

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

Docket No. 9302

PUBLIC VERSION

In the Matter of

RAMBUS INCORPORATED

APPEAL BRIEF
OF COUNSEL SUPPORTING THE COMPLAINT

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STATEMENT OF THE CASE

“The job of JEDEC is to create standards which steer clear of patents which must be used to be in compliance with the standard whenever possible.”

CX0903 at 2 (e-mail from Richard Crisp, Rambus’s representative at JEDEC, to Rambus executives and engineers, August 1996).

“It is contrary to industry practice and understanding for an intellectual property owner to remain silent during the [EIA/JEDEC] standard-setting process – and then after a standard has been adopted and implemented – later attempt to assert that its intellectual property covers the standard and allows it to exclude others from practicing the standard.”

CX2957 at 2 (affidavit of Joel Karp of Samsung – later Rambus Vice President of Intellectual Property – May 1996).

Complaint Counsel proved at trial, and will demonstrate here, that Rambus Inc. (“Rambus”) acquired monopoly power by conduct that led JEDEC, an industry standard-setting body, to adopt standards that ultimately were covered by Rambus patents. For years Rambus participated in JEDEC’s work while concealing its patents and patent applications, carefully amending and expanding the scope of its patent applications, and planning for future enforcement of its patents against crucial technologies adopted as JEDEC standards. This abuse of JEDEC’s process violated JEDEC’s specific rules of disclosure and general rules of conduct, and fundamentally subverted JEDEC’s pro-competitive purpose of adopting open standards based on full information. And, most critically for the purposes of this case, it allowed Rambus to obtain monopoly power by behavior that is the very antithesis of competition on the merits. The force of the deceptively captured JEDEC standards, not Rambus’s ability to triumph in the open marketplace, today allows Rambus to command the monopoly power it unquestionably enjoys: the power to reap from \$ 1-3 billion in royalties, ultimately from consumers.

Rambus set out to persuade the computer memory industry to adopt its radical new proprietary technology for memory chip design called “RDRAM.” Had Rambus contented itself with openly using RDRAM to compete against JEDEC’s proposed standards, we would not be here today. But Rambus began to fear that JEDEC’s proposed open standards for computer memory (which relied on more evolutionary improvements to existing memory technologies) posed the greatest competitive threat to Rambus’s radically different approach. Not content to allow its bid for monopoly to rise or fall solely on the competitiveness of its RDRAM architecture, Rambus set out to neutralize the competitive threat posed by JEDEC by locking up

JEDEC's supposedly "open" standards with patents.

The plan Rambus launched to achieve this end spanned much of a decade. In 1991, Rambus voluntarily joined JEDEC. For more than four years Rambus participated in JEDEC's standard-setting activities, all the while actively pursuing and amending its patents and applications in order to make certain that its intellectual property rights would cover the technologies incorporated in JEDEC's standards. Before and after resigning from JEDEC in 1996, Rambus concealed its plans to secure patent power over the JEDEC standards, making no disclosure of its patents and pending patent applications related to JEDEC's ongoing work – though on two occasions it did disclose to JEDEC other Rambus patents that were not related to JEDEC's ongoing work. Rambus's deliberate failure to disclose its relevant intellectual property violated JEDEC's rules and Rambus's duty to act in good faith, and struck at the very core of JEDEC's standard-setting process. JEDEC's rules required that its standards could not be based on patented technologies without careful and informed consideration, and assurance that the patented technology would be available to everyone on reasonable and non-discriminatory terms.

As a result of Rambus's conduct, JEDEC unknowingly adopted standards that contained technologies ultimately subject to Rambus patents – just as Rambus planned. Rambus's conduct deprived JEDEC members of the opportunity to make an informed evaluation of those technologies against other alternatives, or to negotiate in advance for more favorable royalty terms – just as Rambus planned. Rambus waited until 2000, after its own proprietary RDRAM technology had failed to be accepted and the JEDEC standards were in place, before it accused memory manufacturers and others of infringing its patents by using the JEDEC standards. By this time, the industry had become locked in to the JEDEC standards because of the vast

expenditure of resources in designing and manufacturing interrelated compatible products – just as Rambus planned. Having waited for the industry to become locked in, Rambus acquired monopoly power – power it intends to exploit by collecting royalties between \$1-3 billion, costs that in the long run will likely be borne by consumers.

Almost two years ago the Commission assigned Judge Timony to determine whether Rambus had engaged in monopolization, attempted monopolization, or unfair methods of competition in violation of Section 5 of the FTC Act, 15 U.S.C. § 45. Judge McGuire (who assumed the case two months before trial upon Judge Timony’s retirement) has now ruled that there was no violation by Rambus. His Initial Decision is riddled with legal and factual error.

The decision departs radically from the appropriate antitrust analysis. It dismisses the Commission’s complaint as a matter of law for failure to “state[] a legally cognizable cause of action under Section 5 of the FTC Act,” ID 253, holding that the theory set forth in the Commission’s complaint “Lacks a [r]easonable [b]asis in [l]aw.” ID 254, 258.¹ The import of this holding is that the Commission not only erred in issuing the complaint, but would lack statutory authority ever to hear a case based on “a company’s alleged anticompetitive conduct before a standard setting organization.” ID 253, 259.

As a distinct, alternative legal ground for the decision, the decision erroneously concludes that a violation of the FTC Act for standards abuse can be found only for breach of a “clear and

¹ This brief uses the following forms of citation: “ID” refers to the Initial Decision by page; “IDF” refers to the Initial Decision Findings by paragraph; “CCFF” refers to Complaint Counsel’s Proposed Findings of Fact by paragraph; “CCRF” refers to Complaint Counsel’s Reply Findings by paragraph; “Tr.” refers to the trial transcript by page, with the name of the witness in parentheses; “CX,” “RX,” “JX,” and “DX” refer to trial exhibits, by number and page; deposition and other non-trial testimony contained in the record is referred to by exhibit number and page, with the name of the witness in parentheses.

unambiguous obligation or duty” specifically set forth in the standards organization’s rules. ID 259-61. This holding, based largely on patent law and common law fraud, ignores the antitrust law principles developed in the standards area and is contradicted by long-established precedent, including two decisions of the United States Supreme Court.

Infected with these basic legal errors, the Initial Decision virtually ignores Rambus’s conduct, and puts not Rambus but JEDEC and its members on trial. In doing so, the decision ignores the most critical “party” in this Commission action: consumers.

Scouring the record for evidence of any inconsistencies in the minute details of JEDEC’s disclosure policy, the decision makes a series of findings based on JEDEC’s perceived shortcomings for having drafted disclosure rules that the ALJ deemed insufficiently clear and unambiguous, and on the perceived errors of JEDEC’s members in not having discerned for themselves the potential scope of Rambus’s patents. It disregards as irrelevant JEDEC’s basic rules that all standardization programs “shall be carried on in good faith” and shall not result in “restricting competition, giving a competitive advantage to any manufacturer, [or] excluding competitors from the market.” CX0204 at 5. It ignores all documents and testimony showing that JEDEC members in fact had both a specific duty to disclose patents and patent applications and an expectation that such disclosures would be made. Moreover, in its flyspecking quest for inconsistencies, the decision ignores the central issue: whatever the fine nuances or questions it finds at the margins of JEDEC’s rules, Rambus’s conduct – expressly intended to contravene JEDEC’s fundamental purposes – was far outside those margins.

On the basis of these numerous legal and factual errors, the decision concludes that Rambus’s failure, while it was a member, to disclose to JEDEC one patent and four patent

applications did not violate any “clear,” “unambiguous,” and “mandatory” duty under the JEDEC disclosure rules. ID 274-77. This decision is wrong in its premises, wrong in its analysis, and wrong in its outcome. Moreover, the decision’s crabbed and, as we will show, implausible interpretation of JEDEC’s rules is also fatally flawed in its failure to recognize or even consider the fundamental purpose of the JEDEC disclosure obligation – to prevent opportunism and thereby protect against the economic power of an industry-wide standard being hijacked to serve the anticompetitive interests of a single member. This purpose is particularly significant in this antitrust action, in that it helps explain two points the decision fails to grasp: (1) why Rambus’s deceptive failure to disclose was “exclusionary” in the antitrust sense; and (2) why Rambus’s violations of JEDEC’s rules and policies raise issues of public antitrust concern going far beyond mere private contractual disputes.

Having evaluated the legality of Rambus’s conduct using an incorrect standard based on a fundamental misinterpretation of the antitrust laws, the decision adopts wholesale, with little independent review or critical analysis, Rambus’s proposed findings on the remaining issues in the case. In doing so, it repeatedly applies incorrect standards of law, misapplies economic concepts, and ignores large volumes of evidence. Among the more flagrant of these errors, the decision:

- accepts at face value business justifications asserted by Rambus that do not plausibly explain its course of conduct and are contradicted by clear record evidence;
- disregards the question of whether JEDEC would have selected alternative technologies for its standards, and instead substitutes the ALJ’s views about whether alternative technologies were “equal or superior in objective terms,” ID 162-163, effectively replacing an informed decision made by the industry experts through the standards process with after-the-fact judgment by the ALJ;

- wrongly concludes that there were no anticompetitive effects from the Rambus conduct because the ALJ was not convinced that the cost of Rambus’s royalty payments have been passed through to customers or consumers; and
- ignores, despite finding “wholesale destruction of documents” by Rambus, ID 243, the likely relevance of missing documents to issues such as Rambus’s intent and alleged business justifications.

In sum, after reaching the wrong result on the threshold issue, the decision fails to weigh contradictory evidence to reach balanced, informed conclusions, but instead portrays each issue in an artificially simplistic manner, frequently applying incorrect legal standards and ignoring important evidence.

Because the Initial Decision cannot assist the Commission in reviewing this record, Complaint Counsel request that the Commission set it aside entirely, and refer instead to the parties’ proposed findings of fact when conducting its *de novo* review of the record. That review, applying the correct rules of antitrust law, should compel a decision by the Commission that Rambus violated Section 5 of the FTC Act.

A. Statement of Facts.

1. The Revolutionary Rambus RDRAM.

In 1990 two inventors founded Rambus to capitalize on their invention of a revolutionary new architecture for DRAM² – the so-called Rambus DRAM, or RDRAM. Rambus’s RDRAM architecture diverged radically from mainstream DRAM architectures. RDRAM had very few bus lines (“narrow bus”), shared bus lines for multiple functions (“multiplexing”), used a

² “DRAM” is Dynamic Random Access Memory, a form of computer memory that is used in computers and other products. This form of memory is used to temporarily store digitally recorded information such that it is as available to be accessed when needed. Descriptions of this and other technical terms are contained in the Glossary (Appendix A).

“packetized” protocol, and operated at a very high frequency. RDRAM was innovative, fast, and elegant, but expensive and difficult to implement. CCFF 714-24, 1838-94. Traditional Synchronous DRAM (SDRAM) architecture was slower and simpler, but because it was similar to earlier generations of memory, it was relatively cheap, easy to use, and reliable. By operating multiple DRAMs simultaneously on a module, SDRAM could achieve performance comparable to RDRAM. CCFF 1838-61; *see also* Attachment 1 below.

Rambus never planned to manufacture memory. Its primary business plan was to persuade memory manufacturers and users to adopt the RDRAM architecture and pay Rambus a license fee.³ CCFF 702-09; CX0543A at 3. Rambus attempted through 1999 and beyond to persuade the industry to adopt its RDRAM architecture, but ultimately had limited success.

2. Rambus Joins JEDEC.

In December 1991, Rambus attended its first meeting of the JEDEC JC-42.3 Subcommittee, which was working on a standard for synchronous DRAMs, or SDRAMs. Operating at that time under the rules of the larger Electronic Industries Association (“EIA”), JEDEC was the most important standard-setting body for the semiconductor industry. Rambus promptly perceived that the open standard for SDRAMs under development by JEDEC would be the primary competition against Rambus’s RDRAM. CCFF 876-77; 882-84.

JEDEC’s purpose was to create open standards. CCFF 300-04. The EIA-issued Legal Guides contained a “Basic Rule” that standardization activities “not be proposed for or indirectly

³ In 1990 Rambus began marketing its RDRAM architecture, and a small number of companies signed license agreements for the possible future use of RDRAM. In October 1991, the European Patent Office made available the international version of Rambus’s ‘898 patent application. Rambus’s subsequent U.S. continuation and divisional applications, however, remained confidential.

result in . . . restricting competition, giving a competitive advantage to any manufacturer, [or] excluding competitors from the market.” CX0204 at 5; CCF 315, 389-95. Through the EIA, JEDEC was admonished to “[a]void requirements in [JEDEC] standards that call for the exclusive use of a patented item or process.” JX0054 at 9; *see also* CX0203A at 11. These written “basic rules” embodied and expressed JEDEC’s purposes, and provided standards of conduct that shaped JEDEC members’ expectations about how other members would behave. Richard Crisp, Rambus’s official representative to the JEDEC JC-42.3 Subcommittee on memory standards, acknowledged that Rambus’s plan to license its memory patent portfolio was fundamentally inconsistent with JEDEC’s prime objective: “The job of JEDEC is to create standards which steer clear of patents which must be used to be in compliance with the standard whenever possible.” CX0903 at 2.

To help achieve open standards, JEDEC had a two-part policy that (1) obligated members to disclose any patents or patent applications that might relate to ongoing JEDEC work, and (2) prohibited JEDEC from incorporating patented technologies in standards unless the patent-holder committed to provide licenses on reasonable and non-discriminatory (“RAND”) terms. CCF 316-21. JEDEC and its JC-42 Committee took steps to ensure that all members understood the JEDEC patent policy. The Chairman, Mr. Jim Townsend, opened every meeting of the JC-42.3 Subcommittee with a discussion of the JEDEC patent policy. Mr. Townsend showed portions of the EIA manual and an informal “patent tracking list.” Sometimes he also showed a memorandum referring to the EIA rules governing “patentable matters” and reminding participants of their obligation to indicate “the intent of your company to patent or not patent the subject matter.” CX0042A at 7; CCF 357-72. In October 1993 JEDEC published a revised

version of its Manual of Organization and Procedure, which set forth the JEDEC disclosure policy:

The Chairperson . . . must call to the attention of all those present the requirements contained in the EIA Legal Guidelines, and call attention to the obligation of all participants to inform the meeting of any knowledge they may have of any patents, or pending patents, that might be involved in the work they are undertaking.

CX0208 at 19; CCFF 408-18.⁴ JEDEC added a reminder to the top of the sign-in sheet used at each meeting, stating, “Subjects involving patentable or patented items shall conform to EIA policy.” CX0306 at 1; CCFF 375-81. JEDEC also informed members of their obligation to act in good faith, which was designed in part to prevent companies from exploiting any loopholes in the organization’s specific rules for their own individual gain. CCFF 310-14.

These “basic” rules, specific rules, and duty of good faith shaped members’ expectations regarding the JEDEC standards process. Members understood that they were required to act in good faith, CCFF 310-15, and abide by the JEDEC patent policy. CCFF 316, 319-20, 324. Members and non-members alike expected that the process would result in open standards available to everybody. CCFF 300-04; CX2107 (Oh, Dep.) at 29:07-31:07, 135:23-138:04. Members expected others to follow JEDEC procedures, and objected vehemently on the rare occasions when a member attempted to enforce a non-disclosed patent against a JEDEC standard. CCFF 423-34.

3. The Rambus Scheme: “Fees and Royalties . . . From Any Manufacturer.”

Rambus developed a plan to deal with competition from JEDEC: if the marketplace

⁴ At least twice before the revised manual was published, Mr. Townsend showed relevant draft portions to the JC-42.3 Subcommittee. CCFF 411-12.

failed to accept RDRAM, Rambus could use its patents against the emerging JEDEC standard. CCFF 757-66, 800-06. Rambus CEO Geoffrey Tate described this strategy in a June 1992 draft business plan. Rambus's "#1 strategy" against SDRAMs – its Plan A – remained to get the Rambus RDRAM architecture accepted in the marketplace. The plan went on to set forth Rambus's alternative strategy – its Plan B:

Finally, we believe that Sync DRAMs [SDRAMs] infringe on some claims in our filed patents; and that there are additional claims we can file for our patents that cover features of Sync DRAMs. Then we will be in position to request patent licenses (fees and royalties) from any manufacturer of Sync DRAM. Our action plan is to determine the exact claims and file the additional claims by the end of Q3/92. Then to advise Sync DRAM manufacturers in Q4/92.

CX0543A at 17. In September 1992, Rambus's business plan repeated, "Sync DRAMs infringe claims in Rambus filed patents and other claims that Rambus will file in updates later in 1992."

CX0545 at 21. The following month, Mr. Crisp reported to the Rambus Board of Directors on "the SDRAM status at JEDEC, [and] the Rambus patent strategy." CX0606 at 2; CCFF 938.

4. Rambus and the SDRAM Standard: "Preplanning Before Accus[ing] Others of Infringement."

Rather than disclosing its belief that "Sync DRAMs infringe" Rambus's intellectual property, Rambus set out to maximize its leverage over the JEDEC standards. It began by exploring the risks of such a strategy. Although Rambus destroyed many documents relating to this period, the following is clear: As "preplanning before accus[ing] others of infringement," Rambus Vice-President Allen Roberts contacted Rambus's outside patent lawyer, Lester Vincent, in March 1992 and discussed "Advising JEDEC of patent application." CX1941 at 1 (emphasis in original). Even without knowing the JEDEC disclosure requirements, Mr. Vincent warned

Rambus of the risks of not disclosing its patent applications: “Cannot mislead JEDEC into thinking that Rambus will not enforce its patent.” CX1942; CCFF 885-92. Mr. Vincent often repeated his warning that Rambus’s conduct regarding JEDEC could cause it to lose its ability to enforce its patents. CCFF 850-51.

Despite Mr. Vincent’s advice, Rambus representatives began working to ensure that Rambus would obtain patent claims covering technologies used in future SDRAMs, and to conceal those claims from JEDEC. CCFF 806, 809, 812-14, 854. Rambus observed technologies proposed at JEDEC, and then secretly sought to amend its patent applications to add claims covering those technologies. CCFF 810. Rambus anticipated technologies that JEDEC might consider, amended its patent applications accordingly, and then remained silent when those technologies were later proposed. CCFF 811. Rambus consistently positioned itself to enforce patents against JEDEC standards while concealing its potential patent rights from JEDEC.

Among the technologies that Rambus representatives saw proposed at the December 1991 and February and April 1992 JEDEC meetings were a mode register with programmable CAS latency⁵ and programmable burst length.⁶ CCFF 527-39, 876, 894. Shortly thereafter, Richard Crisp (with full support of his superiors at Rambus) led efforts to amend Rambus’s patent applications to add claims covering these technologies. CX1946 (Vincent notes: “Richard Crisp wants to add claims to [the] original [patent] application” to cover programmable CAS latency);

⁵ See Glossary. As we discuss below, JEDEC at the time considered numerous alternatives for each of the technologies that Rambus secretly patented.

⁶ See Glossary.

CX1947 (Vincent notes: “Richard [Crisp] has claims for [pending patent applications] we have filed”); CCFF 900-01, 928. In May 1992, the JEDEC JC-42.3 Subcommittee asked Mr. Crisp whether Rambus had anything to say about whether Rambus had patents relating to a technology known as dual bank design.⁷ Mr. Crisp shook his head “no.” CCFF 902-06. But Mr. Crisp did add dual bank design to the technologies to be covered by Rambus patent applications. In September 1992, he met with Mr. Vincent to discuss adding claims covering programmable CAS latency and dual bank design to Rambus’s pending patent applications, to “cause problems [with] Synch DRAM & Ram link.”⁸ CX1949 at 1. CCFF 932-36. Work continued and on May 17, 1993, Mr. Vincent filed an amendment to Rambus’s pending ‘651 application adding claims to cover programmable CAS latency that were “directed against SDRAMs.” CX0702; CCFF 939, 945-49, 955-58.

Even as Rambus observed the JEDEC JC-42.3 Subcommittee debate and ultimately incorporate these technologies in its SDRAM standard, Rambus remained silent. In June and July 1992, the JC-42.3 Subcommittee voted on whether to adopt a programmable mode register to set CAS latency and burst length in the SDRAM standard. The ballot contained a line to be marked if the recipient was “aware of patents involving this ballot.” CX0252A at 2. Mr. Crisp returned a completed ballot to JEDEC (voting against the proposal) and spoke during the subsequent JEDEC meeting at which the ballot was debated and passed, but did not indicate anything about his ongoing work to amend Rambus’s pending patent applications. CCFF 919-

⁷ See Glossary.

⁸ RamLink was a standard for memory systems under development by a working group of the IEEE.

27. The Subcommittee adopted the SDRAM standard in March 1993, and on May 19, 1993 (two days after Mr. Vincent filed Rambus's '651 amendment), the Subcommittee Chairman informed the JC-42.3 Subcommittee including Mr. Crisp that the JEDEC Council was set to approve the SDRAM standard. Throughout this time, Rambus made no patent-related disclosure to JEDEC.⁹ The Council approved the standard, and the SDRAM standard was published later that year.¹⁰ CCF 558-62.

