

# **EXHIBIT I Part 1**

**Carnegie Mellon University's Presentation  
on Marvell's JMOL and Motion for  
New Trial (Non-Damages) – Dkt. 805**

May 1 – 2, 2013



**Carnegie Mellon**

**The Court Should Deny Marvell's JMOL and  
New Trial Motions on Infringement and Validity**

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**Marvell Ignores the Applicable Law**

**CMU's Liability Case was Compelling**

## The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity

### The law on **JMOL** favors CMU



JMOL “should be granted only if, viewing the evidence in the **light most favorable** to the nonmovant and giving it the advantage of **every fair and reasonable inference**, there is insufficient evidence from which a jury reasonably could find liability.”

*Lightening Lube, Inc. v. Witco Corp.*, 4 F.3d 1153, 1166 (3d. Cir. 1993)



JMOL “should be granted only if, viewing all the evidence which has been tendered and should have been admitted in the light most favorable to the moving party opposing the motion, **no jury could decide in that party's favor.**”

*Walter v. Holiday Inns, Inc.*, 985 F.2d 1232, 1238 (3d Cir. 1993)



In considering a JMOL motion, the Court “**may not weigh the evidence**, determine the credibility of witnesses, or substitute [its] version of the facts for the jury's version.”

*Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337, 1342 (Fed. Cir. 2008)  
(quoting *Lightning Lube, Inc. v. Witco Corp.* 4 F.3d 1153, 1166 (3d Cir. 1993))

## The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity

### The law on motions for a **new trial** favors CMU



“When the motion for a new trial is based on the claim that the verdict is against the clear weight of the evidence, the ***Court's discretion is limited***: ... that is, where a ***miscarriage of justice*** would result if the verdict were to stand.”

*Jackson v. City of Pittsburgh*, No. 07-111, 2011 WL 3443951, at \*8 (W.D. Pa. Aug. 8, 2011)  
(internal quotations omitted)



“The Court must not substitute its own judgment of the facts and ***assessment of the witnesses' credibility*** for the jury's.”

*Jackson v. City of Pittsburgh*, No. 07-111, 2011 WL 3443951, at \*8 (W.D. Pa. Aug. 8, 2011);  
*Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1203 (Fed. Cir. 2010)  
(quoting *Williamson v. Consol. Rail Corp.*, 926 F.2d 1344, 1353 (3d Cir. 1991))

## The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity

### Credibility is for the jury



You must consider all of the evidence, but this does not mean you must accept all of the evidence as true or accurate. You are the sole judges of the credibility of the witnesses and the weight their testimony deserves.

12/21/12 Tr.  
at 57:4-7



You should consider each expert opinion received in evidence in this case and give it such weight as you think it deserves. If you should decide that the opinion of an expert witness is not based upon sufficient education, and/or experience, or if you should conclude that the reasons given in support of the opinion are not sound, or if you feel that it is outweighed by other evidence, you may disregard that opinion entirely.

12/21/12 Tr.  
at 59:20-60:2

## The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity



### Marvell raises the following arguments regarding infringement

- **MNP:** The MNP does not determine “branch metric values” for “branches” of a “trellis” in its post-processor
- **NLD:** The NLD FIR filters are not part of the “branch metric” computation
- **Simulators:** Simulators are not “detectors” that operate on “signal samples”
- **Indirect Infringement:** Marvell was not willfully blind to its own and its customers’ infringement



# The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity



Dr. McLaughlin's *infringement* testimony was compelling

**MNP:** Using Marvell's documents, Dr. McLaughlin showed that Marvell's MNP post-processor computes "branch metric values" for "branches" of a "trellis"

**CMU '839 Patent Claim 4**

March 13, 2001

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 index from a set of signal-dependent branch metric functions; and

MNP is a detector  
 MNP computes branch metric values for branches of a trellis  
 MNP is a Viterbi-like detector

Ex. P-770, pg. 28

**Marvell's MNP Technology Internal Presentation - December 17, 2009**

By Dr. Hongxin Song

DSP Technical Presentation 5: Data Detection

12/17/2009

Error Event Candidate Screening

• Error event = Detected data - True data

• With a given block length L bits, Linear Filter Search search for a few alternative paths that suggest error events in a pre-defined list. Alternative paths have PAI closest to the best path.

• The error event list includes 0, 1, 2, ..., L, etc.

• Query information is also used if available for both best path and alternative paths.

