 (N.D. Ill. 2009) rev'd on other grounds 667 F.3d 1261 (Fed Cir. 2012); *i4i Ltd. P'Ship v. Microsoft Corp.,* 670 F.Supp. 2d 568, 581-582 (E.D. Tex. 2009) aff'd 598 F.3d 831, 860 (Fed. Cir. 2010)

Failure to get an opinion of counsel

See In re Seagate Tech. LLC, 497 F.3d 1360, 1369 (Fed. Cir. 2007) (en banc)*; Koninklijke Philips Elecs. N.V. v. Cinram Int'l, Inc.,* No. 08-0515, 2012 WL 4074419, at *5 n. 17 (S.D.N.Y. Aug 23, 2012); *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1336, 1348 (Fed. Cir. 2011) ("[T]he failure to obtain an opinion of counsel or otherwise investigate the patent situation can be considered, in the totality of the circumstances."); *Aspex Eyewear, Inc. v. Clariti Eyewear, Inc.*, 605 F.3d 1305, 1313 (Fed. Cir. 2010) ("[T]he timing as well as the content of an opinion of counsel may be relevant to the issue of willful infringement, for timely consultation with counsel may be evidence that an infringer did not engage in objectively reckless behavior.")

Marvell's Infringement Was Objectively Willful

Marvell misreads *Knorr-Bremse* and *Seagate* regarding its failure to get an opinion of counsel

As reflected in §12.2 of the 2012 AIPLA Model Patent Jury Instructions cited by this Court (Dkt. 753 at 4), the failure to obtain an opinion is properly part of the "totality of the circumstances"

12.2 Willful Infringement – Absence of Legal Opinion

[The following instruction should be given only if the Defendant does not claim reliance on a legal opinion to rebut willfulness.]

In considering under the totality of the circumstances whether [the Defendant] acted willfully, you may consider as one factor the lack of evidence that [the Defendant] obtained a competent legal opinion. However, you may not assume that merely because [the Defendant] did not obtain a legal opinion, the opinion would have been unfavorable. The absence of a lawyer's opinion, by itself, is insufficient to support a finding of willfulness.

Spectralytics, Inc. v. Cordis Corp., 649 F.3d 1336, 1347-48 (Fed. Cir. 2011); *Aspex Eyewear, Inc. v. Clariti Eyewear, Inc.*, 605 F.3d 1305, 1313 (Fed. Cir. 2010); *In re Seagate Technology, LLC*, 497 F.3d 1360 (Fed. Cir. 2007) (en banc).

Marvell's Infringement Was Objectively Willful

Marvell misreads *Knorr-Bremse* and *Seagate* regarding its failure to get an opinion of counsel

Knorr-Bremse held _only_ that "the failure to obtain an exculpatory opinion of counsel shall no longer provide an _adverse inference or evidentiary presumption that such an opinion would have been unfavorable,_" not that the failure to obtain such an opinion is irrelevant to willfulness

See Knorr-Bremse Sys. Fuer Nutzfahrzeuge v. Dana, 383 F. 3d 1337, 1345-1346 (Fed. Cir. 2004); *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1336, 1348 (Fed. Cir. 2011) ("[T]he failure to obtain an opinion of counsel or otherwise investigate the patent situation can be considered, in the totality of the circumstances."); *Aspex Eyewear, Inc. v. Clariti Eyewear, Inc.,* 605 F.3d 1305, 1313 (Fed. Cir. 2010) (the timing as well as the content of an opinion of counsel may be relevant to the issue of willful infringement, for timely consultation with counsel may be evidence that an infringer did not engage in objectively reckless behavior)

Seagate did not change this law in any respect

See In re Seagate Tech., LLC, 497 F. 3d 1360, 1370 (Fed. Cir. 2007)

Marvell's Infringement Was Objectively Willful

Objective willfulness is based on the "totality of the circumstances," including:

Failure to take any remedial action where the patent and accused technology describe "highly similar functionality"

See i4i Ltd. P'Ship v. Microsoft Corp., 670 F. Supp. 2d 568, 581-582 (E.D. Tex. 2009) aff'd 598 F.3d 831, 860 (Fed. Cir. 2010)

Failure to read the file history

See SunTiger, Inc. v. Scientific Research Funding Grp., 9 F. Supp. 2d 601, 607 (E.D. Va 1998); *Goss Int'l Americas, Inc. v. Graphic Management Assoc., Inc.,* 739 F. Supp. 2d 1089, 1126 (N.D. Ill. 2010)