5. Rambus and the DDR SDRAM Standard: "Another Patenting Spree."

After the SDRAM standard was adopted in 1993, the JC-42.3 Subcommittee began work on specific implementations of the standard and on the next generation or "future" SDRAM standard (which would later become known as double data rate SDRAM, or DDR SDRAM). CCF 578-85. Rambus continued amending its patent applications to add claims covering JEDEC work.¹¹ In June 1993 (after efforts begun by Mr. Crisp in September 1992), Rambus

⁹ In September 1993, four months after the SDRAM standard was formally adopted and shortly before it was published, Mr. Crisp disclosed to JEDEC Rambus's first issued patent, the '703 patent. The claims of this patent were unrelated to JEDEC's ongoing work. Mr. Crisp made no mention of any of Rambus's pending patent applications or its ongoing efforts to amend those applications. Rambus made no further patent-related disclosure to JEDEC until it withdrew from the organization in June 1996. CCF 976; *see also* CCF 859-66.

¹⁰ Because the previous generation still met the needs of most of the industry, SDRAMs did not start to become widely adopted until sometime in 1996.

¹¹ The following summarizes the relevant technologies, the respective Rambus applications and patents during the time Rambus was a JEDEC member, and the date the application was amended or the patent issued addressing the respective technology (*See* CCF 1122-1237):

filed an amendment to its pending ‘692 application adding claims covering on-chip PLLs¹² “directed against future SDRAMs and RamLink.” CX0702; CCFF 962-67. In March 1994, Rambus Vice-President David Mooring (who personally had attended three JEDEC meetings) proposed that Rambus “kick-off another patenting spree.” CX0726. Rambus Vice-President Allen Roberts (Mr. Crisp’s direct supervisor in 1992-93) led the effort. CCFF 987-93. In September 1994, Mr. Vincent filed an amendment to Rambus’s pending ‘646 application, adding claims relating to dual-edge clocking,¹³ multi-bank design, and auto-precharge¹⁴ “for the MOST/SDRAM defense.”¹⁵ CX0745; CCFF 1004-08. In January 1995, Rambus filed an amendment to its pending ‘961 application adding new claims relating to programmable CAS

<u>Technology</u>	<u>Application/Patent</u>	<u>Amended/Issued</u>
Programmable CAS Latency	‘651 application* ‘961 application ‘490 application	May 1993 January 1995 June 1995
Programmable Burst Length	‘961 application	January 1995
On-chip PLL/DLL	‘692 application	June 1993 October 1995
Dual Edge Clock	‘646 application ‘327 patent	September 1994 April 1996

* The amendment to the ‘651 application was intended to add claims covering programmable CAS latency in SDRAMs. Rambus representatives believed that it did, but they later discovered that the claims were drafted more narrowly than they had intended. CCFF 958.

¹² See Glossary.

¹³ See Glossary.

¹⁴ See Glossary.

¹⁵ MOST was a DRAM architecture that also threatened to compete with RDRAM.

latency and burst length. CCFF 1028. In June 1995, Rambus filed an amendment to its pending '490 application adding claims relating to programmable CAS latency. CCFF 1049.

In August 1995, Rambus hired its first in-house counsel – a patent attorney named Anthony Diepenbrock – for the primary purpose of “determin[ing] what should proactively be done to strengthen [the Rambus] IP position relative to competition.” CX0831. CEO Geoff Tate directed staff to send Mr. Diepenbrock e-mails discussing “competitive technology developments” such as “JEDEC meeting reports” to assist his work. *Id.*; CCFF 1056-61.

In October 1995, Mr. Vincent filed a further amendment to Rambus’s pending '692 application containing additional claims relating to on-chip PLL/DLL. CCFF 1069, 1074-75. Also in October 1995, the PTO issued a notice that Rambus’s pending '646 application, which contained claims relating to dual-edge clocking, would issue shortly as a patent. CCFF 1076-77. In April 1996, the PTO issued Rambus’s '646 application as the '327 patent – Rambus’s first issued patent that directly covered ongoing JEDEC work. CCFF 1092-95; CX0942 (describing the '327 patent as part of a “minefield” threatening DDR SDRAM); CX0946 (referring to the “double-data-rate/327” patent).

During this time, Rambus prepared for enforcement of its patents against JEDEC-compliant products. In early 1994, CEO Geoff Tate, CFO Gary Harmon and Vice-President Allen Roberts met with patent counsel Lester Vincent to discuss patent enforcement against current and future SDRAMs with specific reference to programmable CAS latency and on-chip PLL. CCFF 981. In September 1994, after Mr. Crisp alerted Rambus officers by email from a JEDEC meeting that “NEC PROPOSES PLL ON SDRAM!!!,” CX0711 at 36, Vice-President Roberts wrote, “So if we want to fight this one (after the claim is issued), we better stock up our

legal warchest.”¹⁶ CX0757 at 1; CCFF 1009-17. Mr. Crisp agreed that “[i]t seems likely we will have to fight litigation at some point in the future.” CX0757 at 1. The following month, Mr. Roberts asked CEO Geoff Tate and others, “Why can’t we sue for using a PLL on an SDRAM if we [are] granted that patent?” CX0763. Mr. Crisp again agreed, describing Rambus’s pending application covering on-chip PLLs as “one of our key technology patents,” stating that Rambus “need[ed] to be able to collect on it,” and concluding, “I would hope that we would sue other companies, in particular those that are not licensed [for RDRAM].” *Id.* CCFF 1018-25.

In September 1995, in response to rumors that other companies were considering using on-chip DLLs, Vice-President Roberts, in an e-mail entitled, “Let the IP war begin,” wrote to Rambus executives and Mr. Crisp, “I think we are going to need to generate a IP crush plan on this. [On-chip DLLs] are claims which we have filed but have not been issued.” CX0833. Mr. Diepenbrock gave a presentation within Rambus listing on-chip DLL and dual-edge clocking as technologies that could be used in a potential “Offensive” IP strategy. CX1267; CCFF 1069.

As Rambus pursued its secret planning for future patent enforcement against JEDEC-compliant SDRAMs, it continued to participate in JEDEC. During 1994 and 1995, the JC-42.3 Subcommittee considered a number of technologies for incorporation into the next generation standard. These included programmable CAS latency and burst length, dual bank design, auto-precharge, and externally supplied reference voltage (all to be carried over from the SDRAM standard), as well as on-chip PLL/DLL, dual-edge clocking, and source synchronous clocking.¹⁷

¹⁶ Mr. Roberts’ e-mail, and most of his message, has vanished. The sentence quoted above survives as embedded text in a reply e-mail sent by Mr. Crisp.

¹⁷ See Glossary.

CCFF 586-648. In late 1995, the JC-42.3 Subcommittee's work on the next generation standard intensified. A survey ballot indicated strong support among JC-42.3 Subcommittees members for on-chip PLL/DLL, and mixed support for dual-edge clocking.¹⁸ CCFF 609-12, 637-38. During the first half of 1996, a number of proposals discussed dual-edge clocking and on-chip PLL/DLL technologies for the next generation standard.¹⁹ CCFF 613-16, 639-41.

Rambus continued to conceal its plans to assert patents against JEDEC-compliant SDRAMs. Between May 1994 and March 1995, Mr. Crisp informed Rambus executives and engineers of at least four proposals in JEDEC, involving three separate technologies, that he believed might infringe Rambus patent rights.²⁰ See CX0711 at 26, 31; *id.* at 36-37; *id.* at 52, 54; *id.* at 56, 58; CCFF 996-99, 1009-15, 1031-38. On each occasion, he raised the patent issue with Rambus executives but not with JEDEC. CCFF 859-66. Rambus plainly believed its pending patent applications covered ongoing JEDEC work.

Rambus not only failed to disclose relevant patent information, but it affirmatively misled

¹⁸ A form of dual-edge clocking called "toggle mode" was considered in 1991-92 for the SDRAM standard. However, the JC-42.3 Subcommittee decided in April 1992 not to use dual-edge technology in the SDRAM standard because it was not necessary and many members had not developed a sufficiently symmetric clock signal. But members decided at that time to consider using dual-edge clock technology in the next generation standard. CCFF 623-32. As noted above, on-chip PLL was first proposed in September 1994. CCFF 600-607.

¹⁹ Although Rambus stopped attending JC-42.3 Subcommittee meetings after December 1995, it remained a member through June 1996 and continued to receive meeting minutes. Mr. Crisp circulated a copy of the January 1996 minutes within Rambus, with a cover note directing attention specifically to a Micron presentation regarding clocking and PLL/DLLs for future SDRAMs. CCFF 1098.

²⁰ For example, in September 1994, Richard Crisp observed a proposal at JEDEC relating to on-chip PLL. Mr. Crisp immediately informed executives and others at Rambus, and asked, "What is the exact status of the patent with the PLL claim?" CX0711 at 36-37.

JEDEC. In September 1993, Richard Crisp disclosed Rambus's '703 patent to JEDEC – a patent containing claims entirely unrelated to JEDEC's ongoing work. JEDEC members who reviewed this patent concluded that Rambus did not have patent rights over ongoing JEDEC work.²¹ CCF 1275-76.

Rambus later used this disclosure to persuade JEDEC that it was complying with the JEDEC disclosure policy. In May 1995, members of an independent IEEE working group developing a standard known as RamLink or SyncLink made a presentation at JEDEC. CCF 1043. The IEEE architecture differed substantially from the JEDEC architecture, but shared a number of attributes with the Rambus architecture. CCF 1507-08, 1517. Following the presentation, the JC-42.3 Chairman asked Mr. Crisp to report at the next meeting whether Rambus had any patents relating to the RamLink/SyncLink proposal. CCF 1044. In an e-mail to Rambus executives and others, Mr. Crisp identified five potential intellectual property issues, including programmable CAS latency. He suggested that Rambus determine what it had “that may work against them,” but recommended that “[i]f it is not a really key issue . . . then I think it makes no sense to alert them to a potential problem they can easily work around.” CX0711 at 68, 73; CCF 1045-47.²² In June 1995, after having reviewed a collection of Rambus patents and applications, Mr. Crisp concluded that Rambus's patent applications “should be able to block”

²¹ When JEDEC members believed Rambus patents related to a technology, they dropped it. In March 1997, certain JEDEC members recognized that the claims in Rambus's '703 patent were similar to a proposal by NEC for a loop-back clock. Members objected to the proposal on patent grounds, and it was immediately dropped. CCF 2433-40.

²² *See also* CX0783 at 2 (Crisp: “I certainly do not want to bring this intellectual property issue [with SyncLink] up without careful consideration. I especially do not want it all over JEDEC . . .”).

SyncLink – “we just need to sweat through the details” in order to “get a claim to shoot synclink in the head.” CX0797 at 1. After attending the next IEEE meeting, he wrote to Rambus executives, “It is essential that we be absolutely sure we have the standard adequately covered by patents. I am more convinced of this than ever.” CX0711 at 110, 113-14. Mr. Crisp met with Mr. Vincent in August 1995 to discuss amending Rambus’s pending patent applications to add claims covering aspects of SyncLink. CCFF 1050-55.

At the JC-42.3 Subcommittee meeting in September 1995, Mr. Crisp presented a letter to the JC-42.3 Subcommittee that concluded:

At this time, Rambus elects to not make a specific comment on our intellectual property position relative to the Synclink proposal. Our presence or silence at committee meetings does not . . . make any statement regarding potential infringement of Rambus intellectual property.

JX0027 at 26. JEDEC members reacted negatively to this statement; Subcommittee Chairman Gordon Kelley stated “he heard a lot of words, but did not hear anything said.” CX0711 at 166. Mr. Crisp mollified them, however, by reminding them that Rambus had disclosed a patent to JEDEC in the past (the ‘703 patent), implying that Rambus complied with the disclosure requirement. CX0711 at 166, 167; CCFF 1062-68.

Rambus’s outside counsel Lester Vincent and in-house counsel Tony Diepenbrock continued to express concerns about the legal risk associated with Rambus’s behavior at JEDEC. CCFF 850-51; CX1958 at 12-21. In September 1995, in response to these concerns, Mr. Crisp acknowledged that Rambus had “not really made the [JEDEC] committees aware” of Rambus’s patents, and suggested that Rambus “re-evaluate our position relative to what we decide to keep quiet about, and what we say we have.” CX0837 at 2. Mr. Crisp insisted, however, that Rambus

continue its efforts to amend its patent applications to cover the competing architectures: “We should also redouble our efforts to get the necessary amendments completed, the new claims added and make damn sure this ship is watertight before we get too far out to sea.” *Id.* Contrary to Mr. Crisp’s suggestion, Rambus did not make any disclosure at the next meeting.

6. Rambus Withdraws from JEDEC: “To the Extent Anyone Is Interested ...”

In December 1995, Mr. Vincent forwarded to Rambus a copy of the Federal Trade Commission’s proposed consent decree in the *Dell* matter, involving failure to disclose a patent to a standards organization.²³ CX1990. Rambus discussed the implications of that decision with its lawyers in early 1996, and decided to withdraw from JEDEC. CCF 1083-91. On June 17, 1996, Rambus submitted its letter to JEDEC withdrawing from the organization. The letter, signed by Mr. Crisp, stated “[t]o the extent anyone is interested, I have enclosed a list of Rambus U.S. and foreign patents.” But the attached list had one key exception: Rambus omitted its ‘327 patent, its only issued patent with claims relating to technologies discussed by JEDEC.²⁴ Rambus did not identify any of its pending patent applications. CX0888; CCF 1109-14.

7. The Industry Adopts DDR SDRAM.

After Rambus withdrew, the JC-42.3 Subcommittee continued its work on the future SDRAM standard. During 1997 JEDEC adopted the key technologies of the future SDRAM standard, by then named DDR SDRAM. The new standard built on technologies from the

²³ *Dell Computer Corp.*, 121 F.T.C. 616 (1996).

²⁴ On June 17, 1996, the same day Rambus sent JEDEC its withdrawal letter and the list omitting the ‘327 patent, Mr. Diepenbrock discussed with Mr. Vincent potential enforcement of the ‘327 patent against a particular device that used a dual-edge clock. CX0889 at 2.

SDRAM standard (including programmable CAS latency, programmable burst length, dual bank design, and auto-precharge) but also incorporated additional technologies proposed while Rambus was still a member, including on-chip DLL and dual-edge clocking. CCFF 653-57. The completed standard was passed by the JC-42.3 Subcommittee in 1998, approved by the council, and published in 1999.

The industry began implementing the DDR SDRAM standard even before the standard was final. Many memory manufacturers began to design DDR SDRAMs as early as 1997, and many companies began design of products to interface with or incorporate DDR SDRAM memory long before the standard was finalized. By late 1999, many memory manufacturers had completed their designs of these products, and some had produced samples, completed testing procedures, and begun or were ready to begin mass production. CCFF 2509-26.

8. Rambus Prepares to Enforce Its Patents.

a) “Our Leverage Is Better to Wait.”

After withdrawing from JEDEC, Rambus continued to conceal its belief that its patent rights would cover technologies incorporated in the JEDEC standards, which offered the only substantial competition to its RDRAM architecture. In February 1997, after an internal “DDR [SDRAM] threat assessment meeting,” CEO Geoff Tate circulated an e-mail telling Rambus staff: “do *NOT* tell customers/partners that we feel DDR may infringe – our leverage is better to wait.” CX0919. *See also* CCFF 1676-1700; CX0939 at 1 (Chairman Bill Davidow: “One of the things we have avoided discussing with our partners is [the] intellectual property problem” – that “we think [SyncLink] and SDRAM-DDR infringe our patents”); CX0942 (CEO Geoff Tate: “our policy so far has been NOT to publicize our patents and i think we should continue with

this.”).

In the meantime, Rambus continued to build its patent portfolio covering the technologies in the JEDEC standards. In 1997, Rambus’s pending application covering on-chip PLL/DLL issued as a patent. CCFF 1644-45; CX0946. By 1999, it obtained issued patents covering various technologies used in JEDEC’s SDRAM and DDR SDRAM standards, including programmable CAS latency and burst length, as well as additional patents covering dual-edge clocking and on-chip DLL. CCFF 1631-75. These patents all derived from Rambus’s original 1990 application and grew out of the same family of patent applications pending while Rambus was a JEDEC member. CCFF 730-31, 858.

b) “Shred Day 1998.”

Soon after leaving JEDEC, Rambus began to prepare for the final phase of its scheme. In October 1997, Rambus hired Mr. Joel Karp to negotiate license agreements with manufacturers of SDRAMs and other memory that competed with RDRAMs (although Rambus was careful not to let the industry know why he was hired). CCFF 1701-09; CX0960; CX0963. In late 1997 and early 1998, Mr. Karp began planning a “Strategic Patent Licensing Program” against DDR SDRAM. CX0551; CCFF 1710-17.

Rambus knew litigation would likely arise out of its efforts to enforce its patents. In the spring and summer of 1998, Mr. Karp met repeatedly with CEO Geoff Tate to discuss document retention and destruction. CCFF 1718-35. In the summer of 1998, Rambus implemented a “document retention plan” that led on a single day, “Shred Day 1998,” to Rambus collecting in burlap bags and shredding over 20,000 pounds of documents. CCFF 1736-43; CX1052. Richard Crisp threw out all of the paper in his office, including any documents he had relating to JEDEC

and Rambus's patent prosecution work.²⁵ CCFF 1738. On Rambus's instructions, outside patent counsel Lester Vincent destroyed handwritten notes, correspondence to and from Rambus, and other documents – other than correspondence with the PTO – in his files.²⁶ CCFF 1744-52. Rambus's "document retention plan" remained in force for two years; except for a brief hiatus when Rambus sued Hitachi, document destruction continued until Rambus sued Infineon in 2000. CCFF 1736, 1750, 1752.

9. Rambus Springs Its Trap: "Let the IP War Begin."

Throughout the 1990's, Rambus continued with its Plan A – efforts to convince the industry to adopt RDRAM. In 1996, Intel agreed to develop a chipset to interface exclusively with RDRAM and its future Pentium III and IV processors. CCFF 1600-15. But by late 1999, it was clear that the industry was unlikely to generally adopt the RDRAM architecture. RDRAM suffered from large size, low yield, and high test and packaging costs compared to DDR

²⁵ Certain of Richard Crisp's e-mails apparently no longer exist. CCFF 1753. Many of his e-mails survived due to oversight; Crisp transferred a block of his e-mails from one laptop to another via Rambus's server, and forgot to delete the file from the server. CCFF 1753. Mr. Crisp later joked about trying to find a document from 1996 or 1997 relating to DDR SDRAM "that hasn't fallen victim to the document retention policy :-)". CX1079.

²⁶ Two ALJs in this matter and a district court judge have expressed serious concern about Rambus's destruction of evidence. Order, February 26, 2003 (Timony, J.) at 8 (entering adverse presumptions against Rambus because of "Rambus's intentional destruction of documents that it knew or should have known were relevant to reasonably foreseeable litigation."); Order, April 15, 2003 (McGuire, J.) at 4 ("significant and ongoing concerns" about Rambus's destruction of documents); *Rambus, Inc. v. Infineon Techs. AG*, No. CIV. 3:00CV524, 2004 WL 547536 (E.D. Va., March 17, 2004) at *20 ("It is beyond question that Rambus instituted a document destruction policy and thereby intentionally destroyed documents . . . relevant to this case."); *id.* at *24 (evidence "strongly indicates that Rambus explicitly linked . . . the shredding of documents with preparing for patent litigation").

SDRAM. CCFF 1838-76.²⁷ More importantly, by October 1999 technical problems caused Intel to end its exclusive support of RDRAM and develop chipsets to support SDRAM and DDR SDRAM. CX2887; CCFF 1877-96, 1911-18. Market share that had been projected for RDRAM went instead to SDRAM and DDR SDRAM. CCFF 1897-1905, 1910. Plan A failed.

Beginning in late 1999, Rambus implemented Plan B. For the first time, it informed memory manufacturers and others that JEDEC-compliant SDRAMs and DDR SDRAMs infringed Rambus's issued patents. CCFF 1950-94; CX1371 at 33 *et seq.* Under threat of litigation, seven memory manufacturers, accounting for approximately one-half of the worldwide DRAM market, signed license agreements by the fall of 2000, committing to pay Rambus royalties on their sales of JEDEC-compliant products. CCFF 1995-2013. Three memory manufacturers refused to sign license agreements, and are in litigation with Rambus. CCFF 2014-32. Rambus has threatened to sue certain manufacturers of chipsets and other computer components that interface with memory, although it has not yet done so. Rambus has asserted that its patents cover programmable CAS latency and burst length, on-chip DLL, and dual-edge clocking as used in JEDEC standard products. But Rambus apparently believes that its patents cover additional technologies discussed in JEDEC while Rambus was a member, including

²⁷ Richard Crisp recognized from the time he attended his first JEDEC meeting in April 1992 that these factors would be a serious disadvantage to RDRAM:

It really looks like there is a lot of momentum against us in the main memory arena. . . . The things they [JEDEC members] seem most concerned about (price, latencies, and power) are all things we don't really do well. . . . It seems unlikely that we are going to be able to do better on price than the SDRAMs (license fees in need of recapture, royalties to be paid, bigger die size)."

CX1708 at 3.

multi-bank design, auto-precharge, source synchronous clocking, externally supplied reference voltage, and low swing signaling. CCF 1959-74, 3113-82. Rambus's patents over the JEDEC standard technologies has positioned it to, in Rambus's words, "Collect royalties on all DRAM and controllers forever." CX1386 at 8; *see also* CX1380A at 3 ("5 Year Objectives: All/90%+ DRAMs/controllers pay us royalties . . . – We are ratcheting up royalty rates over time to the value of the IP"). Rambus expects to collect between \$1-3 billion in royalties on sales of JEDEC-compliant memory and interface products. CX1391A at 32 (possibility of market share increasing to 100%, average royalty rates increasing to 5%, and royalties increasing to \$3 billion by 2005); CCF 2033-54. Over time, these costs are likely to be passed on to consumers. CCF 3050-51.

