

**UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION**

Public Version

In the Matter of

RAMBUS INCORPORATED,

Docket No. 9302

a corporation.

**MEMORANDUM IN SUPPORT OF COMPLAINT COUNSEL’S MOTION IN
LIMINE TO EXCLUDE CERTAIN TESTIMONY OF MICHAEL GEILHUF**

Complaint Counsel respectfully submits this memorandum in support of its motion to exclude the portions of the anticipated trial testimony of Michael Geilhufe that even he would not rely on – his cost estimates. Mr. Geilhufe’s cost estimates fail the most cursory reliability analysis. They depend on facts that Mr. Geilhufe did nothing to establish and for which there is no basis in the record. And the methodology used to translate those “facts” into cost estimates is invariably nothing more than Mr. Geilhufe’s naked assertion that the cost is what he says it is because he says so. It is perhaps because of these defects in the sources and methodologies that he used that Mr. Geilhufe concluded that if he were an executive and he received his own report, he would not consider it sufficient to make a decision regarding which technology to use:

The analysis of the alternatives is totally inadequate for a -- let's say if my design manager came to me in my general management role with these alternatives and said decide one, I would say go take another five engineers and go to work and do a better job and find serious alternatives analyzing carefully and give me the pros and cons of each one of them.¹

A close look at both the factual basis for Mr. Geilhufe’s opinions and the methodologies he used to arrive at those opinions reveals that they are nothing more than subjective belief and unsubstantiated speculation. Therefore, the proposed testimony is unreliable, and it should be excluded.

¹ Geilhufe Dep. (3/5/03) at 232:25

I. Background

Because the basis for much of Mr. Geilhufe's opinions lies in his experience, the first part of this background is a discussion of that experience. The next section describes the factual bases and methodologies described by Mr. Geilhufe in his deposition as supporting the conclusions he has for the costs of replacing the Rambus claimed technologies with the alternatives proposed by Professor Jacob.

A. Mr. Geilhufe's Experience

Mr. Geilhufe's report lists his experience as "30 years of integrated circuit manufacturing experience."² However, a closer look at that experience reveals that he has little experience in the DRAM industry since the mid-1980s at the very latest,³ and no real DRAM manufacturing or design experience since that period. Mr. Geilhufe's last formal education in electrical engineering was in 1967.⁴ After that he designed DRAMs and other memory products for Advanced Memory Systems, Inc., until 1973.⁵ At his deposition, Mr. Geilhufe testified that he "was involved with DRAM design issues" until the mid to late 1980s,⁶ but his resume does not reflect any DRAM design experience in that time period.⁷ In fact, none of the firms where Mr. Geilhufe worked between the early 1980s and 1999 even manufactured DRAM.⁸ His DRAM-related experience during that period was restricted to the period between 1982 and 1988 when he was involved in

² Geilhufe Report at 10 [Tab 1].

³ Even Mr. Geilhufe described the period when he was designing DRAMs to the jury back when he was involved in DRAM manufacturing. See Geilhufe Report at 10 [Tab 1].

implementing Intel's strategy to ensure the continued supply and availability of DRAM devices after Intel left the DRAM fabrication business in the early 1980s.⁹

From 1988 to 1999, Mr. Geilhufe worked at Information Storage Devices ("ISD").¹⁰ ISD developed a non-volatile memory storage device for voice recorder related products.¹¹ During that time he had no design or manufacturing experience with DRAMs. The only experience he had of even marginal relevance to DRAM manufacture during that time was that he "was being kept apprised of the facility capabilities," of a Samsung semiconductor plant manufacturing ISD's non-DRAM products.¹² Finally, from 1999 to 2001, Mr. Geilhufe worked for the DRAM manufacturer Winbond, where he was "aware of the volume of DRAMS that were manufactured, the types of DRAMS that were manufactured, obviously the profitability of the – or lack thereof -- of the DRAM business."¹³ However, he did not do any "specific work" relating to the costs involved in manufacturing DRAM at Winbond.¹⁴

