

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

Public Version

In the Matter of RAMBUS INCORPORATED, a corporation.
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Docket No. 9302

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

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 232:25-233:7, In the Matter of Rambus, Inc. [Tab 2].

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 describes the period when he was designing DRAMs as the "way-back-when time frame." Geilhufe Dep. at. 40:7-8 [Tab 2].

⁴ Geilhufe Report at 1 [Tab 1].

⁵ *Id.* Although his resume indicates that by 1973, Mr. Geilhufe was a Manager of Memory Development at Intel until 1977 and then a Manager of "Reliability Engineering" from then to 1979, *Id.*, at 23, Mr. Geilhufe stated that his last direct DRAM design experience was 1978. Geilhufe Dep. at 31:4-8 [Tab 2].

⁶ *Id.* at 31:4-19.

⁷ Mr. Geilhufe's position between 1984 and 1987 was "GM and Director Components Contracting." Geilhufe Report at 22 [Tab 1]. His resume describes no DRAM design experience in that period but instead describes the position as follows: "Launched, developed and managed international contract semiconductor manufacturing business for low cost chip production and buffering of Intel's plant capacity." *Id.*

⁸ Geilhufe Dep. at 31:23-33:5 [Tab 2].

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 these products? A Those particular products were Samsung-designed products. Q Okay. A Those particular DRAMS were Samsung-designed DRAMS." *Id.*, at 32:23-33:5.

¹⁰ Geilhufe Report at 2 [Tab 1].

¹¹ Geilhufe Dep. at 41:21-42:3 [Tab 2].

¹² *Id.*, at 97:20-98:15.

¹³ *Id.*, at 33:3-34:5.

¹⁴ *Id.*

¹⁵ Geilhufe Report at 11-14 [Tab 1]. "Q ... What did you do to determine which cost elements you were going to model and which cost elements you were not going to model? A I used the same process that -- I don't know about cost analysts, but that a general manager of my experience would use in analyzing the cost of a product. By that I mean life cycle cost from conception all the way through consumption. And then I just went down those elements and I tried to identify which ones were relevant." Geilhufe Dep. at 76:24-77:9 [Tab 2].

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?

A Of course not. My numbers are based on my experience, my own manufacturing experience. I cannot speak for any of the other manufacturers. I can certainly speak for some of the international manufacturers because I have personal experience, which you recognize is confidential and I can't really tell you what the numbers are that exist in some of those factories.²⁰

2. Good Die Yield

This cost element relates to the effect of the alternative feature or technology on the number of good DRAM chips that can be taken from the wafer (the “yield”).²¹ The higher the number of chips that can be taken from a particular wafer, the lower the average cost of each chip taken from that wafer.²² In order to justify his conclusions regarding the cost effect of this element, Mr. Geilhufe generally focused on the size of the control circuitry he believed was required to implement each alternative proposed by Professor Jacob. Mr. Geilhufe conducted no investigation to determine either the amount of circuitry that could be removed from the DRAM due to the replacement of existing technology, or the amount of circuitry that had to be added to implement the alternative. Rather, the methodology he used was to exclusively rely on his experience.²³ For example, Mr. Geilhufe’s evaluation of the cost of replacing dual-edged clocking with Professor Jacob’s alternative of interleaving on-chip memory banks depends on

¹⁹ *Id.*, at 94:2-11.

²⁰ *Id.*, at 94:13-22.

²¹ *Id.*, 103:13-17.

²² “So what I’m doing is I’m basing my good die yield analysis on the performance distribution and whether or not, for instance, the fixed CAS latency alternative specification will cut off part of the population that maybe physically functional but may not meet the specification, one, or, secondly, it may be physically defective.” *Id.*, at 103:20-104:15.

²³ This same lack of factual support permeates his analysis of all of the alternatives under this element. *See e.g., Id.*, 198:17-20 (Asynchronous Toggle mode: “I made an estimate but, quite frankly, it was fairly difficult to estimate that accurately.”); *Id.*, at 208:8-17 (Vernier Mechanism on Controller IC: “It’s based on -- the DLL size itself is quite small, so it’s not a die size issue. It’s more a -- I lost my thought -- that’s correct, it is based on my experience.”); *Id.*, at 105:5-15 (Fixed CAS latency: “That estimate is based on -- yes, it’s based on my experience”).

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, when asked how Complaint Counsel could verify his results, Mr. Geilhufe had no answer. “I think I can only speak from my own experience and you’ll have to identify how to verify that experience.”³³

5. Inventory

The costs described in this element relate to the allegedly increased costs that are incurred by DRAM manufacturers due to increases in the number of varieties of DRAM

²⁸ *Id.*, at 173:20-24 (“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”).

²⁹ *Id.*, at 106:1-17.