B. Proceedings Below.

The Complaint, issued on June 18, 2002, charged Rambus with violating section 5 of the FTC Act by monopolization, attempted monopolization, and unfair trade practices. The case, originally assigned to Chief ALJ James P. Timony, was reassigned to current Chief ALJ Steven J. McGuire on February 28, 2003, two months before the beginning of trial. Fifty-four days of trial began on April 30, 2003, and concluded on August 1, 2003. After post-trial briefing and closing arguments, the ALJ closed the record on October 9, 2003.

On February 25, 2004, the Secretary issued the Initial Decision dismissing the Complaint in its entirety. Complaint Counsel filed a notice of appeal on March 1, 2004.

C. Standard of Review.

Commission Rule of Practice § 3.51(c) requires that the administrative law judge presiding over a matter "consider[] [] the record as a whole" and base the initial decision on

“reliable and probative evidence.” 16 C.F.R. § 3.51(c). The ALJ failed to do so; instead, “he relied to an extraordinary degree upon [Respondent’s] proposed findings and conclusions of law,” made findings of fact “based to a considerable extent on bits and pieces of unsupported and self-serving testimony, much of which is contradicted by documentary evidence,” and “simply ignored” much of the evidence introduced by complaint counsel. *Adolph Coors Co.*, 83 F.T.C. 32, 177 (1973). As a result, the Commission should review the entire record de novo and enter its own findings of fact and conclusions of law. 16 C.F.R. § 3.54(a).

QUESTIONS PRESENTED

1. Is it exclusionary conduct for a company to acquire monopoly power by pursuing a secret and deliberate pattern of conduct to obtain patents covering an industry standard, when the company chose to join the standards body, the purpose of the standards body was to set open standards, and the rules required members to disclose patents and applications related to the standard-setting work?
2. Where JEDEC when considering its standards had available various options (including choices of alternative technologies), but the industry’s implementation of the standards precludes those options today, has the Rambus course of conduct distorting JEDEC’s standards choices made a significant contribution to Rambus’s monopoly power?

SUMMARY OF ARGUMENT

Antitrust law prohibits the acquisition of monopoly power by anticompetitive, or “exclusionary” means. The ALJ found that Rambus indeed has acquired monopoly power, but did not acquire that power by exclusionary means, for two reasons: First, the ALJ concluded that Rambus did not violate a “clear and unambiguous” JEDEC disclosure rule. Second, the ALJ decided that Rambus’s entire course of conduct was irrelevant, because no matter what Rambus

or JEDEC did, Rambus's technologies would have been adopted wholesale by JEDEC, at exactly the same prices as Rambus is now demanding. Both of the ALJ's conclusions are wrong.

First, Rambus's conduct was exclusionary. The standards process creates the potential for individual members to hijack a standard's economic power by engaging in opportunistic conduct. JEDEC's purposes and procedures were designed to prevent such conduct and protect its standards from being used for individual benefit or to exclude competitors. They were, therefore, fully consistent with the goals of the antitrust laws. Rambus voluntarily joined and renewed its membership in JEDEC and participated regularly in JEDEC activities over a four-year period. Yet simultaneously (and continuing after its withdrawal from JEDEC), Rambus engaged in a prolonged, deliberate course of conduct that undermined the fundamental purpose of JEDEC to adopt open standards, contravened JEDEC's procedures of adopting patented technologies only on the basis of full information and a commitment to RAND terms, and violated Rambus's duty of good faith and its specific JEDEC obligation to disclose patents and patent applications that might be involved in JEDEC work. Rambus asserts that its individual interest in maintaining the secrecy of its patent applications justifies its behavior. While outside the JEDEC context its excuse might be plausible, within JEDEC this "justification" has no merit. Rambus's deliberate conduct in violation of its JEDEC obligations and contrary to JEDEC's purposes and procedures, in circumstances that lead to concrete harm to the marketplace, constitutes exclusionary conduct.

Second, Rambus's exclusionary conduct led to specific anticompetitive harm. Rambus's patents covering technologies incorporated in the JEDEC standards enable Rambus to increase price, reduce output and exclude competitors with respect to technologies used in over 90% of

DRAMs sold today. Rambus in fact has exercised that power by imposing royalties – price increases that are likely in the long run to be passed on to consumers. It also has threatened to exclude individual companies from the market. Rambus’s monopoly power is durable because of the high after-the-fact cost of switching from the technologies in the JEDEC standards. Rambus expects to earn \$1-3 billion in monopoly profits from its conduct.

The record establishes the requisite causal link between Rambus’s course of conduct and its acquisition of monopoly power. Information on Rambus’s potential patent rights was highly material when JEDEC was considering various options for its standards (including choices of alternative technologies). Rambus’s concealment of this material information was capable of contributing to JEDEC’s choice to select technologies covered by Rambus’s patents. Even if the Commission were to apply a strict but-for test of causation, the record demonstrates (to the extent it is possible to recreate the hypothetical but-for world that Rambus’s conduct prevented) that absent Rambus’s conduct, JEDEC members likely would have adopted alternative technologies or, at a minimum, would have negotiated in advance to secure lower royalties.

To restore competition in the technology markets associated with the JEDEC standards and to prevent further consumer harm, the Commission should enter the proposed order.

ARGUMENT

I. Rambus’s Conduct Was Exclusionary.

Section 2 of the Sherman Act, 15 U.S.C. § 2, and a corresponding claim under § 5 of the FTC Act, 15 U.S.C. § 45, seek to distinguish between legitimate and improper means of obtaining monopoly power. In particular, the antitrust laws seek to distinguish monopoly power

acquired by means of competition on the merits from monopoly power acquired by means that do not further efficiency or competition, or do so in an unnecessarily restrictive manner. *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 605 n.32 (1985) (quoting 3 Philip Areeda & Donald Turner, *Antitrust Law* 78 (1978)).²⁸

Rambus worked for a decade to ensure its patents covered the technologies incorporated in the JEDEC standards. While Rambus disputes that it violated the specific terms of the JEDEC disclosure policy, there is no doubt that Rambus's scheme and its outcome were antithetical to the express and intended purposes of the JEDEC standard-setting process. JEDEC sought to incorporate proprietary technologies into standards only on the basis of informed discussion, and only with assurances of reasonable and non-discriminatory prices and access. Rambus sought exactly the opposite. Its scheme worked, and today Rambus has the power to control which firms may practice the standards, and on what price and terms. Long-standing antitrust precedent and economic analysis establish that subversion of the standard-setting process – such as that executed by Rambus – presents risks of anticompetitive behavior and public injury of precisely the kind that the antitrust laws were designed to prevent.

²⁸ Conduct is exclusionary if it impairs the opportunity of rivals in a manner that does not further competition's basic goals of lower prices, better products or greater efficiency. See generally, 3 Philip Areeda & Herbert Hovenkamp, *Antitrust Law* ("Areeda & Hovenkamp"), ¶ 651a (2002); *Town of Concord v. Boston Edison Co.* ("*Town of Concord*"), 915 F.2d 17, 22 (1st Cir. 1990); Einer Elhauge, *Defining Better Monopolization Standards*, 56 Stan. L. Rev. 253 (2003) (distinguishing between conduct that impairs the opportunities of rivals by improving the monopolist's own efficiency and conduct that impairs the opportunities of rivals by impairing rival efficiency). On the other hand, conduct does not violate the antitrust laws, even if it harms rivals by impairing their opportunities, if that conduct furthers "competition's basic goals – lower prices, better products and more efficient production methods." *Town of Concord*, 915 F.2d at 22.

A. The Abuse of the JEDEC Standards Process by Rambus Was Exclusionary Within the Meaning of the Antitrust Laws.

“The [JEDEC] meeting opened with a lot of controversy regarding Patents. . . . Micron says the [JEDEC patent disclosure] policy exists due to anti-trust concerns.”

CX0711 at 16 (e-mail from Richard Crisp to Rambus executives and engineers, March 1994).

Antitrust law has long been concerned with the risk that one or a small number of participants can capture the economic power of an industry-wide standard and turn what should be a procompetitive activity into a source of exclusionary power. Standard-setting bodies have recognized the potential for such opportunism, and many (such as EIA and JEDEC) have adopted rules and procedures to prevent it. Rambus’s conduct – intended to subvert those purposes and violate those procedures – is not competition on the merits and should be condemned under the antitrust laws.

1. Antitrust Law Seeks to Prevent Anticompetitive Harm Resulting From Individual Members Hijacking the Economic Power of Industry-Wide Standards through Opportunistic Conduct.

“The most valuable patents are ones that must be used in order to be in compliance with a standard.”

CX0903 at 2 (e-mail from Richard Crisp to Rambus executives and engineers, August 1996).

“Two possible legal theories for non-enforcement [of a patent involved in an industry standard]: 1) Estoppel? 2) Antitrust?”

CX1958 at 12 (presentation handout apparently sent to Richard Crisp by Rambus counsel Lester Vincent, May 1993)

Collaborative industry standard-setting may achieve tremendous gains in efficiency. The

benefits of standard-setting include speeding the development and implementation of new technologies, opening markets to new entry, and promoting intense price competition, reduced costs, and greater efficiency. Standard-setting can be particularly valuable in the case of interface standards, which promote compatibility and interchangeability among separate components and products. Because of these benefits the antitrust laws generally accord rule of reason treatment to legitimate, properly-motivated standard-setting efforts.

For at least the better part of a century, however, the courts, the Commission, and economic scholars have recognized that, because of the market power that can result, the private standard-setting process presents the risk of serious anticompetitive harm. *See, e.g., Standard Sanitary Mfg. Co. v. United States*, 226 U.S. 20, 41 (1912) (agreement among members of a trade association, *inter alia*, not to market “seconds” of enameled ironware plumbing products). At the core of this antitrust risk is the potential for a standard, if it becomes widely adopted, to result in the exclusion from the marketplace of competing products, services, or technologies.

CCFF 2600-30; Tr. 7187-7202, 7225-56, 7288-7308 (McAfee).²⁹ Adopting a particular product

²⁹ *See* Standards and Certification, Final Staff Report, FTC Bureau of Consumer Protection, at 28 (April 1983) (“Practically all successful standards and certification programs carry the potential for significant power over the marketplace.”); *id.* at 34 (“[W]here reliance on a particular standard or seal is significant, noncompliance becomes so competitively disadvantageous from the point of view of producers that voluntary standards become mandatory.”). Economists have focused in particular on standards in industries that require compatibility among products or components. *See, e.g.,* Michael Katz and Carl Shapiro, *Systems Competition and Network Effects*, 8 J. Econ. Perspectives 93, 105-06 (1994) (“In markets with network effects, there is a natural tendency toward *de facto* standardization, which means everyone using the same system.”); Richard Gilbert, *Symposium on Compatibility: Incentives and Market Structure*, 40 J. Indus. Econ. 1 (1992) (“Variety may be the spice of life, but the price of variety is high in markets where products and services need to be compatible to function properly”); Carl Shapiro, *Setting Compatibility Standards: Cooperation or Collusion*, Working Paper at 7 (2000) (“ . . . an initial industry-wide standard can have significant efficiency and welfare consequences for three reasons: (1) cooperation may lock in a different product design

or technology as part of an industry-wide standard may have durable results in the market, as it can be very difficult to displace that product or technology.³⁰ Thus, a standard can have the potential to exclude from the market over the long term viable and otherwise competitive technologies that are not included in the standard.

This exclusionary power gives rise to the antitrust risk that one or a group of companies may improperly use the standard-setting process to exclude rival products or technologies from the marketplace, and thus increase their individual or collective market power. Such conduct has long been recognized as a potential antitrust violation. *See, e.g., Radiant Burners, Inc. v. Peoples Gas Light & Coke Co.*, 364 U.S. 656 (1961) (agreement of utilities to permit only installation of gas burners compliant with industry standards); *National Macaroni Mfrs. Ass'n v. FTC*, 345 F.2d 421 (7th Cir. 1965) (association standard for durum wheat as component in macaroni products); *cf. Fashion Originators' Guild of America v. FTC*, 312 U.S. 457 (1941) (association agreement to refuse distribution to firms that sold copied fashion designs).

than would emerge from competition; (2) cooperation may eliminate a standards war prior to tipping; and (3) cooperation is likely to enable multiple firms to supply the industry standard . . . , whereas a standards war may lead to a single, proprietary . . . product.”); Michael Katz and Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 *American Econ. Rev.* 424, 424-25 (1985); Stanley Besen and Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization (“Choosing How to Compete”)*, *J. Econ. Perspectives* 117, 117-19 (1994); Daniel Swanson, *Evaluating Market Power in Technology Markets when Standards are Selected in which Private Parties Own Intellectual Property Rights*, Working Paper Presented at the Joint Hearings regarding Competition and Intellectual Property Law and Policy in the Knowledge Based Economy (“*Evaluating Market Power*”) at 4 (April, 2002).

³⁰ Tr. 7295-7308 (McAfee); Besen and Farrell, *Choosing How to Compete*, *J. Econ. Perspectives* at 118-119 (“Because buyers want compatibility with the installed base, better products that arrive later may be unable to displace poorer, but earlier standards.”); Joseph Farrell, *Standards and Intellectual Property*, 30 *Jurimetrics J.* 35, 37 (1989) (“[I]t can be hard for users or vendors to coordinate a switch from an old standard to a new one, even if all would like to do so.”).

Even where a standard-setting organization itself seeks to follow open, unbiased procedures to achieve pro-competitive standards, there is a significant risk that the exclusionary power of a standard may be captured as a result of opportunistic behavior, or hold-up, by one or more members.³¹ As one court has put it:

In such cases, the principal concern has been the use of standard setting as a predatory device by some competitors to injure others; normally there is a showing that the standard was deliberately distorted by competitors of the injured party, sometimes through lies, bribes, or other improper forms of influence, in addition to a further showing of market foreclosure.³²

Because such opportunistic behavior serves only to transfer wealth,³³ it has no efficiency

³¹ See Tr. 7257-88; 7306-08 (McAfee); Swanson, *Evaluating Market Power* at 3 (“Although competition may exist in the technology market in advance of the selection of a proprietary standard, the act of selection has consequences that can possibly lead to reduced competitiveness and increased *ex post* market power.”). Whether the incorporation of a technology into a standard could give the owner of that technology market power was discussed as part of the recent Joint Hearings regarding Competition and Intellectual Property Law and Policy in the Knowledge Based Economy, sponsored jointly by the Commission and the Department of Justice. See e.g., *Statement of Allen M. Lo, Juniper Networks, Inc.* (April 18, 2002); *Statement of Scott K. Peterson, Hewlett-Packard Co.*, (April 18, 2002); *Statement of Amy A. Marasco, American National Standards Institute* (April 18, 2002); *Statement of Donald Deutsch, Oracle Corporation* (April 18, 2002); *Statement of Richard Rapp and Lauren Stiroh, Standard Setting and Market Power* (April 18, 2002). The misuse of standards to exclude competitors was also discussed in the reports relating to the 1983 Hearings on Standards and Certification. See *Statement of Timothy J. Muris, Director, Bureau of Consumer Protection, Accompanying the Final Staff Report on the Standards and Certification Rule* at 9 (April 1, 1983) (“As the Staff Report discusses, and as the *Hydrolevel* case dramatically illustrates, standard setting can be misused to exclude competitors unreasonably, injuring consumers. The Commission can pursue anticompetitive restraints as unfair methods of competition, using a rule of reason approach, or as unfair acts or practices under the Commission’s unfairness protocol, in each case weighing the benefits and costs of the challenged activity.”).

³² *DM Research, Inc. v. College of Am. Pathologists*, 170 F.3d 53, 57-58 (1st Cir. 1999) (footnote omitted).

³³ See generally Timothy Muris, *Opportunistic Behavior and the Law of Contracts* (“*Opportunistic Behavior*”), 65 U. Minn. L. Rev. 521 (1981). In the context of relationships

rationale.³⁴ Such behavior can be costly because it forces market participants to incur costs to avoid being subjected to opportunism.³⁵

Standard-setting organizations frequently adopt rules and procedures intended to prevent, to the extent possible, opportunistic behavior by members to hijack the economic power of industry-wide standards.³⁶ Such measures often include procedures intended to ensure that any

governed by contracts, opportunism can occur “when a performing party behaves contrary to the other party’s understanding of their contract, but not necessarily contrary to the agreement’s explicit terms, leading to a transfer of wealth from the other party to the performer.” *Id.* at 521; *see generally*, Benjamin Klein, Robert Crawford & Armen Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & Econ. 297 (1978); Oliver Williamson, *Transaction Cost Economics: The Governance of Contractual Relations*, 22 J.L. & Econ. 233 (1979). Opportunistic behavior in contract performance is limited by the terms of contracts where such behavior is anticipated, and in the implication of good faith performance of contracts where the conduct was not specifically anticipated. Muris, *Opportunistic Behavior*, 65 U. Minn. L. Rev. at 524.

³⁴ Muris, *Opportunistic Behavior*, 65 U. Minn. L. Rev. at 555 n.91 (“Prohibiting the . . . behavior when its only result is to transfer wealth discourages such behavior and accordingly reduces the amount of resources spent on it and protecting against it.”). One reason for an implied duty of good faith under contract law is to limit those costs. *See, e.g., id.* at 552-72. Such action by the judiciary furthers the goal of efficiency - if the courts declined to imply a duty of good faith, the costs of contracting would increase, resulting in decreased gains from trade. *Id.* at 524.

³⁵ The inquiry as to whether opportunistic conduct should be considered anticompetitive is highly fact specific, especially with respect to whether the opportunistic behavior not only transfers rents but may result in market power. *See Eastman Kodak Co. v. Image Technical Servs. Inc. (“Kodak”)*, 504 U.S. 451 (1992); Timothy Muris, *Improving the Economic Foundations of Competition Policy*, Remarks at the George Mason University Law Review's Winter Antitrust Symposium (Jan. 15, 2003). *See generally*, Benjamin Klein, *Market Power in Antitrust: Economic Analysis after Kodak*, 3 Sup. Ct. Econ. Rev. 43 (1993); Benjamin Klein, *Market Power in Franchise Cases in the Wake of Kodak: Applying Post-Contract Hold-up Analysis to Vertical Relationships*, 67 Antitrust L.J. 283 (1999); Carl Shapiro, *Aftermarkets and Consumer Welfare Making Sense of Kodak*, 63 Antitrust L.J. 483 (1995); Timothy Muris, *The FTC and the Law of Monopolization*, 67 Antitrust L.J. 693, 704-707 (2000).

³⁶ *See* Mark Lemley, *Intellectual Property Rights and Standard-Setting Organizations (“Standard-Setting Organizations”)*, 90 Cal. L. Rev. 1889 at 1902-06 (2002).

decision to use patented technologies is made openly and knowingly, based on full information.³⁷

The antitrust laws and the FTC Act provide a remedy when a member of such an organization nevertheless captures the standard – whether by violating the organization’s express rules or by circumventing those rules in a manner “contrary to the other [parties’] understanding ... but not necessarily contrary to [the rules’] explicit terms”³⁸ – and thereby acquires monopoly power. The Supreme Court has confirmed this point on two occasions.

In *American Society of Mechanical Engineers, Inc. v. Hydrolevel Corp.* (“Hydrolevel”), 456 U.S. 556 (1982), plaintiff Hydrolevel sued a standards organization (“ASME”) and two member companies under both Section 1 and Section 2 of the Sherman Act, 15 U.S.C. §§ 1, 2. Hydrolevel alleged that an employee of each company manipulated the standards organization’s procedures to harm Hydrolevel’s competing product. After the two companies settled, a jury found ASME liable under Section 1 of the Sherman Act. Explicitly recognizing the risks of anticompetitive harm flowing from the misuse of the power of a standards organization to further the individual anticompetitive aims of particular members, the Supreme Court affirmed the imposition of civil antitrust liability against the standards organization for failing to prevent an individual member from issuing an interpretation of ASME’s standard that in effect declared the

³⁷ Tr. 7271-88 (McAfee); *See generally* testimony at FTC and United States Department of Justice, Joint Hearings Regarding Competition and Intellectual Property Law and Policy In the Knowledge-Based Economy, Day 13, Standard-Setting Practices; Statement of Richard Rapp (April 18, 2002) at 5 (“In the absence of knowledge about proprietary IP rights in the technologies under consideration, manufacturers may find themselves the victims of opportunism after the standard has been set. That is, the patent holder may charge a royalty that reflects a premium arising from irreversibility - the cost of revising the standard to save the cost of royalty.”).

³⁸ *Muris, Opportunistic Behavior*, 65 U. Minn. L. Rev. at 521.

competitor's product unsafe. *Id.* at 571-73. The Supreme Court held that literal compliance with the organization's rules did not prevent the imposition of antitrust liability. On the contrary, it ruled that the organization could be held liable because its rules were not adequate to prevent anticompetitive abuse. *Id.* at 572.