B. The Cost Elements

The expert report filed by Mr. Geilhufe included a number of cost "elements" that Mr. Geilhufe determined to be relevant to the determination of the cost to manufacture a DRAM device containing an alternative feature proposed by Complaint Counsel's technical expert, Professor Bruce Jacob, rather than the feature currently in JEDEC-compliant DRAM and claimed by Rambus.¹⁵ None of the cost elements set forth in the

⁹ "Q So were these products [that you contracted for while at Intel] designed by Intel and then the design was transferred to Samsung or was Samsung the designer of 88 TD /F1 12 to Sams 0D /t

report were described in the report and the report is silent on the methodologies used to determine the costs, other than a reference to Mr. Geilhufe's "years of integrated circuit manufacturing experience." Although Mr. Geilhufe apparently evaluates thirteen cost elements, nearly all of the costs per unit found by him relate to six elements. Those elements are: (1) wafer sort, (2) good die yield, (3) packaging, (4) Final test and good unit yield, (5) inventory, and (6) board complexity. Because most of the costs, and all of the variable costs determined by Mr. Geilhufe come under those elements, this motion will focus on those cost elements. The following section describes each cost element and identifies the information that Mr. Geilhufe testified was required to establish the cost of each element. Finally, each section identifies the methodology used by Mr. Geilhufe to gather the facts he deemed necessary to evaluate the cost element and the methodology he used to arrive at his opinion of the cost.

1. Wafer Sort

In this cost element, Mr. Geilhufe sought to evaluate the test costs experienced by DRAM manufacturers at a particular stage of the DRAM fabrication process.¹⁶ For each effected alternative technology proposed by Professor Jacob, Mr. Geilhufe asserted additional test costs solely based on either an assumption or his "experience." For example, Mr. Geilhufe's evaluation of the cost of using fuses to set CAS latency under this cost element depends on Mr. Geilhufe's determination of how long it would take to blow the necessary fuses.¹⁷ But he conducted no investigation of how long such an operation takes.¹⁸ When asked how Complaint Counsel could verify the estimates arrived at by Mr. Geilhufe, he stated that Complaint Counsel should "go to – Infineon is

¹⁶ *Id.*, at 88:22-89:22.

¹⁷ *Id.*, at 131:2-22.

¹⁸ *Id.*, at 131:2-22 ("Q Did you do anything to determine how long it would take to burn these fuses? A No, I did not specifically analyze that."). This same lack of factual support permeates his analysis of all of the alternatives under this element. *See e.g., Id.*, at 100:22-25 (fixed CAS latency: "I assumed that by not having to test a piece of silicon for two different CAS latencies, that test time would be reduced somewhat. And that very likely could improve the cost somewhat"); *Id.*, at 134:5-19 (Scale CAS Latency with Clock: "Again, based on my experience, I estimated that there would be a slight increase in test time."); *Id.*, at 207:6-208:7 (Vernier Mechanism on Controller IC: "I made an assumption of approximately how much test time is required to test the DDL -- excuse me, the DLL as a percentage of the total test time. And from that point of view, I then concluded it's approximately two cents.").

one of the companies, go to the cost accounting system and get the number.”¹⁹ However, Mr. Geilhufe made it clear that he did not conduct such a survey.

Q Did you do anything like that [talk to Infineon] to come up with this number?

comparing the amount of circuitry removed by eliminating dual-edged clocking with the amount of circuitry added by implementing the interleaving alternative.

Q So you believe that the circuitry that would be added would be larger than [the circuitry being removed]?

A Significantly larger than the decrease.

Q What's that based on?

A Again, my years of design experience.

Q Did you look at a DDR product that is out there today to see what the size of the circuitry is that allows it to do dual edge clocking?

A No, I did not.

* * *

Q Was there anything else you did to determine there would be more circuitry added than removed in this alternative?