Ex. P-770, pg. 28

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Ex. P-770, pg. 28

**Marvell's MNP Technology Exhibit A of Chip Stipulation**

NLF for Error Path 1

Branch Metric Value for Branches of Error Path 1

Path Metric Value for Error Path 1

NLF for Error Path 2

Branch Metric Value for Branches of Error Path 2

Path Metric Value for Error Path 2

56

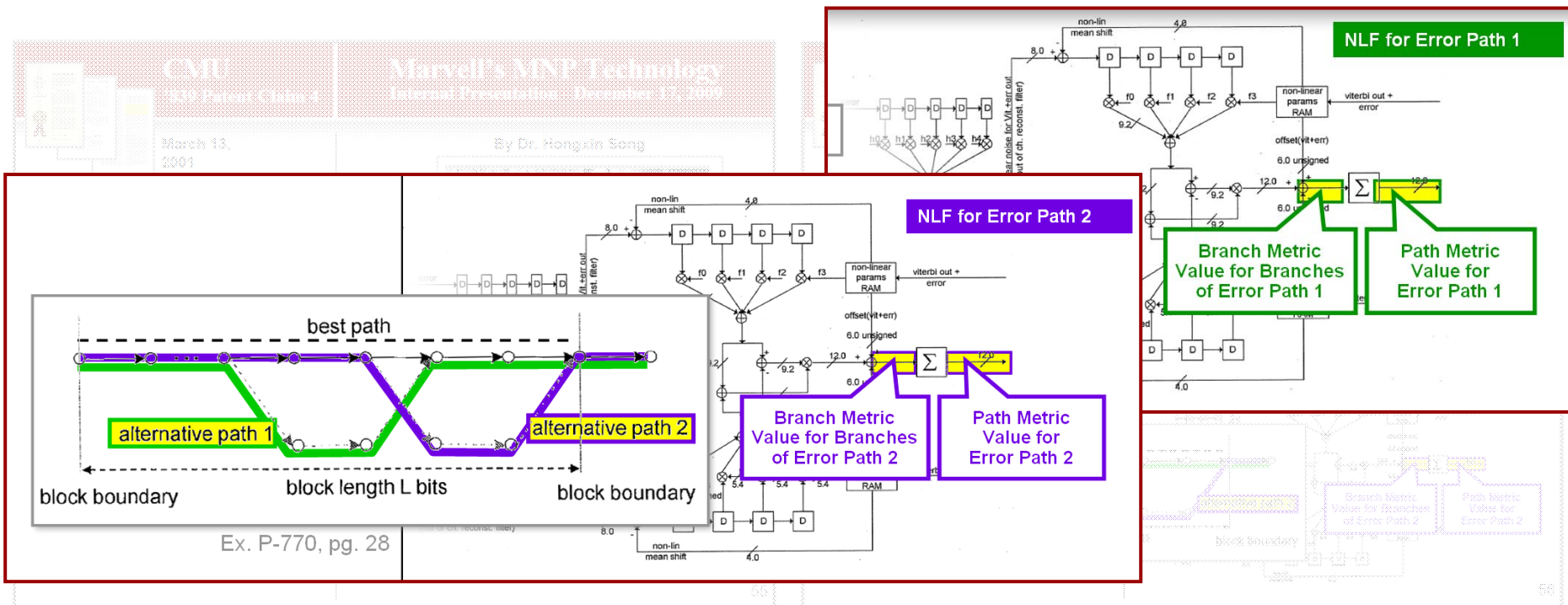
P-Demo 7, at 55 and 56

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Ex. P-770, pg. 28

P-Demo 7, at 55 and 56

P-Demo 7, at 56

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**Marvell's MNP Technology Internal Presentation - December 17, 2009**

By Dr. Hongxin Song

**Nonlinear Metrics**

- Steps to calculate nonlinear branch metric:
  - Remove mean offset
  - Nonlinear filtering
  - Calculate distance
  - Normalization by noise variance

$$BM_k = \frac{1}{\text{var}(Y)} \sum_{l=1}^L |Y_{k,l} - \hat{Y}_{k,l}|^2$$

$$I = [1, L, L-1, \dots, 1]$$

It works with nonlinear branch metric in the state space.

$$PM = \sum_k BM_k$$

Ex. P770, pg. 25

Ex. A Chip Stipulation

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March 13, 2001

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MNP is a detector

MNP computes branch metric values for branches of a trellis

MNP is a Viterbi-like detector

**Marvell's MNP Technology Internal Presentation - December 17, 2009**

**Nonlinear Processing and Correction in MNP**

- After error event screening, available paths are:
  - Linear best path
  - Nonlinear paths
- For each of the above paths, calculate the nonlinear BMs and PMs
- Select the path with smallest nonlinear PM as the nonlinear best path
- Finally selection is also considered if available
- If nonlinear best path / linear best path, correction is avoided

For each of the above paths, calculate the nonlinear BMs and PMs

Ex. P770, pg. 25

Ex. A Chip Stipulation

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For each of the above paths, calculate the nonlinear BMs and PMs

$PM = \sum_k BM_k$

Branch Metric Value

Path Metric Value

Branch Metric Value

Path Metric Value

For each of the above paths, calculate the nonlinear BMs and PMs

For each of the above paths, calculate the nonlinear BMs and PMs

# The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity



Dr. McLaughlin's *infringement* testimony was compelling

**NLD:** Using Marvell's documents and testimony, Dr. McLaughlin showed that the NLD's FIR filters are part of the "branch metric" computation