Anticompetitive manipulation of a standards organization also was the conduct at the core of the antitrust violation in *Indian Head, Inc., v. Allied Tube & Conduit Corp.*, 817 F.2d 938 (2d Cir. 1987), *aff'd sub nom. Allied Tube & Conduit Corp. v. Indian Head, Inc.*, 486 U.S. 494 (1988) ("*Allied*"). The defendant Allied, a producer of metal electrical pipe, was charged with manipulating the National Fire Protection Association voting procedures to obtain a standard that favored Allied's metal pipe and disadvantaged competing plastic pipe producers.³⁹ The NFPA Board determined that the rules had been circumvented but not violated, 817 F.2d at 941, and at trial, the jury likewise found that Allied "did not violate any rules of the Association," but nonetheless rendered a verdict finding that Allied's conduct "did 'subvert' the consensus standard-making process of the Association" and violated the Sherman Act. 486 U.S. at 498; *see also* 817 F. 2d at 941.⁴⁰

On appeal, Allied argued that its conduct as a matter of law did not constitute an unreasonable restraint of trade. 817 F.2d at 947. The Court of Appeals rejected this argument,

³⁹ Specifically, Allied recruited 155 persons to register as voting members of NFPA and then packed the annual membership meeting where the crucial standard vote was taken. 817 F.2d at 940-41.

⁴⁰ The trial court set aside the jury verdict on grounds that, as a matter of law, Allied's conduct was protected from liability by the *Noerr-Pennington* doctrine. *Id.* at 942. The Court of Appeals overturned this ruling, *id.* at 943, and ordered the jury verdict reinstated. *Id.* at 947.

upholding the jury verdict that, by recruiting sham members and packing the meeting, Allied had “subverted” the substantive, consensus-based standards process. The court held this conduct violated the intent (although not the letter) of the NFPA voting procedures. *Id.* “We refuse,” the Court of Appeals said, “to permit a defendant to use its literal compliance with a standard-setting organization’s rules as a shield to protect such conduct from antitrust liability.” *Id.*

The Supreme Court, after initially granting certiorari on the question of antitrust liability, rejected Allied’s arguments and dismissed the grant of certiorari on that issue as “improvident.” 486 U.S. at 499, n.3.⁴¹ The Court emphasized that the validity of Allied’s conduct was to be tested “under the standards of conduct set forth by the antitrust laws that govern the private standard-setting process.” 486 U.S. at 509. Antitrust legality did not turn alone on the question of compliance with the rules of the standards organization, the Court said, but on the larger question of whether the pro-competitive purposes of private standard-setting had been subverted:

The antitrust validity of [Allied’s] efforts is not established, without more, by petitioner’s literal compliance with the rules of the Association, for the hope of procompetitive benefits depends upon the existence of safeguards sufficient to prevent the standard-setting process from being biased by members with economic interests in restraining competition. An association cannot validate the anticompetitive activities of its members simply by adopting rules that fail to provide such safeguards.

Id. (footnote omitted).

In these cases, the Supreme Court clearly established that a company’s conduct in a standard-setting organization is to be evaluated under the antitrust laws not solely in terms of

⁴¹ The Court held that Allied’s conduct was not protected from antitrust liability under the *Noerr-Pennington* doctrine, and affirmed the decision of the Circuit Court. 486 U.S. at 498. The result was to reinstate the jury verdict against Allied.

whether it was in literal compliance with the organization’s rules, but also whether it subverted the hope of procompetitive benefits arising out of the standard-setting process. As a district court noted in discussing *Allied*, “[w]here . . . the decisionmaking process of a private standard-setting has been subverted, a standard produced by that process does not promote competition.”⁴²

The Initial Decision is directly contrary to this and other precedent. The ALJ held that the legal theory underpinning the Commission’s complaint “Lacks a Reasonable Basis in Law” (ID 254) because there is no legal ground under Section 5 of the FTC Act to challenge a corporation’s abuse of the standards process through violation of a standards organization’s rules, failure to disclose patent applications, or breach of good faith. ID 258. The ALJ thus held as a matter of law that the Commission is without power under its authorizing statute to address the conduct challenged in the Complaint. The ALJ further held that “[e]ven if a cause of action exists under the FTC Act based upon a company’s alleged anticompetitive conduct before a standard setting organization,” such a violation can be found only for breach of a “clear and unambiguous” obligation or duty set forth in the specific rules or policies of the standards organization. ID 259. Both rulings are wrong. As we showed above, in *Hydrolevel* and *Allied* the Supreme Court has held exactly the opposite. Conduct that intentionally subverts the procompetitive purposes and circumvents the procedures and expectations of a standards organization in a manner likely to cause anticompetitive harm is an antitrust violation regardless of whether it technically violates the organization’s specific rules.

The ALJ misinterpreted *Allied* as applying only to “egregious unlawful activity” in the

⁴² *Sessions Tankliners, Inc. v. Joor Mfg. Inc. (“Joor”)*, 786 F. Supp. 1518, 1530 (C.D. Cal. 1991), *rev’d on other grounds* 17 F.3d 295 (9th Cir. 1994).

form of “agreements among some or all members acting in cartel-like fashion to exclude rival technologies.” ID 290. But both *Hydrolevel* and *Allied*, though decided under Section 1 of the Sherman Act, involved antitrust violations arising not from the agreement of competitors acting as a cartel, but the opportunistic behavior of particular participants in the standards processes. In each case, what raised unethical conduct to the level of antitrust violations was not the fact that the conduct was executed by means of agreement, but the effect of the conduct. The perpetrators seized the economic power of standards bodies by circumventing the bodies’ rules and used them to exclude competition in furtherance of their individual, anticompetitive purposes.

Indeed, the ALJ’s view, that *Allied* applies only to the narrow situation where multiple firms work together to subvert the purposes of a standards organization, is inconsistent with decisions holding that the presence of the standards organization itself supplies the concerted conduct element of a violation of Sherman Act § 1. *E.g.*, *Hydrolevel Corp. v. Am. Soc. Mech. Engineers*, 635 F.2d 118, 124 (2d Cir. 1980), *aff’d* 456 U.S. 556 (1982) (affirming Sherman Act § 1 liability for standards abuse by the standards organization itself as conspirator); *Joor*, 786 F. Supp. at 1530 (on remand in the aftermath of *Allied*, holding that a single firm’s actions in securing a standard through knowing misrepresentations established antitrust liability under Sherman Act § 1; the element of concerted conduct was found by the involvement of the standards organization itself).

Allied and *Hydrolevel* both make clear that anticompetitive abuse of the standards process can occur in various ways. Though the process that Rambus used to undermine the JEDEC decision-making was secretive, as opposed to the blatant vote-packing in *Allied*, it was for that very reason all the more dangerous. JEDEC and its members had no opportunity to take

corrective action until after Rambus's monopoly power was solidified.

2. Rambus Participated Voluntarily in JEDEC, But Subverted JEDEC's Procompetitive Goals, Basic Rules and Disclosure Policy.

a) JEDEC's Purposes and Procedures Were Intended To Prevent Its Standards from Being Used to Exclude Competitors.

"The job of JEDEC is to create standards which steer clear of patents which must be used to be in compliance with the standard whenever possible."

CX0903 at 2 (e-mail from Richard Crisp to Rambus executives and engineers, August 1996).

JEDEC's goals and procedures were fully consistent with "competition on the merits."

The JEDEC standard-setting process involved competition of a specific type – competition among various available technologies to be included in a standard. JEDEC's general purposes, and the procedures it implemented to achieve those purposes, provide important guide-posts to how JEDEC and its members expected this competition to occur. JEDEC's purposes and procedures were designed to avoid opportunistic hold-up behavior, and the anticompetitive outcomes that such behavior can produce.

The EIA Legal Guides, applicable to all JEDEC standard-setting activities, articulated "basic rules" under which standardization programs, including those of JEDEC, were to be conducted.⁴³ These basic rules expressly embraced the principles of pro-competitive standard-setting in terms intended to prevent a single participant or a small group of participants from using JEDEC standards to obtain market power. They required that:

⁴³ JEDEC specifically provided that its meetings are to "be conducted within the current edition of EIA legal guides . . . incorporated herein by reference." JEDEC Manual of Organization and Procedure, JEP 21-I, § 9.1, CX0208 at 18. See CCF 305-309.

“[Standardization programs] shall not be proposed for or indirectly result in . . . restricting competition, giving a competitive advantage to any manufacturer, [or] excluding competitors from the market”

EIA Legal Guides (3/14/83), CX0202 at 6; see CCFF 315.

The basic rules also state that standardization efforts “shall be carried on in good faith under policies and procedures which will assure fairness and unrestricted participation.”⁴⁴ This basic rule was intended to prevent a participant from exploiting a loophole in the organization’s specific rules and procedures in order to achieve a result contrary to JEDEC’s fundamental purposes.⁴⁵ This express provision reinforces the implied duty of good faith that arises from any joint undertaking such as cooperative standard-setting.⁴⁶

EIA and JEDEC adopted specific procedures in furtherance of these basic rules. To minimize the possibility that a patent-holder could use its patent opportunistically to exclude competitors from practicing the standard, the JEDEC operating manual stated that standards “that require the use of patented items should be considered with great care.”⁴⁷ JEDEC emphasized that any decision to incorporate a patented technology in a standard should be taken knowingly, based on full information. The JEDEC manual provided:

“[C]ommittees should ensure that no program of standardization

⁴⁴ EIA Legal Guides (3/14/83), CX0202 at 6.

⁴⁵ See CCFF 315, 300-304.

⁴⁶ *E.g., Agere Systems Guardian Corp. v. Proxim, Inc.*, 190 F. Supp.2d 726, 739 (D. Del. 2002) (allowing pleading of counterclaim for breach of implied duty of good faith and fair dealing against patent holder that sued user of industry standard for infringement based on patent not disclosed in standards process).

⁴⁷ CX0208, § 9.3, at 19.

shall refer to a product on which there is a known patent unless all the relevant technical information covered by the patent is known to the formulating committee, subcommittee, or working group.”

CX0208, § 9.3, at 19.⁴⁸ Additionally, the JEDEC rules prohibited adopting a standard that required the use of a patent unless the holder of the patent provided written assurance that “a license will be made available without compensation to applicants desiring to implement the standard,” or that “a license will be made available to all applicants under reasonable terms and conditions that are demonstrably free of any unfair discrimination.”⁴⁹ These requirements also served to align the purposes of JEDEC with the principles of antitrust law – the provisions sought to prevent a patent-holder from using a JEDEC standard to unreasonably restrict the access of some or all competitors to the marketplace.⁵⁰

To ensure that the JEDEC committees received the necessary information regarding patented technologies, JEDEC rules required all participants to disclose relevant patents or patent applications. JEDEC amended its manual in 1993 specifically to set forth this obligation:

“The Chairperson . . . must call to the attention of all those present the requirements contained in the EIA Legal Guidelines, and call attention to the obligation of all participants to inform the meeting of any knowledge they may have of any patents, or pending patents, that might be involved in the work they are undertaking.”

⁴⁸ This rule did not preclude JEDEC from promulgating a standard that incorporated patented technology “if technical reasons justify the inclusion;” rather, it sought to ensure that the potential costs associated with a patented technology were understood and considered as part of the decision-making process. *Id.*

⁴⁹ CX0208, § 9.3, at 19.

⁵⁰ CCFE 2683-2690.

CX0208 at 19.⁵¹

JEDEC also followed a series of procedures to remind members of this obligation. Jim Townsend, Chairman of the JC-42 Committee, began each meeting with a presentation summarizing the patent policy. From time to time, the Chairman also circulated (and included in the meeting minutes) memoranda to various members asking them to research their company's position regarding "patents held or applied for" relating to particular matters and indicate "the intent of [their] company to patent or not patent the subject matter." *See, e.g.*, CX0336 at 1; CX0042A at 7; CX0342 at 1; CX0347 at 2; JX0018 at 14; JX0019 at 17. JEDEC modified the meeting sign-in sheet to add a reminder of the EIA/JEDEC policy regarding "patentable or patented items," CX0306 at 1, and added a line to committee ballot forms asking all recipients to indicate during their voting responses if they were aware of patents related to the subject of the ballot. CX0252A at 2.

JEDEC members expected that their standard-setting work would be conducted pursuant to these procedures. Members expected that JEDEC's standards would be open, free of unknown patents, and available to everybody. CCFF 300-04. Members wanted to make informed choices, and to avoid using patented technologies unless they first had the opportunity to evaluate alternatives, consider the strength of a RAND commitment, and make an informed decision. CCFF 316-17. Members understood that they were expected to disclose relevant patents and patent applications (CCFF 316, 318-20), and relied on others to act in good faith and to disclose relevant patent information on a timely basis. As EIA General Counsel John Kelly explained:

⁵¹ The manual also specifically defined the term "patent" to include patent applications: "For the purpose of this policy, the word 'patented' also includes items and processes for which a patent has been applied for and may be pending." CX0208 at 19.

[W]e're [not] in a position to conduct patent searches to determine as a matter of fact whether any patents are involved in the standards work that we perform. We rely on the participants in the process to surface patent issues to our attention . . . but if we don't know, we're not in a position to go out and find out . . .

Tr. 1836-37 (J. Kelly); *see also* Tr. 6702-03, 6709-10 (Lee) (discounted marketplace rumor about Rambus patents in part because he relied on Rambus to disclose relevant patents at JEDEC); Tr. 1693-94 (Landgraf) (patents disclosed to allow decision whether to modify the proposal or to inquire about licensing terms); Tr. 6598 (Lee) (disclosure “was to be able to allow the committee to avoid the use of patents and incorporating them in the standard.”); Tr. 1343 (Sussman) (early disclosure allows members not to waste time and to focus on an alternative). Indeed, Richard Crisp recognized the importance JEDEC members attached to early disclosure and informed his management of “a big ruckus” caused by a late patent disclosure. CX0711 at 187 (Crisp e-mail: “Hitachi stated that they had a patent [. . .] This created a big ruckus. [The] criticism of Hitachi was that they waited until the ballots had been passed before mentioning that they had a patent.”).

In the rare instances when a member tried to enforce a non-disclosed patent against JEDEC-compliant products, members protested strongly. Beginning in September 1993, for example, JEDEC learned that Texas Instruments was enforcing patents that it had never disclosed against products using “Quad CAS” technology, which had been incorporated in JEDEC standards. The reaction was overwhelming – Texas Instruments was lambasted in three successive meetings. JX0017 at 6-7; JX0018 at 7-8; JX0019 at 4-5; CX0711 at 1 (Crisp e-mail: “TI was chastized for not informing JEDEC”); CX0711 at 15, 16 (Crisp e-mail: “The meeting opened with a lot of controversy. . . . The whole issue got pretty nasty. . . . [Sanyo representative Howard Sussman] made a motion that TI withdraw from JEDEC pending resolution of the patent

issue!”). The committee voted unanimously to rescind existing standards and halt work on in-progress standards containing Quad CAS technology.⁵² CCF 424-32. Subcommittee Chairman

Gordon Kelley wrote to Texas Instruments:

I am and have been concerned that this issue [TI’s failure to disclose patents relating to Quad CAS technology] can destroy the work of JEDEC. If we have companies leading us into their patent collection plates, then we will no longer have companies willing to join the work of creating standards . . .

CX2384. When TI claimed that the JEDEC patent policy required clarification, the JEDEC committee members (with Richard Crisp present) voted unanimously that they thought the policy was clear. CCF 428; JX0019 at 4-5; Tr. 5028-29 (Kellogg). EIA General Counsel John Kelly nevertheless responded to TI in a memorandum circulated to the full JEDEC committee, “Written assurances must be provided by the patent holder when it appears to the committee that the candidate standard may require the use of a patented invention.” CX0355 at 2 (emphasis in original). As John Kelly commented at the time, “It is unfortunate that the matter ended this way. But TI left us with no other options!” CX0348 at 1.

Indeed, JEDEC has been remarkably consistent. The record reflects only three other instances over the previous 20 years in which a company failed to disclose a relevant patent or patent application at JEDEC and subsequently attempted to enforce its patent rights against companies practicing a JEDEC standard. In each such instance (by SEEQ, Wang and Texas Instruments), JEDEC and its members objected vociferously and took whatever steps they could both to resist the assertion of patents and to prevent a repeat of such conduct in the future. CCF

⁵² This solution was not available to JEDEC when Rambus asserted patents against the SDRAM and DDR SDRAM standards because those standards had already been widely implemented throughout the industry.

423-34.

Against this stark record, the decision (like Rambus itself in its briefing below) fails to identify:

- a single instance in which a JEDEC member failed to disclose a relevant patent or patent application to JEDEC and later enforced the patent against companies practicing a JEDEC standard, without provoking immediate and vigorous protests from JEDEC members for failing to comply with the JEDEC patent policy.
- a single witness who testified that it was consistent with JEDEC purposes and procedures, with their expectations, or with the principles of good faith, for a JEDEC member intentionally to conceal from JEDEC patents, patent applications or ongoing patent work relating to claims that they intended to enforce in the future against companies practicing a JEDEC standard.

Instead, the decision (following Rambus's lead) cobbles together bits and pieces of evidence, frequently taken out of context. Although Rambus tries to spin these together in an attempt to justify its conduct, the record refutes any assertion that Rambus's overall course of conduct was consistent with JEDEC's purposes and procedures or with Rambus's obligations as a JEDEC member.

In sum, in accordance with JEDEC's basic rules, specific rules and procedures, JEDEC and its members expected to be able to compare and choose among technologies based in part on information as to whether any of those technologies might be subject to another member's royalty demands. "Competition on the merits" in the JEDEC context consisted of permitting JEDEC members to make an informed choice among alternative technologies, with full knowledge as to the differing performance capabilities and potential prices of each. As explained below, however, even if antitrust liability did turn on a clear and unambiguous obligation under the JEDEC rules, as incorrectly required by the ALJ, the record here amply establishes that such

a test would be satisfied.⁵³

b) Rambus’s Course of Conduct Violated JEDEC’s Basic Rules, Violated the Duty of Good Faith, and Violated JEDEC’s Specific Disclosure and Licensing Policies.

It is contrary to industry practice and understanding for an intellectual property owner to remain silent during the standard-setting process – and . . . later attempt to assert that its intellectual property . . . allows it to exclude others from practicing the standard.

CX2957 at 2 (affidavit of Joel Karp of Samsung – later Rambus Vice President of Intellectual Property – May 1996).

As described in the Statement of Facts, beginning within weeks after Rambus first joined JEDEC, and continuing for nearly a decade, Rambus successfully pursued a calculated plan that resulted in its control, through patent rights, of the JEDEC standards that today govern virtually all DRAM memory and related chips sold world-wide. This plan conflicted with the basic rules of the JEDEC standard-setting process, violated the duty of good faith, and violated the literal requirements of the JEDEC rules.

Rambus intentionally violated each of JEDEC’s patent-related rules, both basic and specific. Whereas JEDEC required that “all the relevant technical information covered by the patent [be] known to the formulating committee” before a patented technology was incorporated in a standard,⁵⁴ Rambus intentionally concealed information about its claims to relevant

⁵³ Because JEDEC’s rules, properly interpreted, reinforce the procompetitive aims of the antitrust laws, this case does not present the question of whether the antitrust laws standing alone require patent disclosure obligations as a general matter for every standards organization. The antitrust implications of patent disclosure rules (or lack of rules) must necessarily be evaluated as a fact-specific, case-by-case inquiry.

⁵⁴ CX0208 at 19 (JEDEC Manual, § 9.3).

technologies. Whereas JEDEC sought to ensure that possible non-proprietary alternatives would be considered and that patented technology would be incorporated in its standards only “if technical reasons justify the inclusion,”⁵⁵ Rambus representatives deprived JEDEC of the opportunity to conduct a specific comparison based on full information. Whereas JEDEC prohibited patented technology from being incorporated in a standard unless the patent holder committed in advance to license the technology to all comers on reasonable and non-discriminatory terms, Rambus was determined to “reserve[] the sole right to decide whether or not to license” any party, to set the rate or rates for any license, and to “enforce its patents against any unlicensed party without limitation.” CX1243 at 1 (draft letter to IEEE, January 1996).

In sum, whereas JEDEC sought to ensure that its standard-setting activities would not result in “restricting competition, giving a competitive advantage to any manufacturer, [or] excluding competitors from the market,”⁵⁶ Rambus positioned itself to have the power to decide which companies can produce JEDEC-compliant DRAMs and how much it will charge them in royalties to do so.

The Commission should reject Rambus’s efforts to isolate individual elements of its course of conduct, and instead should evaluate Rambus’s overall course of conduct as a whole. *Continental Ore Co. v. Union Carbide & Carbon Corp.*, 370 U.S. 690, 699 (1962).⁵⁷

⁵⁵ CX0208 at 19 (JEDEC Manual, § 9.3).

⁵⁶ CX0202 at 6.

⁵⁷ *Id.* (“[P]laintiffs should be given the full benefit of their proof without tightly compartmentalizing the various factual components and wiping the slate clean after scrutiny of each.”)

Nonetheless, Rambus violated the specific requirements of the JEDEC disclosure policy, even construed most narrowly. Rambus strategically failed to disclose to JEDEC its '327 patent, its pending '651 application (which it believed covered technologies considered and adopted by JEDEC), and its '961, '490, '692, and '646 applications (which Rambus believed covered, and did in fact cover, technologies considered and adopted by JEDEC). CCFF 1122-1237. Rambus also failed to disclose to JEDEC its belief that five additional technologies adopted or considered by JEDEC were likely to infringe its patents. CCFF 3113-82.