³⁰ *Id.*, at 106:18-107:5.

³¹ *Id.*, at 164:23-165:11.

³² *Id.*, at 166:19-23 (“Q And what did you do to determine that the cost of that would be two cents per unit? A I used my experience as to what is a likely decrease in yield and what kind of effect that would have.”) This same lack of factual support permeates his analysis of all of the alternatives under this element. *See e.g., Id.*, at 134:25-135:11 (Scale CAS latency with the clock); *Id.*, at 188:2-189:24 (Double Clock Frequency: “I believe I made the assumption that approximately a one percent reduction in yield would result because of the higher speed testing at final test.”)

³³ *Id.*, at 189:11-12.

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 determined by Mr. Geilhufe the basis for the specific impact of the costs was not an investigation of the impact of such a variety of output on inventory costs, but simply his generalized experience in the industry.³⁷

6. Board Complexity

This cost element relates to the increases in cost that Mr. Geilhufe projects based on changes to the DIMM that either Mr. Geilhufe believes is required to implement one of Professor Jacob's alternatives, or that Professor Jacob believes is required for the same purpose.³⁸ The cost increase results from the requirement of a new and, according to Mr. Geilhufe, more expensive component such as an on-DIMM clock or a connector. In each case, the cost estimate provided by Mr. Geilhufe was the result of a type of survey he made of either suppliers or manufacturers of the new component. However, Mr. Geilhufe could not identify either the part number of the component³⁹ or, in most cases,

³⁴ *Id.*, at 107:8-109:20.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*, at 110:16-19 (“That was an estimate that I had -- it's just based on my experience.”)

³⁸ The DIMM or “dual in-line memory module” is the circuit board that the DRAM chips are generally connected to prior to the incorporation of the DRAM into a PC. When a consumer buys a DRAM upgrade for his computer, the upgrade comes in the form of a DIMM or a SIMM (“single in-line memory module”). DIMMs and SIMMs are attached to motherboards by connectors.

³⁹ *See e.g.*, 182:10-12 (Connectors: “Q Okay. And you don't remember what that part number is? A I do not.”).

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'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.")

⁴¹ 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.")

⁴² See e.g., 196:3-8 (On-DIMM Clock: "Q When you say you received quotes, did they send you a letter or did you -- A No, I reviewed the specifications, looked at their price list and then had a conversation with their sales representative as to what the volume discounts would be."); 212:10-14 (On-DIMM DLL: "Q This quote that you received regarding the on-DIMM DLL cost -- A Yes. Q -- how did you receive this quote? A It was by phone I'm sure.")

Nor do Mr. Geilhufe's opinions rest on any reliable principle or method. In fact, the main method used by Mr. Geilhufe to analyze the facts is the same method he uses to obtain the facts, his resort to experience. The methodology he used to calculate his costs from the "facts" thus mirrors the way he found the facts: the costs are what he says they are because his experience tells him so. This thoroughly opaque approach is indistinguishable from a simple bottom line conclusion and makes it impossible to determine where his determinations of fact end and his applications of methodology begin. That method also makes it impossible to discern precisely what he did to determine what the costs were as that methodology provides no guidance to allow his results to be checked. Finally, the *ad hoc* nature of Mr. Geilhufe's opinions is reflected in what he claims to be the margin of error for those opinions: despite the distinctly different methodologies used to determine the costs of using the different technologies, Mr. Geilhufe concluded at his deposition that the margin of error for each was 25%.⁴³

His reliance on experience in this case is insufficient for yet another reason: nowhere in his report and, despite repeated questions regarding the bases for his opinions at deposition, at no point in his deposition, has Mr. Geilhufe even attempted to show how his experience leads to the conclusions reached or why that experience is a sufficient basis for the conclusions. This is particularly important here as most of Mr. Geilhufe's DRAM-related experience is more than two decades old.⁴⁴ Even though Mr. Geilhufe has not manufactured or designed a DRAM in many years, he claims to know, solely on the basis of that experience, the size of circuitry on DDR SDRAMs (which he never manufactured or designed himself), the testing time for SDRAM and DDR SDRAM (neither of which he has designed or manufactured) and other facts necessary for his conclusions. But Mr. Geilhufe has made no attempt to explain the tenuous connection between his experience, which apparently ended in the 1980s, and the facts he claims to draw from that experience.

⁴³ Each estimate in Mr. Geilhufe's tables is preceded by a "~" symbol, apparently as an indication that the number is approximate. Geilhufe Report at 11-14 [Tab 1]. Although not mentioned anywhere in his report, Mr. Geilhufe later emphasized in his deposition that his model "is exactly that, it's a model that's based on my experience and I need to make sure you understand that all numbers are approximate based on my experience in the industry." Geilhufe Dep. at 90:15-18 [Tab 2].