A I did not do clearly a detailed design. I simply estimated what the multiplexing circuitry would require.²⁴

When asked how Complaint Counsel could verify the values he found, Mr. Geilhufe had no recommendations. "I can only give you based on my experience my estimates. You have to get your estimates where you see fit."²⁵

3. Packaging

Once it is determined by the DRAM manufacturer that the DRAM chip is "good," it is then packaged, which involves encapsulating the chip in a plastic package, which protects the chip from the environment.²⁶ The costs attributable to this element appear largely to result from the type of package used and the number of "pins" or connections required by the chip to accomplish its functions. As regards the number of pins used, Mr. Geilhufe's cost estimates appear to be based on his experience that each pin costs one cent per pin per DRAM chip.²⁷ The cost of the type of package used was determined by

²⁴ *Id.*, at 161:17-164:10.

²⁵ *Id.*, at 167:19-21.

²⁶ *Id.*, at 105:16-25.

²⁷ *Id.*, at 136:6-8.

Mr. Geilhufe on the basis of “confidential conversations” he has had in the past with firms that purchase from contract manufacturers.²⁸

4. Final Test and Good Unit Yield

This cost element is similar to the “wafer sort” and “good die yield” elements discussed earlier. However, while those elements related to the testing stage of DRAM production where the manufacturer is attempting to determine which DRAM chips should progress further into the production process, this element relates to the testing that is done after the DRAM chips are cut from the wafer and packaged.²⁹ The cost changes assigned by Mr. Geilhufe relating to this factor appear largely to stem from decreases in the number of DRAM chips that the DRAM manufacturer can sell.³⁰ For example, Mr. Geilhufe’s determination of the additional cost of interleaving on-chip memory banks under this element depends on how much yield would decline due to Mr. Geilhufe’s perceived need for “higher speed testing.”³¹ But Mr. Geilhufe did nothing either to establish that need or to establish how much it would cost other than to resort to his experience.³² Once again, w

chips that they make. According to Mr. Geilhufe these cost increases result from cost increases in each level of the DRAM industry's supply chain.³⁴ Increases in the number of varieties of DRAM produced by a DRAM manufacturer would increase its costs because it would increase the complexity of the manufacturing process to produce a number of different types of chips rather than one type of chip.³⁵ In addition, Mr. Geilhufe asserted that other firms in the DRAM supply chain would experience increased costs due to increases in the number of varieties of DRAM chip and the increased risk that the DRAM customer, for example, would not have the varieties of DRAM that the market demanded.³⁶ But as with each of the other cost changes

even the manufacturer⁴⁰ of the component. While Mr. Geilhufe apparently called a few suppliers to determine the costs of some of the components, he could not remember the names of any of the supplier representatives.⁴¹ Nor did Mr. Geilhufe ever receive written quotes for the components he estimates.⁴²

II. Discussion

Rambus has proffered Mr. Geilhufe to testify regarding what he believes to be additional costs that would result from using the technologies proposed by Complaint Counsel's technical expert, Professor Bruce Jacob. Mr. Geilhufe's report appears to describe the additional costs of the DRAM devices to, at times, within less than a penny per DRAM device. But it describes neither Mr. Geilhufe's methodology, nor his sources of facts other than to note that the estimates are "based on my 30 years of integrated circuit manufacturing experience." At his deposition, it became clear that there were a few other sources of information relied upon by Mr. Geilhufe, but that none are themselves reliable. For each cost estimate, Mr. Geilhufe arrived at facts in an entirely subjective manner that could not be duplicated or verified in any way by Complaint Counsel. As described below, Mr. Geilhufe's principal source of information, his generalized experience in the industry, amounts to nothing more than *ipse dixit*, with no detail that would allow others to determine how he concluded that a particular fact was true. Mr. Geilhufe's other sources of facts were marred by his inability or unwillingness to provide information to allow Complaint Counsel to verify the facts that he found.

⁴⁰ See e.g., 177:20-21 (Connectors: "Q Which manufacturers did you look at? A I don'tves.ut Tw rs did y48 Tf ()q371.8squ 9.9

The admissibility of expert testimony is governed by Commission Rule 3.43(b).⁴⁵ Under the rule, “irrelevant, immaterial, and unreliable evidence shall be excluded.”⁴⁶ The Federal Rules of Evidence provide a framework for analyzing the reliability of expert testimony. Therefore, Rule 702 of the Federal Rules of Evidence, amended in 2000, provides an instructive starting point for analysis.