Rambus also made affirmative statements, remained silent in the face of statements by others, and otherwise falsely implied that it was abiding by the terms of the disclosure policy and had nothing relevant to disclose. In May 1992, a member raised concerns about the possibility of Rambus patents relating to two-bank technology. When the Chairman asked if Mr. Crisp had a comment about that, he shook his head, "no." The Chairman then said, "they don't have anything to say about that." CCFF 904. Another member stated that he had seen Rambus's foreign patent application and that it should not be a concern for the JEDEC standardization effort. CCFF 906. Mr. Crisp remained silent in response to both comments.

In July 1992, Rambus returned a ballot voting against use of programmable CAS latency and burst length in the SDRAM standard. Despite Mr. Crisp's ongoing work with Rambus patent counsel to add claims covering these technologies, he did not check the ballot line to be marked if the voting entity knew of any patent issue. At the subsequent meeting, Mr. Crisp spoke out against use of these technologies on technical grounds, but again did not mention patent issues. CCFF 919-27.

In September 1993, Mr. Crisp disclosed to JEDEC Rambus's '703 patent, although the

claims were unrelated to JEDEC's ongoing work. CCFF 968-76. In September 1995, to deflect criticism for Rambus's failure to answer directly a question as to whether it had patents relating to a SyncLink presentation at JEDEC, Mr. Crisp reminded JEDEC members that he had actually disclosed a patent to JEDEC in the past. CCFF 1066.

In June 1996, Rambus submitted to JEDEC a letter attaching a list of all of its issued patents, with an egregious exception: it omitted from the list its '327 patent, the one issued patent directly relevant to ongoing JEDEC work. CCFF 1109-14.

Abundant evidence of the anticompetitive intent of Rambus confirms the exclusionary nature of its conduct.⁵⁸ The record evidence clearly establishes that Rambus representatives were keenly aware of the relationship between ongoing JEDEC work and Rambus patent applications. Richard Crisp, who instigated many efforts to broaden Rambus's patents to cover ongoing JEDEC work, had numerous meetings and conversations with others at Rambus and outside counsel as part of those efforts. CCFF 885-92, 900-01, 917, 932-39, 945-49, 955-58, 962-67, 987-93, 1000-08, 1028, 1049-55, 1069, 1074-77. On other occasions, while observing JEDEC presentations he recognized that Rambus patent applications likely covered JEDEC work

⁵⁸ In Section 2 analysis, intent serves primarily to confirm the exclusionary character of a course of conduct. As the Supreme Court explained in *Aspen Skiing Co.*, “[e]vidence of intent is merely relevant to the question whether the challenged conduct is fairly characterized as ‘exclusionary’ or ‘anticompetitive’ . . . or ‘predatory’” *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 602 (1985); see also *United States v. Microsoft Corp.* (“*Microsoft*”), 253 F.3d 34, 59 (D.C. Cir. 2001) (“our focus is upon the effect of that conduct, not upon the intent behind it.”); *Ball Mem'l Hosp. v. Mutual Hosp. Ins.*, 784 F.2d 1325, 1339 (7th Cir.) (“[t]he focus must be on the objective basis, not the mental state”), *reh'g denied en banc*, 788 F.2d 1223 (7th Cir. 1986). Thus, to the extent courts consider anticompetitive intent, they seek to determine “whether the underlying purpose of the firm's conduct was to enable the firm to compete more effectively.” *Illinois ex rel. Burris v. Panhandle E. Pipe Line Co.*, 935 F.2d 1469, 1481 (7th Cir. 1991).

and informed Rambus management. CCF 884, 911-18, 996-99, 1009-17, 1031-38, 1041-46, 1071-73, 1078-82, 1096-99. Others at Rambus shared this knowledge of Rambus patent applications and JEDEC work, including CEO Geoff Tate and Vice President Allen Roberts. Indeed, both during and after the time it was a JEDEC member, Rambus made extensive plans for future patent litigation against JEDEC standard SDRAMs. CCF 885-92, 962-67, 981, 993, 1000-03, 1012-24, 1029-30, 1056-61, 1069.

Rambus's scheme extended far beyond simple awareness of the relevance of its patent applications to ongoing JEDEC work. Rambus's course of conduct was not an accidental failure to disclose. *See, e.g., Dell Computer Corp.*, 121 F.T.C. 616 at 629-30 (1996) (Comm. Azcuenaga dissenting, distinguishing between knowing misrepresentation or manipulation and constructive knowledge or unsubstantiated inferences); 2 Herbert Hovenkamp et al., *IP and Antitrust*, ("Hovenkamp, *IP*") § 35.5, at 35-40 to 35-41 (2002). Rather, the record establishes that Rambus for years intentionally worked to obtain patent coverage, without JEDEC's knowledge, over the technologies incorporated in the JEDEC standards.

Rambus' anticompetitive intent was confirmed in 1998 when, preparing to enforce its patents against the industry, it engaged in a massive effort to destroy documents that might be discoverable in litigation. *See Rambus, Inc. v. Infineon Techs. AG*, No. CIV. 3:00CV524, 2004 WL 547536 (E.D. Va., March 17, 2004) at *24 (evidence "strongly indicates that Rambus explicitly linked . . . the shredding of documents with preparing for patent litigation"). Not only did Rambus shred thousands of pounds of documents within the company, it also instructed its outside counsel Lester Vincent (who had advised them on the equitable estoppel risks of their course of conduct) to purge his files. CCF 1718-58. Common sense dictates that Rambus did

not go to such lengths to destroy documents showing that it acted with legitimate intent to pursue a procompetitive business purpose.

3. Rambus’s Subversion of JEDEC’s Process Had No Procompetitive Justification.

“I said there could be [an] equitable estoppel problem if Rambus creates [the] impression on JEDEC that it would not enforce its patent or patent appl[icatio]n”

CX1942 (Handwritten notes of Lester Vincent, Meeting with Richard Crisp and Allen Roberts, March 1992).

“– No further participation in any standards body . . . do not even get close!!”

CX1928 (handwritten notes of Lester Vincent, undated (apparently from early 1996 shortly after learning of the Dell proposed consent agreement))

As discussed above, because JEDEC’s goals and procedures were reasonably tied to procompetitive benefits, evidence that Rambus deliberately subverted those goals and procedures for its own independent gain establishes that Rambus’s conduct was exclusionary. Even if the Commission were to consider the justifications Rambus proffered, however, the inquiry would yield the same result. The record in this case confirms that Rambus’s conduct did not serve to reduce prices, improve the quality of anyone’s products, or increase anyone’s efficiency.⁵⁹

⁵⁹ A business reason proffered to justify a monopolist’s exclusionary conduct must describe how its conduct advanced competition on the merits. *Microsoft*, 253 F.3d at 59 (the monopolist must assert “a procompetitive justification – a nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal”); *id.* at 71 (Microsoft’s asserted justification for its exclusive contracts with internet access providers – that it wanted “to keep developers focused upon its APIs” was not an unlawful goal, “but neither is it a procompetitive justification . . .”); *see also Kodak*, 504 U.S. at 483-486 (“[I]ability turns, then, on whether ‘valid business reasons’ can explain Kodak’s actions.”); *id.* at 485 (proffered “free riding” justification inconsistent with the

Rambus proffered three general justifications for its failure to disclose its intellectual property interests: reducing the likelihood of interference proceedings in the Patent and Trademark Office,⁶⁰ preserving rights in foreign countries if applications have not yet been filed there, and protecting trade secrets. These proffered justifications fail because (1) they disregard and fail to justify the actual conduct at issue; and (2) they are not supported by the evidence.

First, while the justifications Rambus proffers may or may not explain a company's abstract interest in maintaining the confidentiality of its intellectual property, they provide no support for Rambus's conduct here – voluntarily joining an organization in which the disclosure of relevant intellectual property was required by the organization's rules, expected by the membership, compelled by the duty of good faith, and necessary for the organization to function as intended. As we explain above, JEDEC's rules sought to ensure that no one company would coopt its standards for its own individual benefit to the disadvantage of others, and that technologies would be evaluated on the basis of full information concerning potential patent rights. Commitment to the JEDEC disclosure rules assured JEDEC members that, if they were going to disclose information on otherwise confidential patent applications, they would receive a

antitrust laws). A proffered justification must also be nonpretextual – on its face, it must be consistent with the conduct in question and the effects of that conduct – and it must be substantiated by the record evidence. *See, e.g., Kodak*, 504 U.S. at 484 (questioning Kodak's alleged "high quality service" justification as inconsistent with Kodak's argument regarding lifecycle pricing); *Microsoft*, 253 F.3d at 66-67 (general claims that integration of the browser into the operating system was "highly efficient" providing "substantial benefits customers and developers" rejected because "[Microsoft] neither specific[d] nor substantiate[d] those claims."); *see also id.* at 63-64.

⁶⁰ It is questionable whether a justification based on denying a third party the opportunity to submit relevant information to assist the PTO in evaluating the validity of a pending patent application is cognizable under the antitrust laws. This, however, is not a question that the Commission needs to decide in this case.

corresponding benefit – the good faith commitment of other members to share their information on equal terms. It further confirmed for industry participants (JEDEC members and non-members alike) that they would not be subject to a deliberate patent ambush if they committed to and invested in implementing a JEDEC standard. Rambus’s purported justifications ignore this critical factual context, and are therefore irrelevant.

Second, the evidence not only fails to support, but actually contradicts, the proffered justifications. Apart from the testimony of its experts, which consisted of theoretical assertions based entirely on assumptions, Rambus offered only two pieces of supporting evidence. Rambus relied on attorney Lester Vincent’s generic advice to Rambus not to disclose patent applications. This advice was unrelated to JEDEC, however. Rambus also relied on a single e-mail from Richard Crisp, in which he referred to “not disclosing our trade secrets any earlier than we are forced to.” CX0837 at 2. The cryptic comment fails to explain how Rambus’s overall course of conduct at JEDEC was necessary to protect trade secrets.

Neither piece of evidence confirms that Rambus was in fact worried at the time about loss of trade secrets, loss of foreign rights, or interference proceedings, let alone what trade secrets might be lost, in which foreign countries, or which applications might be vulnerable to interference proceedings. Neither piece of evidence establishes that, even if they in fact existed, these concerns influenced Rambus’s conduct. Fundamentally, neither piece of evidence establishes why, if Rambus was truly concerned about these issues, it chose to join and participate in a standard-setting organization which required disclosure of relevant patent information.

Indeed, the record evidence reveals that Rambus’s proffered after-the-fact justifications

are inconsistent with the realities of this case.⁶¹ The contemporaneous evidence establishes that Lester Vincent informed Richard Crisp and Vice President Allen Roberts from the outset, and others at Rambus over time, that Rambus had strong business reasons not to follow the course of conduct that it chose. Mr. Vincent repeatedly told them that, by joining and participating in JEDEC and not disclosing the existence of relevant patent applications, Rambus risked having the resulting patents held unenforceable pursuant to the doctrine of equitable estoppel. CCFF 850-51; CX3125 (Vincent dep.) at 320-21). Rambus deliberately chose to conceal relevant patent applications, not out of concern of interference proceedings or loss of foreign patent rights, but to prevent JEDEC members from considering the selection of alternative technologies until after they had become locked in to use of the Rambus technologies. *See* CX0711 68 at 73 (“it makes no sense to alert them to a potential problem they can easily work around.”); CX0919 (“do *NOT* tell customers/partners that we feel DDR may infringe – our leverage is better to wait”).

B. The Initial Decision Is Thoroughly Tainted by the ALJ’s Fundamental Misapplication of Antitrust Law Principles.

The ALJ’s analysis of Rambus’s conduct was tainted by his mistaken belief that only specific violations of “clear and unambiguous” organization rules can give rise to antitrust liability. This mistake of law led the ALJ in his fact-finding to put JEDEC and its members on trial, rather than Rambus. Rather than engaging in a balanced review of Rambus’s conduct in light of JEDEC’s purposes, policies, and rules, he hunted for purported ambiguities in the rules,

⁶¹ Rambus questioned only Richard Crisp on this subject, and only briefly. Tr. 3473 (Crisp). Rambus deliberately passed up the opportunity to ask either Lester Vincent or Anthony Diepenbrock, or to call its CEO, its President, its CFO, or either of its former Vice Presidents for Intellectual Property, to explain the reasons for Rambus’s conduct. These circumstances warrant a presumption that the testimony of these witnesses would not have supported Rambus’s purported justifications.

interpreted those rules without reference to the overall purposes of the organization, and in virtually every possible instance contorted the rules to read them in the light most favorable to Rambus. Indeed, the ALJ's disregard of the plain meaning of the rules and his search to find "ambiguities" reached preposterous extremes.⁶²

If there were any ambiguity in JEDEC's specific disclosure rules, those rules should have been interpreted in light of JEDEC's purpose to adopt open standards, avoid "restricting competition, giving a competitive advantage to any manufacturer, [or] excluding competitors from the market," CX0202 at 6, and require that standardization efforts "shall be carried on in good faith under policies and procedures which will assure fairness and unrestricted participation." *Id.* As EIA General Counsel John Kelly testified, one of the purposes for the basic rule of good faith was to prevent members from trying to find and exploit loopholes in the JEDEC disclosure policy. Tr. 1840-50, 2054-55 (J. Kelly).

In addition to his fundamental error of applying an incorrect legal standard, the ALJ also made numerous other errors in evaluating Rambus' conduct under the JEDEC policies, including improper reliance on the Federal Circuit interpretations of fact in *Rambus, Inc. v. Infineon Techs. AG* ("*Infineon*"), 318 F.3d 1081 (Fed. Cir.), *cert. denied*, 124 S.Ct. 227 (2003). The *Infineon* case involved a claim arising under Virginia common law of fraud, was decided under the "clear and convincing" standard of proof, and was based on a different and much less extensive trial

⁶² For example, the ALJ dismisses the language from JEDEC's 21-I Manual requiring committee Chairpersons to "call attention to the obligation of all participants to inform the meeting of any knowledge they may have of any patents, or pending patents, that might be involved in the work they are undertaking." CX0208 at 19. According to the ALJ, this is not evidence that JEDEC participants are under such an obligation to disclose but rather nothing more than an "indirect reference to an otherwise undefined duty that cannot form the basis of an antitrust claim." ID 263-64.

record. Even setting these factors aside, the *Infineon* majority decision is highly suspect, as reflected in the compelling points set forth in the vigorous dissenting opinion. Testimony in this matter from the EIA General Counsel with specific responsibility to interpret the JEDEC disclosure policy during the years in question, contradicted the fact conclusions in the *Infineon* majority opinion. Tr. 2063 (J. Kelly: “I’m afraid the majority as a matter of fact got it wrong.”). Nevertheless, the ALJ ignored all these factors and, although supposedly determining antitrust liability, under a simple preponderance of the evidence standard, on the basis of this record, relied on the Federal Circuit decision to support no fewer than nine separate factual propositions in the space of nineteen pages.⁶³

The ALJ relied on *Kingsdown Medical Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 874 (Fed. Cir. 1988), and similar cases, to conclude that Rambus’s campaign to amend its patents to cover JEDEC standard technologies was lawful. ID 285. The *Kingsdown* decision, however, was decided under the patent laws, and holds simply that a patent holder does not violate those

⁶³ ID 260, 264, 265, 269, 271, 273-74, 276, 277, 278-79. An important example of the ALJ’s misplaced reliance on the Federal Circuit opinion appears at ID 277-79. The ALJ relied almost entirely on the *Infineon* litigation in finding that “Respondent had no duty to disclose regarding DDR-SDRAM because Rambus had withdrawn from JEDEC prior to formal consideration of the standard.” ID 278 (emphasis added). There are three fundamental flaws with this conclusion. First, whatever may have been admitted into or omitted from the record in the *Infineon* litigation, there is absolutely no evidence whatsoever in this record that JEDEC even recognized the concept of “formal” consideration of a standard, let alone that it had any implication with respect to a duty to disclose. Rather, the evidence is entirely to the contrary. Tr. 1985 (J. Kelly) (the duty to disclose is “not tied to any procedural formality in the process at all.”); CCF 318-20, 339-45. Second, the overwhelming weight of the evidence establishes that JEDEC’s consideration of the DDR SDRAM standard in fact began long before Rambus withdrew from JEDEC. CCF 578-85. Third, even if JEDEC had not begun consideration of the DDR SDRAM standard, uncontradicted record evidence in this case establishes that specific work involving the technologies at issue while Rambus was a member triggered an obligation to disclose. CCF 600, 606, 612-15, 628-30, 634-35, 639-40. Rambus could not evade this disclosure obligation by withdrawing from JEDEC. CCF 343-44.

laws by amending a pending application to add claims intended to cover a single competitor's product. The decision says absolutely nothing about liability under the antitrust laws, much less about liability of a patent holder with respect to conduct relating to a standards organization. The complaint in this matter goes far beyond the simple conduct at issue in *Kingsdown*, and that patent case provides no basis to uphold the antitrust legality of Rambus's wide-ranging course of conduct that led to monopoly.

Transfixed by his illusion that any ambiguity in the specific JEDEC rules was grounds for validating the Rambus conduct, the ALJ wrongly disregarded virtually all of the trial testimony of JEDEC participants concerning their understanding of the JEDEC disclosure policy. Most egregious was his treatment of EIA General Counsel John Kelly: After finding that Mr. Kelly was the person specifically responsible for interpreting the JEDEC patent policy, IDF 244, the ALJ simply disregarded his one-and-a-half days of testimony. Even a cursory review of Mr. Kelly's testimony reveals that it is impossible to reconcile with the ALJ's interpretation of the JEDEC patent policy.⁶⁴ The ALJ compounded his error by likewise ignoring most of the

⁶⁴ See generally Tr. 1749-2175 (J. Kelly). For example, Mr. Kelly contradicted the ALJ's conclusion that the requirement of good faith did not apply to JEDEC members but only JEDEC supervisors (Tr. 1840: the basic rules in the EIA Legal Guides are "mandatory" for EIA participants; Tr. 1841: "[C]ompanies need to participate in the process openly and honestly and fairly and in good faith and not in bad faith, because bad faith undermines the confidence of everyone in the process;" Tr. 2053-55: "all participants are under a duty under the EIA Legal Guides to act in good faith;" "clearly there are no intended loopholes"). He contradicted the ALJ's conclusion that JEDEC encouraged but did not require early disclosure of patents and applications (Tr. 1837-38: The EIA/JEDEC patent policy "requires an early disclosure of intellectual property; that is, patents or patent applications that are or may be related to the work of a standard-setting committee;" Tr. 1972: a participant "is required to disclose as much information as possible as early as possible in the process;" see also Tr. 1975, 1984-85). Mr. Kelly's testimony confirms that, based on this record, it was improper for the ALJ to rely on the Federal Circuit opinion in *Infineon* (Tr. 2063-66: "I'm afraid the majority as a matter of fact got it wrong.").

testimony of other fact witnesses,⁶⁵ and relying only on selected snippets frequently taken out of context. Witness after witness demonstrated the effectiveness of Jim Townsend's repeated messages at meeting after meeting: Despite the passage of 8-12 years, the testimony was remarkable for its consistency in describing the key elements of the disclosure policy. CCF 318-20.

The record properly viewed in its entirety leaves no doubt that Rambus successfully subverted JEDEC's rules. Rambus's plan achieved exactly the opposite of what JEDEC intended: Instead of a standards process that gave careful consideration to possible intellectual property rights, with proprietary technologies adopted only on the basis of informed discussion and with assurances of reasonable and non-discriminatory access, JEDEC adopted the technologies in question without material information on crucial intellectual property issues. Instead of standards that do not restrict competition, give a competitive advantage to any company or exclude others from the market, Rambus's conduct has resulted in standards that today give it the power to control which firms may practice the standards, and to dictate the price and terms under which they may do so. Rambus's conduct was exclusionary in the most fundamental sense, and constitutes an unfair method of competition.

⁶⁵ This mistake derives in large part from a misapplication of the *Gypsum* rule. ID 264-265, 269. *United States v. United States Gypsum Co.*, 333 U.S. 364, 395-96 (1948), teaches that if trial testimony is contradicted by contemporaneous documents, the trial testimony should be afforded little weight. But in this matter, even if the ALJ were correct that the contemporaneous documents embodying the JEDEC policies and rules contained ambiguities, *Gypsum* provides no reason to disregard the trial testimony of witnesses explaining any ambiguities, particularly where that testimony is consistent with other contemporaneous documents and evidence.

II. Rambus's Exclusionary Conduct Contributed to Rambus's Unlawful Acquisition of Durable Monopoly Power.

There is no debate that the four technology markets alleged in the complaint constitute well-defined product markets (IDF 1010-140); that each relevant technology market is world-wide in scope (IDF 1016-17); and that Rambus today possesses monopoly power in those markets (IDF 1018-29). Further, Rambus did not have this monopoly power at the time it joined JEDEC, and thus has acquired it since that time. CCFF 3015-16. Despite recognizing these key facts, the ALJ erroneously concluded that Rambus's monopoly power does not constitute anticompetitive harm because he believed that power had not been fully exercised, and was not causally linked to Rambus's course of conduct. Both conclusions are wrong.

First, the law is clear that Rambus's acquisition of monopoly power is in itself anticompetitive harm, regardless of whether that power has been exercised. Moreover, the record confirms that Rambus has exercised that power to increase prices, that the impact is likely to be passed on to consumers, and that Rambus's monopoly power is durable because firms today cannot readily switch from the JEDEC-standard technologies.