⁴⁴ See Section I. A .

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* has been that “unverified statements that [are] unsupported by any scientific method... [provide] no basis for relaxing the usual first-hand knowledge requirement of the Federal Rules of Evidence....” *Rogers v. Ford Motor Co.*, 952 F.Supp 606, 615 (N.D. Indiana 1997) (expert testimony that offers nothing more than a bottom line conclusion is excluded).

In order for an expert’s opinion to be reliable, it must be based on sufficient facts or data. See *Elcock v. Kmart Corp.*, 233 F.3d 734 (3rd Cir. 2000) (expert economist excluded because model relied on assumptions “wholly without foundation in the record); *Coffey v. Dowley Manufacturing, Inc.*, 187 F.Supp.2d 958 (M.D. Tenn 2002) (expert opinion is rejected in part because it is based on “guestimations”). The expert’s opinion must provide some basis on which to examine the reliability of the report. See

⁴⁵ 16 CFR § 3.43(b)(1).

⁴⁶ *Id.* (evidence may be excluded even if relevant, material, and reliable because of considerations of “undue delay, waste of time or needless presentation of cumulative evidence.”)

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 and an assurance of reliability is not enough to allow a court to consider an expert’s proffered opinion to be reliable. See *Daubert v. Merrill Dow Pharmaceuticals Inc.*, 43 F.3d 1311, 1319 (9th Cir. 1995) (on remand).

In deciding whether to admit expert testimony, the court’s foremost objective must be to rule out “subjective belief or unsupported speculation.” *O’Conner v. Commonwealth Edison Co.*, 13 F.3d 1090, 1106 (7th Cir), *cert. denied*, 512 U.S. 1222 (1994). An expert witness may rely on his experience as the basis for his testimony. *F.R. Evid.* 702, Comment, 2000 Amendments. However, if the expert is relying solely or primarily on experience, “then he must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion and how that experience is reasonably applied to the facts.” *Id.*; *Nemir v. Mitsubishi Motors Corp.*, 200 F.Supp.2d 770, 774 (E.D. MI 2002). “The more subjective and controversial the expert’s inquiry, the more likely the testimony should be excluded as unreliable.” *Nemir v. Mitsubishi Motors Corp.*, 200 F.Supp.2d at 774.

An expert is required to employ “in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field,” *Kumho Tire*, 526 U.S. at 152, 119 S.Ct. at 1176. In this respect, the insufficient and unreliable nature of the investigation and analysis Mr. Geilhufe performed was obvious to even Mr. Geilhufe. In particular, he made it clear in response to questioning from his own attorney that the analysis he did for this case was neither as thorough nor as detailed as the work he did or expected to see when he was involved in semiconductor manufacturing outside of the courtroom.

Q So if I understand your answer, your experience in making these cost estimates really does extend to pretty much all the categories of cost that are addressed in the tables in your report?

A The answer is it extends beyond what's in the table. *The Intel-required analyses were more thorough, more detailed. At ISD our analyses*

*were considerably more thorough because we were using outside contract manufacturers.*⁴⁷

It is easy to understand why Mr. Geilhufe would not rely on his own conclusions. The complete absence of objective facts or data in Mr. Geilhufe's report hardly satisfies the requirement of Rule 702 that each opinion be based on "sufficient facts or data." Instead, Mr. Geilhufe invariably proceeds from a *theory* of potential cost impact directly to the impact itself with no intrusion of objective fact to establish that cost impact. Mr. Geilhufe begins his analysis of the cost of each alternative technology by breaking down the costs of a DRAM into its constituent elements. Then, as described above, for each element, he posits a theory that could presumably lead to a conclusion that the element is either more or less expensive than before, because of the incorporation of the alternative technology. But in each case, that theory fails to lead, by itself, to the conclusion that the cost effect of the alternative is as he contends. Because he conducted little or no investigation and because his experience is so remote in time from any active participation in resolving these issues in the real world, Mr. Geilhufe cannot rely on specific facts and must resort to his "experience" in order to move from his theory to an asserted cost effect. Geilhufe's opinions fail to satisfy the requirements of either Rule 702 or the Commission's rules because in the end they are based not on any facts, but irretrievably on subjective belief and unsupported speculation.

For example, in describing the good die yield, one of Mr. Geilhufe's technical justifications for changes in cost was that the alternative technology would increase the size of the control circuitry on each DRAM.⁴⁸ That increase in control circuitry would either increase the size of the DRAM itself so that fewer could fit on each wafer, or it would increase the probability that a chip could suffer from a defect that could not be repaired. In either case, the increase in control circuitry that Mr. Geilhufe envisioned would decrease the yield of DRAM manufacturers, thus increasing the cost.⁴⁹ But Mr. Geilhufe provided no justification for his conclusion that the amount of control circuitry would increase. He agreed that since the technology was replacing the existing

⁴⁷ Geilhufe Dep. at 235:6-15 [**Tab 2**] (emphasis added).