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Rule 702 was amended in 2000 primarily in response to a pair of Supreme Court cases. *F.R. Evid. 702*, Comment, 2000 Amendments. Those cases, *Kumho Tire v. Carmichael*, 526 U.S. 137, 119 S.Ct. 1167 (1999) and *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 113 S.Ct. 2786 (1993) established that the general acceptance test for the admission of scientific and technical evidence was no longer the sole determinant for the admission of such evidence and that to be admitted, such evidence had to be reliable and relevant. A primary focus of the cases since *Daubert* 46

Donnelly v. Ford Motor Co., 80 F.Supp.2d 45, 50 (E.D.N.Y. 1999) (“Without some explanation of the data, studies or reasoning [an expert] employed, his conclusion is simply inadmissible *ipse dixit*”). An assertion of an expert’s qualifications, conclusions

test time, Mr. Geilhufe invariably resorted once again to his generalized experience with no investigation or other factual basis whatever:

Q Now, returning to programming CAS latency with fuses, for the wafer sort cost element for programming CAS latency with fuses, you asserted that it would increase test time and so you added one cent, approximately one cent per unit. Why did you do this?

A It takes time to blow a fuse and to verify that the fuse is open and

the component. In his survey (with a sample size of one to two suppliers) he does not recall or provide the names of the supplier representatives,⁵⁶ the part numbers whose prices he obtained,⁵⁷ or often even the company contacted.⁵⁸ Nor was Mr. Geilhufe's survey a comprehensive one: in investigating the cost of the component, Mr. Geilhufe failed to consider components already in the market that were used for the same purpose.⁵⁹

In still other cases, Mr. Geilhufe claims that his experience was sufficient to allow him to opine on the costs of an alternative, but confidentiality agreements made him unwilling to describe the costs in any more detail.

Q Okay. And so I understand, am I correct in my understanding that part of the basis for your understanding that the additional cost for packaging for this alternative is 25 cents, one basis for that is confidential conversations?

A That's correct.

Q In addition to that confidential conversation or set of confidential conversations, what is the basis for this 25-cent number?

A That is the basis, and my own experience in purchasing BGA packages in the past.⁶⁰

⁵⁶ See e.g., 181:7-23 (Connectors: "Q Do you remember the company that you spoke to, the distributor that you spoke to? A I want to say Arrow but I don't recall exactly. Q Could you spell that, please? A Arrow, A-r-r-o-w. Q Okay. And the person -- it's just Arrow, that's the whole name of the company? A Yes. It's a distributor by that name. Q Arrow, Inc? A Yes. Q And the person that you spoke to at Arrow, Inc? A I don't recall. First name, Hi, I'm Joe. Q That being an example, not actually his name; correct? A Exactly, for example."); 196:9-12 (On-DIMM Clock: "Q And how did you identify that sales representative? I'm sorry, we'll start with what's that sale's representative's name? A I don't know.").

⁵⁷ See e.g., 182:10-12 (Connectors: "Q Okay. And you don't remember what that part number is? A I do not.).

⁵⁸ See e.g., 177:20-21 (Connectors: "Q Which manufacturers did you look at? A I don't recall."); 195:25-196:2 (On DIMM clock: "Q Who did you receive quotes from? A I believe it was Cypress Semiconductor. I don't remember the other one."); 211:14-17 (On DIMM DLL: "Q What is that number based on? A That is based on ASP quotes. And I need to refresh my memory. I do not recall right now where that -- which manufacturer supplied that.")

⁵⁹ "Q How does this clock differ from the clocks that are on, say, registered DIMMs in current production? You understand there are clocks on registered DIMMs, the PLLs on registered DIMMs? A I have not looked at that. So I don't have an answer for you. Q So you don't know how they are different from -- how they are different from what this clock would be? A I have not looked at register DIMMs." *Id.*, at 196:17-197:1.

⁶⁰ *Id.*, at 173:14-24.

This factual basis, like the others before it seem calculated to obscure the details necessary to determine whether the costs ascribed relate to the alternative at all. Without some

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