Second, the record establishes that Rambus's course of conduct contributed to Rambus's monopoly power. Prior to the adoption of the JEDEC standards, each of the relevant markets contained a number of viable and price-constraining technologies. CCFF 2790-2821. In each instance, JEDEC members selected a single technology from those options for inclusion in the standard. Rambus's conduct distorted the JEDEC selection process by depriving JEDEC of highly material information – that Rambus planned to collect royalties based on patents covering certain technologies being considered by JEDEC for incorporation into its standards. Rambus

led JEDEC members to select among various alternatives for its SDRAM and DDR SDRAM standards thinking the alternatives would all be free, when in fact Rambus intended that the four technologies at issue would come with an enormous hidden price tag.

A. Rambus Possesses Durable Monopoly Power in the Relevant Technology Markets.

Rambus has monopoly power. Monopoly power is the power to control prices and exclude competition. *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956); *Carpet Group Intern. v. Oriental Rug Importers*, 227 F.3d 62, 74 (3d Cir. 2000). The offense of monopolization is complete with the acquisition or maintenance of monopoly power; that power does not have to be exercised.

The ALJ improperly accepted Rambus's argument that its acquisition of monopoly power in the four relevant markets does not constitute anticompetitive harm because there is no evidence that prices in the downstream market for DRAMs have increased. ID 323-24. The ALJ was wrong on the law and wrong on the facts. Acquisition of monopoly power constitutes anticompetitive harm, regardless of whether that power has been exercised at the time of a lawsuit. *American Tobacco Co. v. United States*, 328 U.S. 781, 811 (1946) (the material consideration "is not that prices are raised and that competition actually is excluded but that power exists to raise prices or to exclude competition when it is desired to do so."); *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 275 (2d Cir. 1979); *see also* Timothy Muris, *Anticompetitive Effects in Monopolization Cases: Reply* ("Anticompetitive Effects"), 68 Antitrust L.J. 325, 328 n.19 (2000). In any event, Rambus has in fact imposed a dramatic price increase in the form of substantial license fees on nearly half of the manufacturers of downstream DRAM

products. CCFF 1975-80, 1995-2013. Furthermore, those price increases are likely to be passed on to customers and consumers in the long run. CCFF 3050-51.

1. Rambus Has The Power To Increase Price, Reduce Output and Exclude Competitors in the Relevant Technology Markets.

“Solidify the Franchise – Collect royalties on all DRAM and controllers forever.”

CX1386 at 8 (Rambus internal presentation, BHAG [Big Hairy Audacious Goals] for 200x, September 2000).

Rambus has acquired monopoly power in at least four well-defined technology markets: (1) the market for technologies used to specify DRAM latency; (2) the market for technologies used to specify burst length; (3) the market for technologies used to facilitate synchronization of data capture; and (4) the market for technologies used to accelerate the rate of data transfer. IDF 1013. Each of the markets is worldwide. IDF 1016. Rambus has the power to increase price and reduce output in each. *See* ID 252 (“Complaint Counsel have demonstrated that Respondent has monopoly power in the relevant markets.”); Tr. 10046 (Rapp) (Rambus’s economic expert: “Q. . . . it is the case, isn’t it, that, in your view, Rambus today possesses market power in each of the relevant markets defined by Professor McAfee? A. Yes.”).

Rambus’s monopoly power arises from patents that it claims are necessary to make, sell, or use DRAMs that comply with the JEDEC standard. Tr. 7427-28, 7432-33 (McAfee). JEDEC standards dominate the industry, and over 90% of DRAMs sold today comply with the JEDEC SDRAM and DDR SDRAM standards. CCFF 259-62, 267, 2039-40. Customers will not purchase anything other than JEDEC-compliant DRAMs for commodity applications. CCFF 263. Rambus’s patents permit it to assert claims of infringement against DRAM complying with

the JEDEC SDRAM and DDR SDRAM standards, which constitute approximately 90% of the DRAM market.⁶⁶ CCFF 2905-2913. In other words, Rambus's patents permit it to raise the price for technologies used in 90% of DRAMs sold today, and to exclude companies from selling such DRAMs.

This indirect evidence of monopoly power is fully borne out by substantial direct evidence showing that Rambus has, and has exercised, monopoly power. Whereas the four relevant technologies and the formerly available price-constraining alternatives used to be free, Rambus increased price in the relevant technology markets substantially (an increase in royalties from 0% to .75% and 3.5% respectively of the selling price of the downstream SDRAM and DDR SDRAM products). CCFF 1995-2013.⁶⁷ Rambus expects its monopoly power to yield \$1-3 billion in royalties. CCFF 2041-43. Rambus's unilateral ability to control prices, to price discriminate at will, and to threaten to exclude selected competitors confirm its monopoly power.⁶⁸ CCFF 1989-94, 2962-85.

⁶⁶ Internal Rambus documents confirm that Rambus's patents covering technologies in the JEDEC standards, along with patents covering its own RDRAM architecture, give it a market share consistent with monopoly power. CCFF 2911; *see e.g.*, Rambus Presentation re: BHAG for 200x (9/15/00) CX1386 at 4 ("Today - We are on the cusp of achieving our original BHAG [big hairy audacious goal] - SDRAM+DDR+RDRAM>> 90% of the DRAM market - SDRAM/DDR: ~20% paying us royalties now; all by 01/E"). *See also*, Rambus presentation re: Promotions (11/18/99) CX1353 at 7 ("Intellectual Property - . . . Strategic patent portfolio 1: SDRAM/DDR/Controllers all infringe"); Harmon presentation (9/00) CX1382 at 13 ("Rambus: Three Ways to Win:...Rambus receives royalties on competitive alternatives.").

⁶⁷ *See, e.g.*, CX1154 (Tate: one year after launching patent enforcement campaign, "we are close to getting royalties from HALF of the entire dram market!").

⁶⁸ CX1379 at 13 ("Settle – Now - Best terms, Later - Higher, but still good; Fight – Then settle - Even higher terms, Until decision - No guarantee of a license"); CX1097 at 1 (Tate: "if [Hitachi] insist[s] on a fight to the finish we have said we want an injunction: NO

2. Rambus's Monopoly Power Is Durable.

“Barriers to Entry: . . . Once a DRAM or vend[or] [has] committed to [an] architecture [it is] unlikely to change.”

CX0533 at 15 (Rambus business plan, June 1989).

After the JEDEC standards were implemented throughout the industry, it became far more difficult, costly, and time-consuming to switch technologies than it would have been to adopt different technologies in the first place. CCFF 2500-84. Thus, JEDEC's selection of a technology and the industry's implementation of the resulting standards served to eliminate other options from the relevant market. CCFF 2901-2904. The industry is now effectively locked in to use of the technologies contained in the JEDEC standards. Whereas before the standards were adopted, Rambus could obtain patents covering only one of several available, price-constraining technologies in each of the relevant markets, today Rambus has patents allowing it to dictate the terms of access to the sole viable technology remaining in each relevant market. CCFF 2914-22; Tr. 7421, 7459-65 (McAfee).

Because of the large investments made by DRAM manufacturers, chipset makers, other component producers, computer OEMs, and other end-product companies to design and manufacture products compliant with the JEDEC standards, and the coordination difficulties and delays that would be involved in trying to change those standards, any attempt to change the technologies contained in those standards would be costly, complicated, and time-consuming.

Replacing the four technologies at issue would require DRAM manufacturers to redesign

LICENSE.”). Evidence that a firm sets prices without concern for the loss of sales to rivals indicates that the firm has no real rivals. *See e.g., Microsoft*, 253 F.3d at 57-58 (direct evidence of monopoly power includes setting price without considering rivals' prices).

their existing DRAM products. CCFF 2541-46. In addition to the redesign cost and time, DRAM manufacturers would have to verify the new designs, have new manufacturing masks created, produce sample wafers, exhaustively test sample chips, identify and correct errors, have revised manufacturing masks created, produce revised sample wafers, test revised sample chips, have revised sample chips validated and qualified by customers, have additional sets of masks produced, and ramp up production of the new DRAMs. CCFF 2528-40.⁶⁹ Replacing these technologies would take months for each individual DRAM product and could cost individual DRAM manufacturers { } in direct and opportunity costs. CCFF 2532-37 (*in camera*). DRAM manufacturers could theoretically avoid some of these costs by waiting until they redesigned their existing products to switch technologies, but only by increasing substantially the complexity, duration and cost of their redesigns. CCFF 2538-40.

Even more importantly, replacing the four technologies at issue would have substantial implications for a wide range of component and end-product manufacturers. Memory does not operate independently. Rather, it forms an integral part of the central electronic complex of computers and other products. CCFF 13-16, 25-28; Tr. 5008-11 (Kellogg). In a personal computer, for example, memory must interface across the memory module and motherboard with the memory controller (also referred to as the “north bridge,” part of the chipset); it must also operate compatibly with other components, including the central processing unit, the BIOS, and other peripherals. Tr. 3655-61 (Heye); DX-30; Tr. 275-83 (Rhoden); Tr. 4768 (Macri) ({

⁶⁹ For a description of the DRAM design and manufacture process, see CCFF 35-65; Tr. 4140-55 (Shirley); Tr. 4306-50 (Rezcek).

} (*in camera*)).

Replacing the four technologies at issue would create DRAMs that would be incompatible with other components and end-products. CCF 2541-62. As the record establishes:

- No one company could unilaterally alter the design of DRAMs; because of the requirement of interoperability and the tight interface tolerances involved, the industry as a whole must agree on any replacement of technologies in the standards. CCF 2547-52.
- Component manufacturers, such as chipset manufacturers, would incur substantial redesign, qualification and testing costs if the technologies in DRAMs were changed. Other components (such as the motherboard, the processor, the BIOS, and the module) might also have to be redesigned, depending on what technologies were selected to replace the four in question. CCF 2550-62; 2580-84.
- OEMs would have to ensure that all of the various components were redesigned, tested and manufactured on schedule and that they worked properly with one another; OEMs might also have to undertake costly redesign of their systems. *Id.*; see also Tr. at 5877-84 (Bechtolsheim) (a change in the design of SDRAMs and DDR SDRAMs could cost Cisco up to \$1 billion and take one year for it to redesign its own products in response); Tr. at 2781-99 (Krashinsky) (changing the technologies at issue was “way too expensive” for Hewlett Packard).

Replacing the four technologies at issue also would create backwards compatibility problems. Backwards compatibility is important for three reasons: it ensures that products in the marketplace today can function with replacement parts and upgrades produced in the future; it permits new product designs to be based as much as possible on past designs, thus minimizing the cost and maximizing the speed and efficiency of new product introductions; and it permits new products to be introduced that work with both the latest generation and previous generation of DRAM, thus minimizing the risk of shortages of or malfunctions in the latest generation of

DRAM. CCFF 2543-46, 2648, 2680, 3244-49, 3254, 3260. The record evidence demonstrates that, if the four technologies in question were replaced with alternatives:

- Replacement DRAMs bought in the aftermarket might not work in existing equipment. Tr. 5568, 5572, 5574-75, 5577 (Jacob).
- Manufacturers would not be able to reduce cost by reusing the relevant elements of prior product designs. CCFF 2541-46.
- It would be substantially more difficult and costly for manufacturers to reduce the risk of new product launches by designing for both the latest generation and the previous generation of memory. CCFF 2579-84, 3245-49, 3254, 3260.

Furthermore, securing agreement within JEDEC on specific replacement technologies would be difficult and time-consuming, which could delay substantially the introduction of new products. CCFF 2576-84. Reaching agreement would be far more difficult now than before the standards were adopted because of the specific investments companies have made. For example, in the early 1990's, Intel and AMD could have adopted any burst length, including a single fixed burst length. But after programmable burst length was incorporated in the standard, Intel developed its products to use a burst length of four, and AMD optimized its products around a burst length of eight. After the fact, AMD would be harmed by selection of a fixed burst length of four to replace programmable burst length, as would Intel by a selection of a fixed burst length of eight. CCFF 2579-81; *see also* Tr. 3994 (Polzin); Tr. 4448-57 (Peisl) (possible to add features but very difficult to remove features from a implemented standard).

In sum, replacing the four technologies in the JEDEC standards would result in substantial out-of-pocket and opportunity costs to DRAM manufacturers, component manufacturers, and OEMs; create significant coordination problems; and delay new product innovation. The result of these costs, difficulties and delays would not be to provide any

improved products or other benefits to consumers; rather, it would simply place the industry in the position it would have been in had JEDEC selected among the price-constraining alternatives at the time it was setting the standards. For all of these reasons, it was too costly, time-consuming, and disruptive for the industry to change after the standards were widely implemented. CCF 2106, 2527.

The ALJ's finding that the industry was not locked in to use of the four technologies in question was based on misinterpretation of the record evidence. He relied on evidence that industry members regularly introduce new DRAMs. But introducing a smaller or faster, but otherwise identical, version of an existing DRAM, is not the same as introducing a new DRAM design that changes four of the technologies that control how the DRAM interacts with the rest of a computer system. This more ambitious effort to adopt a new architecture would involve agreeing on new technologies for the standards; redesigning, testing and qualifying DRAMs incorporating the new technologies; and redesigning and testing interface components and end products using the new DRAMs. The process would take the industry two years or longer and cost billions. CCF 2563-2584.⁷⁰

The ALJ dismissed evidence of switching costs because Professor McAfee did not quantify them. ID 328. There is, of course, no reason to disregard reliable evidence of lock-in simply because it is not quantified. Coordination difficulties, for example, do not readily lend themselves to quantification. The ALJ simply ignored voluminous factual evidence from the

⁷⁰ The ALJ also cited to the Future DRAM Task Group's consideration of alternatives for the DDR-2 standard after Rambus began suing DRAM manufacturers as evidence that the industry was not locked in. ID 327. However, the record evidence demonstrates that JEDEC did not switch at that time precisely because the industry *was* already locked in. CCF 3230-3261; CCRF 763.

industry participants confirming the importance of switching costs and coordination issues in this industry. CCFF 2547-2585; *see also* CCRF 1342. Furthermore, even if quantification of switching costs were essential, the ALJ completely ignored experienced fact witnesses who, based on actual industry experience, did quantify the switching costs of a DRAM manufacturer and a user. CCFF 2530-37 (Shirley – Micron); Tr. 5880-84 (Bechtolsheim – Cisco). In turn, Professor McAfee testified extensively, based on this and other record evidence, concerning the various elements of industry lock-in, including the importance of a single standard to the DRAM industry and related industries (CCFF 2600-2639) and the specific difficulties of changing an established industry standard (CCFF 2659-2756).

The ALJ magnified his errors by relying on the unsupported assumption that, because the percentage of the surface area of a DRAM chip that relates to complex “peripheral circuitry” dealing with control functions like those specified in the JEDEC standards is relatively small compared to the surface area relating to the uniform “memory array,” the cost and complexity of modifying this peripheral circuitry would also be relatively small. ID 328. Substantial evidence from credible industry sources directly contradicts this simplistic assumption, however, and demonstrates that the cost to DRAM manufacturers, memory controller designers, module manufacturers, motherboard makers, BIOS programmers and computer OEMs of replacing technologies contained in the peripheral circuitry that control interoperability among all of these components would be substantial. CCFF 2547-2585.

In sum, the record evidence confirms that Rambus acquired, and has exercised, monopoly power, and that its monopoly power is durable because the cost, difficulty and disruption involved in replacing the four technologies in question today is sufficient to deter the industry

from doing so despite Rambus's large price increase.

B. Rambus's Monopoly Power Derived from Its Patents Covering Technologies Incorporated in the JEDEC SDRAM and DDR SDRAM Standards, Not Intel's Temporary Adoption of the RDRAM Architecture.

“– Since 1996 we assumed Intel would drive a rapid transition from SDRAM to Rambus

. . .

– [Now] Intel has shifted to ‘let the market decide,’ [and] is enabling DDR . . .

– We must be proactive on our IP with DRAM companies”

CX1379 at 4 (slide from October 1999, in Rambus-Intel Executive Meeting)

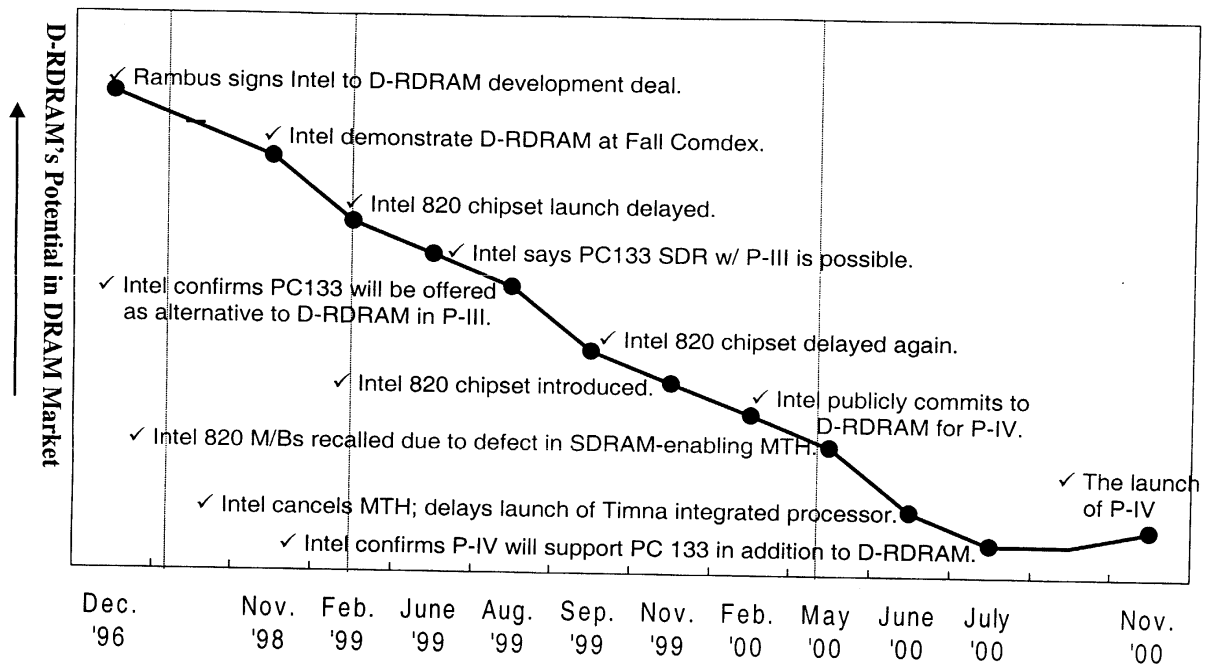
The ALJ's finding that Rambus's current monopoly power in the four technology markets at issue resulted from Intel's adoption of the RDRAM architecture, ID 303-04, makes no sense. In 1999, Intel reversed its decision to support RDRAM and instead developed chipsets to support SDRAM and DDR SDRAM. Indeed, this turning point marked the failure of Rambus's "Plan A," its hope to persuade the market to accept RDRAM as the prevailing memory architecture, and the catalyst for Rambus to implement "Plan B," its enforcement of patents against JEDEC-compliant SDRAMs and DDR SDRAMs.

The undisputed record evidence established that, in 1995-96, Intel adopted the RDRAM architecture as the exclusive memory for purposes of interfacing with its future Camino 820 chipset, intended to support the Pentium III and Pentium IV processors. CCF 1600-05. Beginning in late 1998, however, Intel encountered a series of technical problems in trying to implement the RDRAM interface. CCF 1838-66; Tr. 4828-34 (MacWilliams). These problems led to repeated delays to Intel's Camino 820 chipset. CCF 1877-94; Tr. 4852-53

(MacWilliams). In the meantime, Intel lost market share in the chipset market to competitors' chipsets that interfaced with SDRAM and DDR SDRAM. Tr. 4901-02 (MacWilliams). Intel thought that Rambus had not done enough beforehand to prepare the RDRAM architecture, and failed to adequately solve the problems once they arose. Tr. 4852 (MacWilliams) ("we expected these things to have been sorted out way back in the time where we had test chips or even before we had our direct RDRAM . . . and we were actually surprised to find issues popping up in '99 that were still related to the channel."); 4871-72, 4876-77 (MacWilliams); CX2887 at 2 ("[Intel's] customers are rapidly losing confidence in us and in the [RDRAM] technology, largely due to the lack of total, prioritized support from Rambus."). In 1999, "as a direct result of Rambus' failure to adequately deal" with these technical problems, Intel undertook a comprehensive review of the Intel-Rambus business relationship. CX2887 at 2; CCFF 1911-18. Intel withdrew its exclusive support of RDRAM and introduced controllers to interface with PC133 SDR SDRAM and later with DDR SDRAM. CCFF 1895-96, 1911-18.