Copying is relevant to both the objective and subjective prongs of the willfulness inquiry

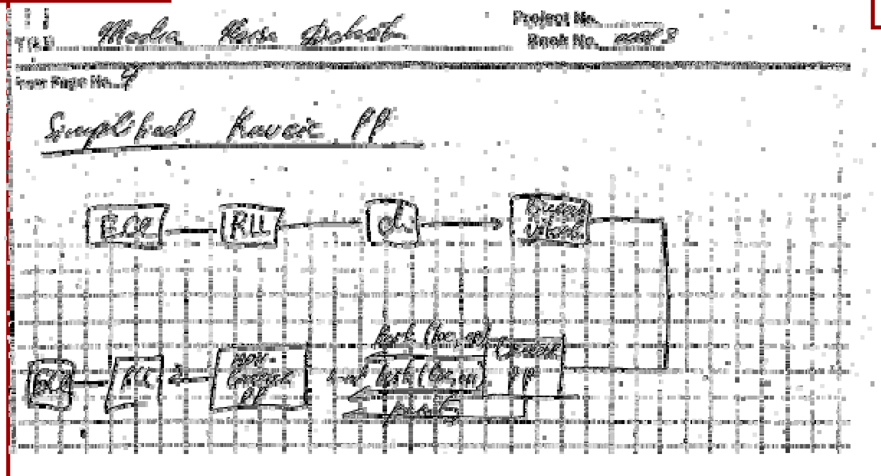
See Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc., 725 F. Supp. 2d 474, 480 (D. Del. 2010) vacated and remanded 711 F.3d 1348, 1381 (Fed. Cir. 2013); *Finjan Software, Ltd. v. Secure Computing Corp.*, No. 06-369 (GMS), 2009 U.S. Dist LEXIS 72825, at *28 (D. Del. Aug. 18, 2009), rev'd in part on other grds *sub nom*, *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197 (Fed. Cir. 2010)

Marvell's Infringement Was Objectively Willful

Marvell acted despite an objectively high likelihood of infringement

The high likelihood of infringement includes the fact that:

- **Mr. Burd used Dr. Kavcic's papers as the "launching pad" for his work**



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KavcicViterbi Simulator

So this was a launching pad for our research. Right? I cannot just start -- I cannot

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Testifying about Ex. P-93

mortal guy. The way I do my research, which might be different from other people, I first try to understand what's available out there. So maybe look at some ideas which people came up with before me. (921:3–9)

So this was for me, to make sure that I do, in fact, understand what Professor Kavcic is trying to do, and, at the same time, just to see kind of what's out there. Right? And then I can use this code for benchmarking later. Right? For performance benchmarking later.

So this was a launching pad for our research. Right? I cannot just start -- I cannot (921:15–22)

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Tech. 30(b)(6) Dep. at 921:15-22; *see also* 12/3/12 Tr. at 167, 169-170; P-Demo 7 at 107

Marvell's Infringement Was Objectively Willful

Marvell acted despite an objectively high likelihood of infringement

The high likelihood of infringement included the fact that:

- **Marvell *knew* about CMU's patents**

Read Lucent's patent on media noise detector more carefully. It seems that Lucent did not patent list detector (since this was presented by K. Knudson, et al at GLOBECOM'99). Instead they patented the media noise PP as a whole, i.e. the system comprising of linear Viterbi and bolted-up PP which utilizes some extra information not used by Viterbi(e.g. non-linear noise, extended whitening filter, etc. And of course as I mentioned earlier, Kavcic detector is also patented.

greg

P-283

From: CN=Greg Burd/O=Marvell
Sent: Thursday, January 3, 2002 4:20 PM
To: CN=Nersi Nazari/O=Marvell@marvell.com; CN=Toai Doan/O=Marvell@marvell.com
Subject: non-linear list detector write up
Attach: kavcicPP.pdf

Nersi, Toai

Here is the preliminary write up on the list detector and its performance

Couple of more developments:

1. Kavcic's detection scheme is patented (assignee: Carnegie Melon Univ., 2001)

2. I also found that a list detector I proposed was patented by Lucent in 1999

greg

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PLAINTIFF'S TRIAL EXHIBIT P-422

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PLAINTIFF'S TRIAL EXHIBIT P-477

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Marvell's Infringement Was Objectively Willful

Marvell acted despite an objectively high likelihood of infringement

Under these circumstances, an objectively reasonable actor would have:

- **Been concerned about the patents — Mr. Doan was not** JX-D-1 at 3-6
- **Read the patent claims — Mr. Burd did not** 12/17/12 Tr. at 169, 174
- **Obtained and read the file histories — Dr. Wu did not** 12/13/12 Tr. at 73:5-18
- **Obtained an opinion of counsel — Marvell did not** Dkt. 753 at 2-3
- **Taken remedial action — Marvell did not**

P-Demo 8 at 31 (Burd Dep. at 655:23 -656:4)

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

The reasonableness of Marvell's litigation defenses should be "based on the record ultimately made in the infringement proceeding."

See Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc., 682 F.3d 1003, 1008 (Fed. Cir. 2012)

The fact that Marvell's litigation defenses went to the jury does not make them "objectively reasonable."

Dkt. 601 at 4; *Powell v. Home Depot USA Inc.,* 663 F.3d 1221, 1236 (Fed. Cir. 2011) (affirming district court's determination that the objective prong was met despite its denial of the patentee's request for a preliminary injunction and the closeness of inequitable conduct defense)

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Validity

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Marvell's lone invalidity defense is baseless

Marvell *abandoned* the "close call" arguments (tap weights and target values)

- **Marvell's "strategic decision" claim is false – it disavowed the tap weight theory almost two years before trial**

> Marvell's initial argument was that selection of the "filter tap weights" of the Seagate Patent is essentially analogous to selection of a branch metric function.[9] (*See* Docket No. 219 at
>
> [9] Marvell distanced itself from this argument over the course of the Court's consideration of the pending motion. (*See* Docket No. 249 at 3).

Dkt. 305 at 15

- **Dr. Proakis said nothing at trial about either tap weights or target values**

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Marvell's lone invalidity defense is baseless

Dr. Proakis admitted at trial that Worstell does not anticipate

① $B_{1,nt} = [X^2_{1,nt} - 2X_{1,nt} \Sigma X_{1,(n-i)t} W_i] \times [1/\sigma_{1,nt}^2]$

② $B_{2,nt} = [X^2_{2,nt} - 2X_{2,nt} \Sigma X_{2,(n-i)t} W_i] \times [1/\sigma_{2,nt}^2]$

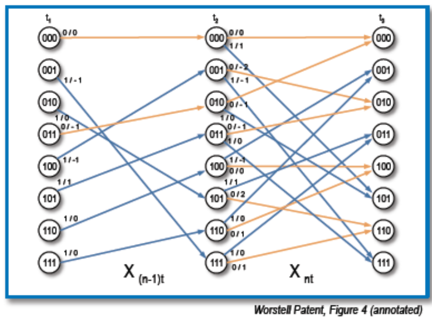
The Worstell Patent Discloses "selecting

4. A method of determining branch metric values for branches of a trellis for a Viterbi-like detector, comprising:

selecting a branch metric function for each of the branches at a certain time index from a set of signal-dependent branch metric functions; and

applying each of said selected functions to a plurality of signal samples to determine the metric value corresponding to the branch for which the applied branch metric function was selected, wherein each sample corresponds to a different sampling time instant.

$_{2,nt} = [X^2_{2,nt} - 2X_{2,nt} \Sigma X_{2,(n-i)t} W_i] \times [1/\sigma_{2,nt}^2]$



Worstell Patent, Figure 4 (annotated)

D-Demo12-15

D-Demo 12-15

A And the orange represent signals with no transitions.

Q Right. So these are the -- can we call the orange branches the zero branches?

A Those correspond to a zero, yes.

Q Right. And then the blue branches are the one branches, right?

A Those correspond to the ones, yes.

12/17/12 Tr. at 93:1-7

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Then it says: This is what Worstell teaches, right? Implementing this in a fairly straightforward way would require eight multipliers, one for each one branch; correct?

A That's correct.

Q Worstell never says, does it, sir, that you put any kind of a multiplier on the zero branch; right?

A That is obvious, Mr. Greenswag. That is totally obvious to a person skilled in the art. There are 16 branches there, and a person skilled in the art would look at that and say, okay, I've got -- eight of these branches have to be scaled by a sigma one squared and the other eight have to be scaled by a sigma two squared.

12/17/12 Tr. at 94:1-12

A I thought I did, sir.

Q Worstell does not disclose putting any kind of a multiplier on the zero branches. Is that correct?

A That would require circuitry, so why should you go through another eight multiplier?