⁴⁸ *Id.*, at 161:8-163:2.

⁴⁹ *Id.*

technology, some control circuitry would be removed, but he characterized the removed circuitry as “slight,” providing no evidence to support that conclusion.⁵⁰ He did not evaluate current DDR SDRAM designs to determine the size of the circuitry being removed, and he did not do a “detailed design” that would allow him to make a determination of the size of the circuitry being added.⁵¹ In addition, once he concluded that the alternative would lead to an increase in the size of the control circuitry, he was forced to make yet another factual leap in order to determine the cost effect of that presumed increase in size:

Q What did you do to determine what the increase in cost would be due to the size, the increase in size of the control circuitry?

A I recognize that the control circuitry is a relatively small portion of the overall die area. I recognized that the control circuitry -- any failures in the control circuitry have a higher impact on yields than failures in the rest of the die. And based on those analyses, I concluded that the cost increase is approximately the three cents.

Q Where did the three cents come from is what I'm trying to understand.

A I assumed a reduction of somewhat less than a percent in yield on this product.

Q What was that assumption based on?

A The elements I just described.

Q DRAM experience, experience in the industry?

A Yes.

Q No other basis besides your experience in the industry?

A That's correct.⁵²

This is similar to the leap Mr. Geilhufe made in determining that certain alternatives would lead to increased testing costs. Mr. Geilhufe came to the conclusion that certain changes would change test time “somewhat,”⁵³ but that conclusion was not enough to allow him to make a determination of the effect of the element on the cost of the alternative. In order to come to a conclusion on the cost effect of this “increase” in

⁵⁰ *Id.*, at 161:17-163:2.

⁵¹ *Id.*

⁵² *Id.*, at 163:15-164:10.

⁵³ *Id.*, at 100:22-25.

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 remains open. I assume it would cost slightly more to blow the fuses and then test the parts.

Q So the increased amount of test time was based on your assumption about how much longer it would take to blow the fuses?

A Generally speaking, yes.

Q Did you do anything to determine how long it would take to burn these fuses?

A No, I did not specifically analyze that.

Q Was the time that you assume based on your experience?

A Yes.

Q Was it based on anything else?

A No.⁵⁴

In other cases, even Mr. Geilhufe apparently felt that his experience was insufficient to determine the cost of the alternatives, so he conducted a survey of the relevant costs.⁵⁵ For example, Mr. Geilhufe opines that Professor Jacob's double clock frequency alternative requires an "on-DIMM clock" to work properly. That conclusion does not allow Mr. Geilhufe to determine the cost of the alternative as he needs to know the cost of such a component. Consequently, he conducted a survey to determine the cost of the component. However, Mr. Geilhufe is unable to provide *any* supporting documentation or details regarding his findings relating to the cost of the component other than the assertions that he conducted such a survey and that he was told the price of

⁵⁴ *Id.*, at 131:2-22. Mr. Geilhufe's analysis of inventory costs is an excellent example of this as well as there is no factual basis for his conclusions that the cost will even increase, yet he is able to determine the amount of the increase down to the fraction of a penny per DRAM chip. ("Q What was the basis for the numbers that you put in the table? A That was an estimate that I had -- it's just based on my experience.") *Id.*, at 110:16-19.

⁵⁵ Perhaps, this is because Mr. Geilhufe has no experience making cost estimates for DIMMs. *See id.*, at 244:22-245:16.

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 detail on how the costs were determined, and exactly what the costs were for, it is impossible to know for sure whether the costs Mr. Geilhufe finds for each of the alternatives is a real cost or simply a guess. This tactic places Complaint Counsel and this Court in the position of guessing at the reliability of the evidence themselves.

III. Conclusion

For the reasons set forth more fully above, Complaint Counsel respectfully request that this Court exclude the portions of the anticipated trial testimony of Michael Geilhufe that relate to his estimations of the cost of the alternative technologies proposed by Professor Jacob.

Respectfully submitted,

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Dated: 3/26/2003

Tabs not Included in Public Version

CERTIFICATE OF SERVICE

I, Melissa Kassier, hereby certify that on May 13, 2003, I caused a Public copy of the following materials:

1. Complaint Counsel's Motion *In Limine* to Exclude Certain Testimony of Michael Geilhufe;
2. Memorandum in Support of Complaint Counsel's Motion *In Limine* to Exclude Certain Testimony of Michael Geilhufe; and
3. [Proposed] Order,

to be served upon the following persons:

by hand delivery to:

Hon. Stephen J. McGuire
Chief Administrative Law Judge
Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, DC 20580

and by electronic mail and overnight courier to:

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