Intel's withdrawal of exclusive support sounded the death knell for Rambus's hopes that RDRAM would dominate the industry. A chart published in the trade press in 2000 and reproduced in a Hynix business document dramatically depicts the effect of these technical problems and Intel's ultimate withdrawal of exclusive support – RDRAM's projected market share declined sharply from almost 80% to around 10%:

2. Rambus's rocky road



CX 2338 at 57; *see also* Tr. 9184-9208 (Tabrizi) (at 9208: “the expectation was Rambus [RDRAM] will be almost 80% of the market. With all the problems that Intel had and when Intel optioned the alternative [also supporting SDRAM and DDR SDRAM], the Rambus penetration came down to maybe around 10 percent or lower than that. Currently, [RDRAM’s] total market is about 4 percent of the total DRAM market . . .”). The marketplace chose SDRAM and DDR SDRAM, and today the RDRAM architecture accounts for less than 5% of the DRAM market. *See* CCF 1897-1905, 1910; DX141.⁷¹

⁷¹ The ALJ also found that Rambus’s monopoly power did not result from standard-setting work at JEDEC because the Intel PC100 specification set the standard for the industry. The ALJ misunderstood the PC100 specification; uncontroverted evidence establishes that the PC100 specification *was* the JEDEC SDRAM standard with a few additional parametrics. CCF 266. In other words, the PC100 specification adopted programmable CAS latency and burst

C. Rambus’s Acquisition of Monopoly Power Arose from its Exclusionary and Deceptive Course Of Conduct Regarding JEDEC.

Rambus set out to acquire monopoly power by deceiving JEDEC into adopting standards covered by Rambus’s patents. In fact, contemporaneous documents confirm Rambus representatives’ belief that their years-long campaign of deception would be both necessary and sufficient to attain the monopoly they sought. And they were right. The record evidence more than suffices to establish the requisite causal link between Rambus’s deceptive conduct and its acquisition of monopoly power.

1. The Appropriate Focus Is Whether Information Withheld by Rambus Was Material.

It is axiomatic that the antitrust laws protect competition, not competitors. Thus, courts evaluating a claim of monopolization under Section 2 of the Sherman Act look not for harm to an individual competitor, but harm to the competitive process, as well as a “causal link” between a monopolist’s conduct and such harm. This “causal link” is satisfied if the monopolist’s conduct “reasonably appear[s] capable of making a significant contribution to creating . . . monopoly power.” *Microsoft*, 253 F.3d at 79; *see 3 Areeda & Hovenkamp* ¶ 651f, at 83-84 (earlier versions of which are cited with approval in *Microsoft*, 253 F.3d at 79); Muris, *Anticompetitive Effects*, 68 Antitrust L.J. at 325.

In a case such as this, where the anticompetitive act consists in substantial part of concealing information, the inquiry focuses on whether, considering the factual circumstances, the information concealed appears to have been “material,” in the sense that its disclosure would

length because they were in the JEDEC SDRAM standard. In any event, the ALJ’s finding is irrelevant to DDR SDRAM, for which Intel never issued any specification. CCRF 1325, 1519, 1523.

have been likely to affect the decision-making process in question.⁷² As explained by the

Microsoft court:

To require that § 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anti-competitive conduct would only encourage monopolists to take more and earlier anti-competitive action.

Microsoft, 253 F.3d at 79. Thus, the causation test cannot and does not require that the "but for" world be proven with certainty.⁷³ This is particularly true in government enforcement actions.

⁷² Cf. *TSC Indus., Inc. v. Northway, Inc.*, 426 U.S. 438, 449 (1976) (test for materiality in securities context: "there must be a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available").

⁷³ This is so, of course, because "neither the plaintiffs nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct." *Microsoft*, 253 F.3d at 76-79. Thus, "[t]o some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'" *Id.* at 79, quoting 3 Philip Areeda & Herbert Hovenkamp, *Antitrust Law*, ¶ 651c, at 78 (1996). Proving a hypothetical outcome in a but-for world is particularly difficult where, as here, that outcome would depend on the complex and interrelated hypothetical decisions of 60 or so JEDEC members and their corporate employers.

In *Affiliated Ute Citizens of Utah v. United States*, 406 U.S. 128, 153-54 (1972), the Supreme Court applied a presumption that withholding material information from multiple individuals in a securities fraud case establishes causation, even where the decisions of affected individuals were unrelated:

Under the circumstances of this case, involving primarily a failure to disclose, positive proof of reliance is not a prerequisite to recovery. All that is necessary is that the facts withheld be material in the sense that a reasonable investor might have considered them important in the making of this decision. *This obligation to disclose and the withholding of a material fact establish the requisite element of causation in fact.*

(citations omitted, emphasis added); see also *In re Apte*, 96 F.3d 1319, 1323 (9th Cir. 1996) (applying reasoning to fraud in bankruptcy context); *Morris v. Int'l Yogurt Co.*, 729 P.2d 33, 40 (Wash. 1986) (en banc) (applying standard to case involving franchise law violation).

“[N]o government seriously concerned about the evil of monopoly would condition its intervention solely on a clear and genuine chain of causation from an exclusionary act to the presence of monopoly.” 3 *Areeda & Hovenkamp* ¶ 651d1, at 83-84.⁷⁴

The ALJ erred by applying an inappropriate test of causation. He unsuccessfully tried to distinguish *Microsoft* and ignored *Areeda & Hovenkamp* altogether, relying instead on a standard set forth in private damages cases.⁷⁵ The ALJ further failed to comprehend the critical importance of the information in question to JEDEC. He did not even address the issue of the

Here, we do not need to decide whether such a presumption should apply – the record is replete with evidence that JEDEC sought the information in question and would have acted upon it to defeat Rambus’s scheme.

⁷⁴ The *Areeda & Hovenkamp* treatise explain the differing positions of the government and a private plaintiff using the following example:

[w]hile the private plaintiff may sue a drunken driver only to recompense a completed wrong, such as wrongful death or property damage, the government may arrest and condemn the drunken driver who has not yet caused harm to anyone. The point is that drunken driving is highly likely to cause social harm, and it is less costly to arrest such a driver before rather than after that harm occurs.

3 *Areeda & Hovenkamp* ¶ 651d1, at 80.

⁷⁵ The ALJ further erred by introducing an additional requirement of “reasonable” reliance borrowed largely from the common law of fraud. ID 305. As discussed above, the courts have long debated whether any “reliance” requirement exists in private cases focusing on the nondisclosure of material facts. Even if the Commission could impose liability only upon a finding of reliance by JEDEC, however, there certainly is no requirement that such reliance be reasonable. The issue is whether consumers, who were not at the bargaining table and for whose interests neither JEDEC nor its members were perfect proxies, were injured by reason of JEDEC’s failure to detect and prevent Rambus’s subterfuge. Alden Abbott and Theodore Gebhard, *Standard Setting Disclosure Policies: Evaluating Antitrust Concerns in Light of Rambus*, 16 *Antitrust* 29, 32-33 (2002). Thus, the relevant question is whether JEDEC was in fact misled, not whether it could theoretically have better protected itself from Rambus’s machinations.

materiality of the information in question. These errors tainted his entire causation analysis.

Regardless of what test is applied, however, the record in this case satisfies the element of causation.

2. The Information Withheld By Rambus Was Material and Rambus's Concealment of That Information Was Likely to, and Did, Affect the Outcome of JEDEC's Selection of Technologies.

"I think it makes sense to review our current issued patents and see what we have that may work against [the SyncLink proposal at JEDEC]. . . . If it is not a really key issue . . . then I think it makes no sense to alert them to a potential problem they can easily work around."

CX0711 at 68, 73 (e-mail from Richard Crisp to Rambus executives and engineers, May 1995).

The anticompetitive harm in this case arises from the distortion of the JEDEC selection process. Rambus denied to JEDEC information material not only to the selection of appropriate technologies for the standards, but also to maintaining the underlying open decision-making process.

The record in this case establishes clearly the importance JEDEC attached to disclosure of the type of information Rambus withheld. Members' behavior confirms this; on the rare occasions when a company engaged in opportunism by attempting to enforce undisclosed patents, JEDEC members erupted.⁷⁶ JEDEC had available to it, and in fact considered, various

⁷⁶ The situation here stands in sharp contrast to an organization that is silent regarding intellectual property disclosure. *See Hovenkamp, IP*, § 35.5, at 35-40:

Some standard-setting organizations have no policy with respect to intellectual property ownership in the standards they promulgate. Misrepresentation before such a standard-setting organization should not raise competitive concerns, even if it violates some other duty, because the

viable and price-constraining alternatives to each of the four technologies at issue. Rambus's concealment of relevant information skewed the competitive process by which JEDEC selected among the available price-constraining alternatives.⁷⁷ The incorporation of the four technologies at issue into the JEDEC standards and the subsequent implementation of the JEDEC standards by the industry served to exclude the non-selected technologies from the relevant markets. The result of this distorted selection process was that Rambus emerged with monopoly power by virtue of its patent rights over the sole technology remaining in each relevant market, unconstrained by any prior commitments regarding the terms under which it would grant licenses. CCFF 3013.

a) JEDEC Purposes and Policies and Rambus's Own Conduct Demonstrate the Materiality of Patent Information Withheld by Rambus.

"[JEDEC Subcommittee Chairman Gordon] Kelley asked to have us state whether or not Rambus knows of any patents especially ones we have that may read on [the SyncLink presentation at JEDEC]."

CX0711 at 68, 73 (e-mail from Richard Crisp to Rambus executives and others, May 1995).

As explained above, JEDEC's purpose was to adopt open standards available to everyone, and its policies provided for avoiding patents where possible, requiring disclosure of

misrepresentation did not cause the adoption of the standard, and therefore presumably did not contribute to or create market power.

⁷⁷ *F. Buddie Contracting, Inc. v. Seawright*, 595 F. Supp. 422, 436-437 (N.D. Ohio 1984) ("Where a firm succeeds in tampering with the competitive bidding process in such a manner that competitive bidding becomes a farce, the Court believes that an unreasonable restraint of trade has occurred.").

relevant patents and applications, and prohibiting use of patented technologies in the absence of a RAND commitment. The purpose of the disclosure policy was to provide the committee with relevant patent information on a timely basis when it could consider alternatives. CCFF 317. JEDEC's basic purpose and the very existence of JEDEC's policies plainly demonstrate that JEDEC believed information of the type concealed by Rambus to be material.

Rambus representatives shared this belief. On multiple occasions, Rambus representatives stressed the importance of concealing information about its patents and patent applications from JEDEC and the industry. *See, e.g.*, CX0837 at 2 (Crisp was "castigated" for disclosing the '703 patent at JEDEC, even though it was unrelated to JEDEC work); CX0726 (Mooring: urging that Rambus "kick-off another patenting spree" directed at memory controllers while it had "a window of opportunity left while we still have confidential information"); CX0783 at 2 (Crisp: "I especially do not want [this intellectual property issue] all over JEDEC . . ."); CX0711 at 68, 73 (Crisp: "I think it makes no sense to alert them to a potential problem they can easily work around."); CX0919 (Tate: "1. Keep pushing our patents through the patent office 2. Do *NOT* tell customers/partners that we feel DDR may infringe – our leverage is better to wait"); CX0939 (Davidow: "One of the things we have avoided discussing with our partners" was Rambus's belief that DDR SDRAM would infringe its patents); CX0942 (Tate: "our policy so far has been NOT to publicize our patents and i think we should continue with this."); CX0947 (Rambus approved Q&As: "Q3: Do Double Data Rate (DDR) SDRAMs use [Rambus's newly issued '481] patent? A: We don't know yet. No DDR products exist for us to evaluate.").

Indeed, in December 1999, on the very eve of threatening the entire DRAM and memory controller industries with patent infringement litigation, Rambus CEO Geoff Tate was still

exhorting his employees not to reveal their belief that JEDEC-compliant DDR SDRAMs and controllers infringed its patents. CX1089 (Tate: if asked whether DDR SDRAMs infringe Rambus's patents, "it's important NOT to indicate/hint/wink/etc what we expect the results of our [infringement] analysis to be.").

b) The Behavior of JEDEC and Its Members in Similar Situations Demonstrates the Materiality of the Patent Information Withheld By Rambus.

"[The ballot for the] SSTL [proposal] passed 30/0 and was sent to council. However Hitachi stated that they had a patent relating to it. This created a big ruckus."

CX0711 at 187 (e-mail, Richard Crisp to Rambus representatives, December 1995).

The record establishes that JEDEC members regarded the disclosure of relevant patent information to be highly material to their decisions. As Chairman Townsend himself noted when explaining the importance of the disclosure policy to the Committee: "The important thing is disclosure. If it is known that a company has a patent on a proposal then the Committee will be reluctant to approve it as a standard." JX0005 at 4. The record evidence bears this out. JEDEC members often noted concerns about patent issues. Some of these were resolved and the matter proceeded; on others, patent concerns caused members to vote against or otherwise express concern about specific proposals. *See, e.g.,* JX0007 at 5 (IDT Burst Patent Discussions: "IDT showed a letter . . . saying that they have applied for a patent on burst [mode static RAMs]. Toshiba suggested that further work by the Committee on burst mode [static RAMs] might find its way into IDT's patent application and therefore discussion should be limited."); JX0010 at 8-9 (V-Pack Ballot: "Committee felt there were at least two patent owners that we know of and a

royalty would have to be paid to each and this inhibited the standard. . . . The conclusion was both parts of the ballot failed.”); JX0012 at 14 (Siemens Item 406: “It was noted that there are some issues to be resolved with DEC patent 4,851,834.”); CX0034 at 4 (Item 444: “There are patents pending in both Japan and the U.S. on this proposal.”); *id.* (Item 450: A question on patents was asked but Hitachi did not know. Mr. Tabrizi promised to check it.”); *id.* (“Motorola Sync DRAM Patent Status. A question was asked about this. Motorola had promised a license letter at last meeting, but has not produced one yet.”); JX0013 at 9 (DRAM Ballot counts: IBM: “Patent issues must be cleaned up before we proceed.”); CX0042 at 9 (Hitachi VSMP Package: “Motion failed. Committee noted there was still a lot of concern about patent rights”).

The importance of patent-related information to JEDEC’s decisions is confirmed by the reactions of JEDEC members on the rare occasions when they learned, after the fact, that a member was asserting patents that had not previously been disclosed. *See* CCFF 434 (Wang’s failure to disclose a patent in the mid-1980’s and subsequent patent litigation); CCFF 362 (the *Wang* litigation sensitized members to the importance of disclosure of patent issues); CCFF 424-32 (JEDEC members’ reaction to Texas Instrument’s failure to disclose a patent relating to Quad CAS technology and subsequent withdrawal of the standard); CCFF 433 (failure to disclose by SEEQ); CCFF 316-22, 358-66, 408-18.

The record confirms that, because JEDEC members knew that Rambus’s business model was to obtain revenues through royalties, and because (unlike most of the major companies in the industry) Rambus had not entered into cross-license agreements, JEDEC members regarded information about Rambus patents as especially material. CCFF 741-45; *see also* CCFF 1569-72. On two occasions, when members had some suspicion, Rambus was specifically asked whether it

had relevant patents. CCFF 902-09, 1041-48. On the one occasion (after Rambus had withdrawn) that certain members recognized an NEC proposal involving a return clock as being similar to the loop-back clock described in Rambus's '327 patent, members insisted that the proposal be dropped, and developed an alternative approach instead. CCFF 2435-40.

c) JEDEC Had Available Multiple Viable Alternatives.

i) JEDEC Actively Considered Multiple Viable Alternatives.

“There were several synchronous [SDRAM] presentations. . . . [Summarizing proposals from NEC, Samsung, Texas Instruments, Toshiba, and Mitsubishi:] All these companies are currently working on their own solutions.”

CX0670 (e-mail from Billy Garrett, Rambus alternate representative to JEDEC JC-42 Committee, to Rambus employees, December 1991).

The uncontested evidence is that JEDEC had available to it multiple alternatives to the four technologies incorporated in the JEDEC standards. JEDEC members considered adopting the following technologies in the relevant markets:

Latency Technology Market:

- (1) programmable CAS latency;
- (2) fixed CAS latency;
- (3) using fuses to set CAS latency; and
- (4) sending a command over pins to set CAS latency.

CCFF 2130-31; DX58; *see also* CCFF 2791-96.

Burst Length Technology Market:

- (1) programmable burst length;
- (2) fixed burst length;
- (3) using fuses to set burst length;
- (4) sending a command over pins to set burst length;
- (5) use of a burst terminate command; and
- (6) identifying burst terminate in the command.

CCFF 2234-35; DX57; *see also* CCFF 2799-2804.

Data Synchronization Technology Market:

- (1) on-chip PLL/DLL;
- (2) PLL/DLL on the memory module;
- (3) PLL/DLL on the controller;
- (4) Vernier circuits;
- (5) data strobes;
- (6) use of read/echo clocks; and
- (7) doing nothing.

CCFF 2366-67; DX59; *see also* CCFF 2815-20.

Data Acceleration Technology Market:

- (1) dual edge clocks;
- (2) single edge clocks at higher frequency; and
- (3) interleaving memory banks on the module.

CCFF 2322-24; DX60; *see also* CCFF 2808-12.

The record makes clear that JEDEC members considered these alternatives to be commercially viable, price-constraining substitutes to accomplish a particular technological objective. *See* CCFF 2131-77, 2184-2218, 2235-2318, 2324-43, 2351-55, 2367, 2381-99, 2403-14, *see also* 2763-2821; Tr. 7329-47 (McAfee) (methodology by which he identified “commercially viable” and “price-constraining alternatives”); Tr. 7348-91 (McAfee) (identification of “commercially viable” and “constraining” alternatives). JEDEC’s serious consideration of these alternatives should be determinative; there should be no need to go any further. Exclusionary conduct that distorted the competition among these alternatives in a

manner calculated to give Rambus patent control over the resulting standard constitutes anticompetitive harm.

To assure the Commission a complete record, however, Complaint Counsel introduced ample evidence to support a more detailed examination of the viability of these and other alternatives. The evidence, taken as a whole, establishes convincingly that these and other technologies were viable candidates to be included in the JEDEC standards, and that JEDEC members considered them so at the time.

JEDEC members judged viability based on a variety of factors, including expected performance, expected cost, expected time to market, degree of backwards compatibility, and the speed with which a compromise could be reached. CCF 122-131. The need for low cost was an overriding concern.⁷⁸ JEDEC sought high performance technologies, but only to the extent permitted by their other constraints, particularly low cost.⁷⁹ Other considerations, such as the

⁷⁸ See CX1708 at 2 (Crisp e-mail: “Compaq (Dave Wooten) like the others, stressed that price was the major concern for all of their systems. They didn’t particularly seem to care if the SDRAMs had 1 or two banks so long as they didn’t cost any more than conventional DRAMs. . . . Sun echoed the concerns about low cost. They really hammered on that point.”); CX0034 at 31 (IBM: “LOW COST!!! (<5% more than [previous generation] DRAM)”); CX2383 (Sun: “[S]ince we are very cost conscious we are willing to drop features that add too much cost or complexity”); CX0711 at 1 (Crisp e-mail: “Desi [Rhoden] added that if the SDRAM doesn’t cost less than 5% more than [previous generation] DRAM they will not be used.”); CX0711 at 32, 34 (Crisp e-mail: “[T]hey want cheap cheap cheap.”); Tr. 9082 - 83 (Tabrizi) (“For any product, if it doesn’t become a low cost to manufacture, it never becomes reality. The issue is cost, cost, cost.”).

⁷⁹ JX0027 at 13 (“The Committee noted they wanted highest performance and lowest price SDRAM.”); CX2777 (“[T]he age old rule for DRAMs still apply. Customers will take as much performance as we can give them for absolutely no added cost over the previous technology. They will not pay extra for increased DRAM performance.”); CX0711 at 32, 34 (Crisp: “The implication here is that customers are willing to leave performance on the table in exchange for having lower cost systems.”); Tr. 2607-08 (G. Kelley) (JEDEC sought “the best technology for an acceptable low cost”).

desire to reach consensus on a timely basis or the need for backward compatibility, also influenced JEDEC's selection among available technologies.⁸⁰

Each of the alternatives listed above offered a unique set of subtle trade-offs among the various factors considered by JEDEC members. One option might offer slightly higher performance, but be somewhat more difficult to design and operate and take time to bring to market; a second might be available immediately using a relatively simple, reliable design, but only provide somewhat lower performance. A third option might achieve reasonably high performance using a simple and inexpensive design, but at the cost of slightly reduced flexibility. A fourth might achieve both reasonably high performance and flexibility, but require somewhat more costly circuitry and testing. All could be viable. Different members could, and likely would, prefer different options. Selection of a single option for the standard would require careful balancing of the various advantages and disadvantages of each option and a complex process of negotiation and trade-offs among JEDEC members to reach a balanced compromise – not only with respect to the specific feature in question, but among all the features that make up a standard. *See* CCFF 242-44, 248-51, 255. In light of the particular importance of low cost, attaching a \$1-3 billion price tag to any one option was highly likely to affect the outcome of this process.

⁸⁰ Selection of technologies was particularly complicated because JEDEC members had no precise information regarding the characteristics of alternatives. Rather, by definition, their decisions were based on their expectations of what various technologies were likely to cost or how they were likely to perform based upon future development and implementation. CCFF 2784. The need for consensus was further complicated by members' differing priorities, which led to different preferences among technologies. CCFF 248-49, 251, 505-06. This led not only to splits among categories of members (memory manufacturers v. users; PC manufacturers v. mainframe manufacturers; controller makers v. graphics chip designers; etc.), but also within categories (technology leaders v. low-cost technology followers, etc.). CCFF 248-49, 251.