CMU '839 Patent Claim 4	Marvell's NLD Technology
<p>March 13, 2001</p> <p>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 index from a set of signal-dependent branch metric functions; and</p> <p>NLD is a detector ✓</p> <p>NLD computes branch metric values for branches of a trellis ✓</p> <p>NLD is a Viterbi-like detector ✓</p>	<p>Nonlinear Viterbi Detector Application Note - C8830 R1.0</p> <p>Hongxin Song December 13, 2006</p> <p>I. Introduction</p> <p>The nonlinear Viterbi detector (NLD) in C8830 R1.0 differs from the linear Viterbi detector (VTD) in that NLD has noise whitening built into the branch metric (BM) calculation. NLD effectively integrates previously media noise processor (MNP) into VTD. In addition, C8830 R1.0 supports large gain targets.</p> <p>Ex. P-596</p> <p>The equalized input (e.g. FIR output) passes through the nonlinear filter (NLF) bank of 32 filters. The mean of each of the 32 filter output is then removed. The branch metrics (BM) of the 32 branches are then calculated. The usual ACS block then follows.</p> <p>NLV supports FIR equalization targets of up to 5 taps, and supports noise whitening of up to 3<sup>rd</sup> order.</p> <p>Ex. P-823 82</p>

P-Demo 7 at 82

# The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity

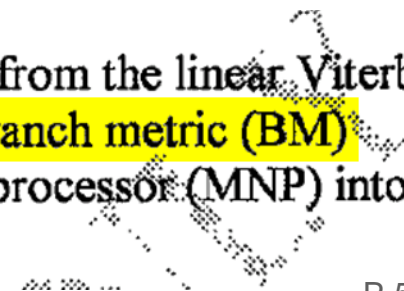


Dr. McLaughlin's *infringement* testimony was compelling

**NLD:** Using Marvell's documents and testimony, Dr. McLaughlin showed that the NLD's FIR filters are part of the "branch metric" computation



The nonlinear Viterbi detector (NLD) in C8830 R1.0 differs from the linear Viterbi detector (VTD) in that NLD has noise whitening built into the branch metric (BM) calculation. NLD effectively integrates previously media noise processor (MNP) into VTD. In addition, C8830 R1.0 supports large gain targets.



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The equalized input (e.g. FIR output) passes through the nonlinear filter (MNF) bank of 32 filters. The output of each of the 32 filter outputs is then processed by the noise whitening section of the NLD branch metric calculation. The usual ACS block then follows.

NLD supports FIR equalization targets of up to 3 taps, and supports noise whitening of up to 3<sup>rd</sup> order.

P-Demo 7 at 82

# The Court Should Deny Marvell's JMOL and New Trial Motions on Infringement and Validity



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**NLD:** Using Marvell's documents and testimony, Dr. McLaughlin showed that the NLD's FIR filters are part of the "branch metric" computation

**CMU**  
'839 Patent Claim 4

March 13, 2001

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.

**Marvell's NLD Technology**  
Burd Testimony - June 10, 2010

3 Q. And so we -- we just walked through  
4 branch metric calculation. When we were walki  
5 through Figure 7, we were walking through the  
6 metric calculation for a single branch; is the  
7 correct?  
8 A. That is correct.  
9 O. And is it possible that for a different  
10 branch of the Viterbi trellis that the f0, f1, f2,  
11 and f3 values can be different?  
12 A. Yes. It is possible. So basically we're  
13 using a branch metric function that is parameterized  
14 in terms of --  
15 THE REPORTER: That is --  
16 THE WITNESS: Parameterized.  
17 MR. RADULESCU: Parameterized.  
18 THE WITNESS: Parameterized. Okay. East  
19 Coast/West Coast; potato/patata. Okay.  
20 Parameterized in terms of -- now I lost my  
21 train of thought. Okay. Parameterized in terms of  
22 branch -- branch metric, branch -- sorry -- branch  
23 index, and so for different branches you would  
24 choose different set of parameters.

Burd Tr. at 552. 86

**CMU**  
'839 Patent Claim 4

March 13, 2001

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Entire circuit, including NLF filter, Computes Branch Metric Value

**Marvell's NLD Technology**

THE WITNESS: Well, it is a statement of the fact that now each whitening filter is associated with a branch metric. Right? And so in fact noise whitening filter is a parameter of branch metric function, okay, as opposed to previous architecture where we had a single noise whitening filter which was kind of built into the FIR filter or, in prior design, it was a standalone filter.

Burd Tr. at 491-492

**Nonlinear Viterbi Detector Application Note - C8830 R1.0**  
Hongxin Song  
December 13, 2006

1. Introduction

The nonlinear Viterbi detector (NLD) in C8830 R1.0 differs from the linear Viterbi detector (VTD) in that NLD has noise whitening built into the branch metric (BM) calculation. NLD effectively integrates previously media noise processor (MNP) into VTD. In addition, C8830 R1.0 supports large gain targets.

Ex. P-596 89

P-Demo 7, at 86 and 89