Q But the patent itself doesn't disclose putting those multipliers, does it?

A And my point is that's obvious to one skilled in the art.

Q And, nevertheless, that's a difference between Worstell and the Kavcic patents, right?

A I don't consider that a difference. In fact, I have looked at the two equations, the Equation 13 and this equation and the modified equation in Worstell, side by side, and they take into account the same in the same way, the correlated noise and signal dependent noise. I can prove it to you; I've done it mathematically, and I know that.

12/17/12 Tr. at 95:1-17

Dr. Proakis conceded three times that Worstell did not anticipate

Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Marvell's lone invalidity defense is baseless

Dr. Proakis's obviousness opinion was based on ignoring Worstell's "constant"

????

$$B_{b,nt} = X_{b,nt}^2 - 2X_{b,nt}\sum_{i=1}^{L} X_{b,(n-i)t} W_i$$

where $B_{b,nt}$ is the branch metric for branch b at time nt;

$X_{b,nt}$ is the noise and equalization error at time nt for branch b;

W_i is the ith tap weight of FIR filter 22;

L is the number of tap weights beyond the center weight.

The new branch metric can also be simplified for particular target responses. For example, the correlation of the noise at the output of FIR filter 22 can be described by the noise autocorrelation sequence. The autocorrelation sequence can be rather lengthy, leading to considerable complexity in the modified Viterbi detector 24. However, FIG. 6 is a plot of the autocorrelation delay against normalized autocorrelation for a PR4 code having a density equal to three. It is assumed that the noise at the input of FIR filter 22 is white, and FIR filter

????

Equation 20

The modified metric used in accordance with the present invention can be further modified to take into account 50 transition noise as well. If it is assumed that the standard deviation of the noise component of each sample is greater where there is a transition in the signal written to the disc than where there is no transition, then each branch metric can be modified by multiplying the metrics which corre- 55 spond to transitions by a fraction which depends on the transition noise standard deviation. Implementing this in a fairly straightforward way would require 8 multipliers, one for each "one" branch leading to each state in the appropriate trellis diagram. As with the presently modified metric, one of 60 the inputs to each of the multipliers is constant, so a simple, fast multiplier such as a canonical signed digital multiplier (as described in more detail in an article entitled *A 300 Mhz Digital Double-Sideband To Single-Sideband Converter in One μm CMOS*, written by Robert W. Hawley, Thu-ji Lin, 65 and Henry Samueli and published in the IEEE Journal of Solid State Circuits, January 1995 —hereby fully incorporated by reference) can be used. Another implementation is

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Marvell's Litigation-Inspired Liability Defenses Are Objectively Baseless

Marvell's lone invalidity defense is baseless

Dr. Proakis's opinions required him to disavow his own prior sworn declaration and expert report

> (2) The Court did not change its construction between its first summary judgment opinion (Docket No. 306) and its second. (Docket No. 337). Instead, the Court

Dkt. 425 at 2

[CMU 1st Bullet:] Prof. Proakis

1) CMU asserts Prof. Proakis' opinions are "infected" with a "self-serving misreading" of the Court's construction of "function." MIL 3 at 1-2.

2) Not True: Prof. Proakis quotes from the Court's entire opinion (twice):

> 104. I have also reviewed the Court's Memorandum Opinion in response to Marvell's Motion for Partial Summary Judgment that the Group I Claims are invalid over the Seagate (Worstell) '251 Patent. With respect to the word "function" the Court stated:
>
> > Marvell did not advance a construction of the word "function," other than to say that it should be given its ordinary meaning. (Docket No. 301 at 25). On the other hand, according to CMU, a "function" is "a mathematical relation that uniquely associates members of a first set with members of a second set." (Docket No. 264 at 5). This is essentially the ordinary meaning of the word "function." See Merriam-Webster's Collegiate Dictionary, 507 (11th ed. 2007) (defining "function" as "a mathematical correspondence that assigns exactly one element of one set to each element of the same or another set"). Under this ordinary meaning, which the Court adopts for purposes of this motion since the parties seem to be in agreement, simply adding another variable into a function – here the target value – does not operate to convert that single function into multiple functions.[10] Therefore, variation of the target value does not render Equation 20 of the Seagate Patent a "set" of functions.
>
> Dkt. No. 306 at 16. The Court also stated in Footnote 10:

See also Proakis Rpt. (Dkt. 471) at ¶ 233 (same).

CMU 3 4

Dkt. 587, Ex. G at 4