The record demonstrates that these were precisely the circumstances governing the evaluation of the alternatives listed above. Detailed testimony and supporting documentary and demonstrative evidence came not only from Complaint Counsel’s technical expert, Professor Bruce Jacob, Associate Professor of Electrical and Computer Engineering at the University of Maryland, but also from a number of leading engineers who participated directly in the evaluation of alternatives within JEDEC. These included Mark Kellogg, a Distinguished Engineer with 29 years of experience at IBM, and Terry Lee, Executive Director of Advanced Technology and Strategic Marketing at Micron with 20 years experience in the field. These witnesses explained that none of the technologies considered by JEDEC was objectively superior – each had its own set of advantages and disadvantages. Tr. 5167-68 (Kellogg) (“I wouldn’t classify [any of four options to synchronize the timing of data capture] as unsatisfactory. I would classify each as having their strengths and weaknesses.”). These witnesses candidly evaluated the perceived advantages and disadvantages of the various options considered by JEDEC.⁸¹

The record confirms that, in many instances, numerous JEDEC members preferred various alternatives listed above to the technologies selected for the standards even though they

⁸¹ See, e.g., Tr. 5117-5119, 5127-28, 5129, 5131 (Kellogg) (advantages and disadvantages of fixed burst length, using pins to set burst length, programmable burst length and use of fuses to set burst length); Tr. 5401-03, 5404-05, 5406-07, 5408, (Jacob) (same); Tr. 5376-78, 5382-83, 5388-89, 5391-92 (Jacob) (same for CAS latency); Tr. 6626-27 (Lee) (advantages and disadvantages of using fixed rather than programmable CAS latency and burst length in the SDRAM Lite proposal); Tr. 5157-58, 5159, 5160-61, 5164-65, 5167 (Kellogg) (advantages and disadvantages of using verniers, a data strobe, a read clock, on-chip PLLs/DLLs, and nothing to synchronize timing of data capture); Tr. 6645-54, 6665-66, 6677-78 (Lee) (advantages and disadvantages of on-chip PLL/DLL, echo/read clocks, and verniers to synchronize timing of data capture); JX0041 at 107-115 (advantages and disadvantages of on-chip PLL/DLL); CX2713 at 1-2 (same); Tr. 6802-03 (Lee) (advantages and disadvantages of using a fast single edge clock rather than a double edge clock); see also Tr. 425-35, 475-77, 505-18 (Rhoden) (discussion of certain alternatives presented at JEDEC); Tr. 4760-81 (Macri) (*in camera*).

believed the selected technologies were free of patents.⁸² As a result of the differing opinions among members, the battle over which alternative to include in the standards was hard-fought. CCFE 2106-2107; Tr. 1379-80 (Sussman) (the first proponent of programmable CAS latency and burst length, “had a lot of arguing to do” to get it accepted at JEDEC).

In many cases, the technologies in the standards were selected not because they were necessarily superior or even preferred, but simply to help achieve a timely consensus or for other reasons. For example, most JEDEC members supported use of a data strobe to synchronize timing. A few companies preferred on-chip DLLs, however, so the group compromised and included both features in the standard, allowing companies to design downstream products to use either feature. Tr. 6682-83 (Lee). Similarly, a key factor in achieving consensus with respect to programmable CAS latency and burst length in 1992 was not just the programmability feature itself, but the modification of Howard Sussman’s earlier proposal to implement the features by means of a particular command sequence (known as “WCBR”) that had been used previously, and that members viewed as evolutionary from the previous generation. Tr. 1382-83 (Sussman),

⁸² JX0010 at 71 (Samsung supported fixed latency/burst length); Tr. 6625-35 (Lee) (supported fixed latency/burst length in SDRAM Lite); Tr. 5131-32 (Kellogg) (same); JX0029 at 13 (majority of members either supported fixed CAS latency and burst length for SDRAM Lite or didn’t care); Tr. 5811 (Bechtolsheim) (supported use of pins to set latency/burst length); JX0010 at 74 (Mitsubishi supported using pins to set burst length); JX0010 at 71 (Samsung supported using fuses as alternative to fixed latency/burst length); CX0034 at 149 (Cray supported using fuses to set latency/burst length); Tr. 6666, 6683 (Lee) (supported use of verniers or echo/read clocks); Tr. 5157 (Kellogg) (supported use of verniers); JX0029 at 17-20 (proposing use of echo/read clocks); CX0368 at 4 (Micron proposing alternatives rather than on-chip PLL/DLL); JX0031 at 71 (Samsung proposing PLL in controller and data strobe); Tr. 4918-20 (MacWilliams) (Intel preferred data strobes over on-chip DLLs); Tr. 1370-71 (Sussman) (graphics card makers and some large computer OEMs preferred double edge clocking; other computer OEMs and smaller companies preferred single edge clocking); CX0371 at 3 (Texas Instruments proposed to use single edge clocking); Tr. 4779-80 (Macri) ({ *in camera*).

5109-10 (Kellogg); CCF 534. Three years later, supporters of SDRAM Lite with fixed latency/burst length “capitulated” and accepted the full-feature SDRAM with programmable latency/burst length in part because delays in reaching consensus threatened to interfere with plans to introduce new products before the critical back-to-school and Christmas seasons. Tr. 6634-35 (Lee).

ii) Additional Alternatives Also Were Available to JEDEC.

“There are always ways to get around any patent is the assumption that we should make.”

CX0569 at 3 (Tate, RAMBUS Business Plan: Plans, Ideas, Issues)

“So there are all kinds of ways to compete in these high-performance markets by making different sets of trade-offs. . . . There are lots of other solutions if you want to be creative about it.”

CX2109 at 70-71 (Rambus Chairman William Davidow, Deposition Testimony, January 2003).

In addition to the specific alternatives listed above, other alternatives were available at the time, although the record does not establish whether or not they were proposed for use at JEDEC. See CCF 2178-83, 2219-27, 2344-50, 2356-65; Tr. 5383-85 (Jacob) (scaling CAS latency to clock frequency as an alternative to programmable CAS latency); 5418-25 (Jacob) (interleaving banks on chip as an alternative to dual-edge clocking), 5435-38 (Jacob: simultaneous bidirectional I/O drivers as an alternative to dual-edge clocking); Tr. 5177 (Kellogg) (“I do think we talked about other things such as separate clock inputs [as an alternative to dual-edge clocking], but I – I can’t confirm that.”); DX60. Generally, engineers had multiple options available to solve any particular DRAM circuit problem. See Tr. 434-35 (Rhoden) (“. . . if you

give ten engineers a problem, you'll probably get 12 or 14 solutions, and the same is true inside the discussions inside the [JEDEC] committee.”); Tr. 4760-61 (Macri) ({

} (*in camera*)).

In sum, the record evidence, consisting of fact witness testimony, expert testimony and contemporaneous documents, establishes that (1) JEDEC seriously considered multiple alternatives for each of the technologies at issue; (2) JEDEC had additional alternatives available to it that it may or may not have considered; (3) each of the identified alternatives was viable and had its own set of advantages and disadvantages; (4) JEDEC members had varying opinions regarding which of the alternatives should be adopted; and (5) the selection of the technologies now incorporated in the standards was hard-fought, and was driven by a combination of technological, cost, and time to market considerations as well as the need for consensus.

d) Absent Rambus’s Conduct, the Outcome Likely Would Have Been Different.

i) JEDEC Likely Would Have Selected Alternative Technologies If Presented With a \$1-3 Billion Price Tag.

“For SDRAMs, auto-precharge is mostly a convenience. It is not fundamental to the performance or usefulness of SDRAM But patenting this feature would have high harassment value”

CX0738 (e-mail to Rambus executives from John Dillon, Rambus’s representative to the JEDEC JC-16 Committee, June 1994).

The evidence also confirms, as clearly as can be established in an imaginary world

depending on the interrelated hypothetical decisions of 50-60 decision-makers, that had Rambus made the appropriate disclosures, JEDEC's members likely would have selected different technologies. *See* CCFE 2101, 3021, 3029-3030. Certain witnesses identified specific alternative technologies they would have supported. CCFE 2101 (Sussman: fixed CAS latency and burst length). Other witnesses testified that they would have supported using alternative technologies, although not having gone through the analysis at the time, they did not settle on a particular alternative to each of the technologies in question. CCFE 2101 (Lee; Meyer; Dr. Oh; Bechtolsheim).⁸³ Still other witnesses testified that, had Rambus disclosed, they would have considered alternative technologies more carefully, although not having conducted an analysis at the time, they honestly could not say for certain what the outcome would have been. CCFE 2101 (Kellogg; Dr. Prince).⁸⁴ Yet others would have considered not only available alternatives but also what licensing terms Rambus would have offered. CCFE 2101 (Kelley). Only one witness, Tom Landgraf, testified that he would have supported the same technologies, but only if Rambus had agreed to RAND licensing terms. CCFE 2415. Because of Rambus's conduct, it is impossible to determine precisely what technologies JEDEC members would have adopted had they been aware of Rambus's patents and patent applications, but the overwhelming weight of

⁸³ Mr. Lee identified multiple technologies that he considered to be viable alternatives to the four technologies at issue, and actually supported use of certain of the alternatives. CCFE 2139, 2144, 2147-48, 2185, 2197-98, 2222, 2244-45, 2272, 2291, 2334-35, 2378-79, 2384, 2394, 2403, 2411, 2414. Similarly, Mr. Bechtolsheim identified alternative technologies that not only were viable, but that he preferred. CCFE 2107, 2187.

⁸⁴ Again, Mr. Kellogg identified a number of technologies that he considered to be viable alternatives to the four technologies at issue. CCFE 2101, 2107, 2145, 2159, 2188, 2235-36, 2246, 2275, 2367, 2397, 2411.

the evidence establishes that the JEDEC standards likely would have been different.⁸⁵

Contemporaneous evidence confirms this. One incident in particular provides a test case for the but-for world at JEDEC. In March 1997, NEC proposed using a type of return clock that certain members recognized as being similar to the unique Rambus loop-back clock (which was the subject of the '703 patent disclosed by Mr. Crisp in September 1993). The reaction was immediate – JEDEC members objected to using a technology that some thought might be subject to Rambus patents. JEDEC immediately dropped the idea, and developed an alternative approach instead. CCF 2435-40. The ALJ ignored this probative evidence in favor of his assumptions and inferences.

The ALJ's obsession with objectively equal or superior alternatives was misplaced. The ALJ committed multiple errors – of law, economics, and fact – in finding that Rambus's acquisition of monopoly power did not constitute anticompetitive harm because the excluded alternative technologies were not “objectively” equal or superior to the four technologies at issue. ID 317. The ALJ lacked any legal, economic, or factual basis to substitute his own subjective judgment regarding the relative merits of 20 or so highly complex technologies for the workings of competition in the marketplace.

⁸⁵ The ALJ compounded his error by finding that Complaint Counsel had failed to prove the hypothetical but-for world after excluding testimony on precisely that issue as speculative. Tr. 532 (excluding testimony from Desi Rhoden regarding how a disclosure by Rambus would have affected his recommendation on how Hewlett Packard should vote on the SDRAM standard); Tr. 1380, 1397, 1456 (excluding testimony from Howard Sussman).

It is ironic indeed that Rambus concealed relevant information material to JEDEC's decisions, and then objected on grounds of “speculation” to evidence as to how the outcomes it prevented from occurring would have been different. Ultimately, having succeeded in excluding some of this evidence, Rambus asserted that it should escape liability because Complaint Counsel allegedly failed to prove that the outcomes would have been different.

First, the ALJ erred as a matter of law in thinking that the excluded alternatives must be objectively equal or superior to the selected technologies. The antitrust laws are concerned with harm to the competitive process. The exclusion of competing or potentially competing (i.e., price-constraining) products or technologies constitutes anticompetitive harm, regardless of whether a particular fact-finder believes that the excluded product or technology is inferior, because price/quality trade-offs are for markets, not judges, to make. In *Microsoft*, for example, the government was not required to prove that the Netscape browser was equal or superior to the Microsoft browser; the harm to competition came from the elimination of a potentially competing technology. *Microsoft*, 253 F.3d at 58-74.

Second, the ALJ's quest for "equal or superior" technologies led to his misapplication of fundamental economic concepts. He disregarded specific evidence of the existence of price-constraining alternatives because he thought such alternatives were not necessarily equal or superior to the four technologies in question. IDF 1096-1107. Indeed, he ignored specific evidence about the preferences of JEDEC members – despite recognizing that such evidence is relevant "to whether JEDEC would have selected the technology" – because such evidence "does not go to whether the alternative is equal or superior in objective terms." IDF 1103-04. In other words, the ALJ determined that one of the most central questions in the case was irrelevant.

The ALJ compounded his error by failing to understand the basic economic doctrine of "revealed preferences." The ALJ (relying solely on Dr. Rapp) misapplied this doctrine to conclude that, because JEDEC actually chose the four technologies at issue, JEDEC must have preferred those technologies over all alternatives in all circumstances. ID 322-323. Indeed, the ALJ's misapplication of this doctrine leads to the stunning implication that, if JEDEC members

preferred the four technologies at issue when they were believed to be free, they must also have preferred them when subject to royalty claims totaling as much as \$3 billion. CCFF 2043, 3100-02.⁸⁶

Third, the ALJ erred as a matter of fact in assuming that JEDEC always sought to adopt the best technologies. In fact, as explained above, the JEDEC decision-making process was considerably more complicated. Based on a review of all the evidence, Professor McAfee concluded that JEDEC followed the economic concept of “satisficing” with respect to the technology choices it made. CCFF 2650-2658, 2773; CCRF 726; Tr. 7251-56 (McAfee). In other words, a technology selected by JEDEC was not necessarily objectively the best technology, but rather a technology that appeared reasonably suited to the task and would garner support based on a consensus of members on a timely basis. The ALJ ignored all of these complexities of JEDEC’s decision-making process when he embarked on his hunt for his mythical “objectively” equal or superior alternatives.

Fourth, having added a requirement not found in the law, misapplied economic concepts, and failed to understand the basis on which JEDEC selected technologies, the ALJ made multiple basic errors of fact due in large part to simply ignoring most of the relevant record evidence on this issue. For example, the ALJ disregarded the most important evidence concerning the

⁸⁶ A fundamental requirement for the application of the revealed preferences doctrine is that the consumer know the price it is paying. Paul Samuelson, *A Note on the Pure Theory of Consumer's Behaviour*, 15 *Economica*, 61, 62 (1938) (“I assume in the beginning as being known, . . . the . . . economic goods which will be purchased per unit time by an individual *faced with the prices of these goods . . .*”) (Emphasis added). Thus, whatever the doctrine of revealed preferences may say about JEDEC members’ preferences based on the information they knew, it says absolutely nothing about their preferences would have been if they had timely access to the information withheld by Rambus.

viability of alternatives – the evidence of the competition among these alternatives that actually occurred within JEDEC. ID at 313-16. The ALJ similarly ignored substantial evidence that was inconvenient to his position; he listed only the disadvantages of each alternative, for example, without even recognizing, let alone evaluating, the advantages of each alternative. *Id.* Indeed, the ALJ adopted over 250 separate proposed findings from Rambus regarding alternative technologies without acknowledging a single disadvantage of the four technologies at issue or a single advantage of any alternative.⁸⁷ IDF 1135-1387. The ALJ largely ignored the testimony of multiple semiconductor engineers with years of experience in the field who were directly involved in the evaluation of the alternatives at JEDEC, and relied instead on the after-the-fact opinions of Rambus’s paid experts. *Id.* But Rambus’s technical experts, Dr. Soderman and Mr. Geilhufe, had not designed a DRAM in over 20 years, had no understanding of JEDEC, had little practical experience in the field and had not bothered to review substantial portions of the record.⁸⁸ CCRF 794, 969; CCFF 2108-2129. Neither had an understanding of why JEDEC had adopted the four technologies at issue. CCFF 2108-2129. Rambus’s economic expert, Dr. Rapp, in turn relied nearly exclusively on the testimony of Rambus’s two technical experts rather than

⁸⁷ The ALJ’s findings are particularly suspect, given that, to be accurate, they necessarily assume that representatives of Samsung, IBM, Micron, Mitsubishi, Sun Microsystems, Texas Instruments, Silicon Graphics and Cray, among other companies, behaved irrationally when they supported the use of alternatives at JEDEC. Indeed, the ALJ’s findings assume that Rambus itself behaved irrationally by concealing relevant patent information and thereby incurring the risk that the patents could be rendered unenforceable pursuant to the doctrine of equitable estoppel.

⁸⁸ Indeed, the experts’ failure to review substantial portions of the record renders their opinions unreliable and is grounds for disregarding their testimony. *See, e.g., Concord Boat Corp. v. Brunswick Corp.*, 207 F.3d 1039, 1057 (8th Cir. 2000) (expert opinion should have been excluded partially “because it did not incorporate all aspects of the economic reality” of the relevant market).

any independent review of the record, and the assumptions underlying his analysis added another layer of error. CCFF 2825-2884; CCRF 970-988; CCRF 1125-1139. None of the three made any effort even to understand the JEDEC decision-making process, let alone to replicate that process in their analysis. CCFF 2115-18, 2120-21, 2825-27. In fact, their key assumptions were wrong – and their unsupported, faulty assumptions of how JEDEC operated fatally infected their conclusions.

The ALJ's conclusion that JEDEC would have adopted the same technologies because they were superior is contradicted by the evidence. Having applied the wrong legal standard, the ALJ erred further in finding that Rambus's conduct before JEDEC was not the but-for cause of its acquisition of monopoly power based on his speculation that, even if Rambus had made a timely disclosure of relevant patent information, JEDEC nevertheless would have adopted the very same technologies because they were superior. This result encompasses multiple errors.

First, JEDEC was prohibited from adopting technologies covered by Rambus's patents absent a RAND commitment by Rambus, which Rambus refused to provide. Had equivalent alternatives been lacking (which was not the case), JEDEC might have chosen to abandon its efforts to standardize synchronous DRAMs, but its rules would have prevented it from adopting technologies claimed by Rambus.

Second, the ALJ ignored the most relevant evidence regarding the viability of the price-constraining alternatives available to JEDEC. As explained above, JEDEC actively considered many of the alternative technologies. These alternatives were proposed by leading technology companies in the industry and were given serious consideration by JEDEC members. Many of these alternatives were favored by other members. Even when the four technologies in question

were believed to be free, their selection was the result of close-fought battles. This alone indicates that selection of alternatives would have been highly likely had Rambus disclosed the \$1-3 billion price tag attached to the four technologies in question.

Third, Rambus's own conduct contradicts the decision. Rambus deliberately considered the possibility that JEDEC could work around its patents in deciding to withhold patent-related information. *See* CX0711 at 68, 73 (“I think it makes no sense to alert them to a potential problem they can easily work around.”); CX0919 (“do *NOT* tell customers/partners that we feel DDR may infringe – our leverage is better to wait”); *see also* CX0738 (auto-precharge feature in SDRAMs is “mostly a convenience,” but “patenting this feature would have high harassment value”); *see also* 2 Hovenkamp, *IP*, § 35.5a, at 35-36 to 35-37 (“Proof of manipulation of the process towards an anticompetitive end . . . should incline a court to doubt the technical superiority of the standard ultimately adopted.”).

The ALJ's assumptions regarding JEDEC members' awareness of Rambus patents are unsupported. The ALJ also assumed that, based on evidence that a small number of JEDEC members had varying degrees of suspicion about Rambus patents, JEDEC would have done nothing different if Rambus had made a specific, timely disclosure to all JEDEC members. Again, the ALJ relied on a series of inferences, all of which are contradicted by the record evidence.

First, the ALJ assumed that any JEDEC members' general knowledge that Rambus had patents over its proprietary RDRAM technology must be equivalent to specific knowledge that Rambus's patents would apply to ongoing JEDEC work. There is no dispute that many industry participants were aware that Rambus had pending patent applications relating to its RDRAM

architecture. Of critical importance, however, is that most industry participants did not know that Rambus also had, and was actively working on, patent applications relating to JEDEC's SDRAM and DDR SDRAM architecture. The SDRAM and RDRAM architectures are fundamentally different. *See* Attachment 1 below. The record evidence indicates that many industry representatives understood that Rambus was pursuing patents with respect to its narrow bus, multiplexed, packetized system with the loop clock; they did not, however, know that Rambus was pursuing patents with respect to JEDEC's wide bus, non-multiplexed, non-packetized system with a unidirectional clock. CCFF 746-56, 1238-59. Because Rambus's initial patent application and European (or WIPO) application contained claims relating solely to RDRAM, even industry representatives who reviewed Rambus's initial patent application had no notice that Rambus was pursuing claims relating to SDRAM. CCFF 1266-76, 1277-1357; *see also* CX1069 (e-mail from Joel Karp, Rambus Vice President for Intellectual Property, May 1999: "They probably think they avoid our IP if they don't go 'packet based' [use a packetized system].").

Second, with respect to those instances in which a company heard that Rambus patents might apply to technologies used in architectures other than RDRAM, the ALJ assumed that this was equivalent to a JEDEC-mandated disclosure. This is far from the case. A patent disclosure within JEDEC included an explanation of what specific technology was affected or how the patent related to the ongoing JEDEC work. In other words, members had to be able to understand what technology was covered by the patent so that they could make an informed choice among it and available alternatives. CCFF 331-32. A vague statement that "Rambus may have patents applicable to SDRAMs" tells members nothing about what technology or

technologies would be covered, and so does not permit any evaluation of alternatives.⁸⁹

Third, the ALJ assumes that a statement outside of JEDEC is equivalent to a formal disclosure within JEDEC. This also does not follow. Statements outside of JEDEC lack any context, and JEDEC members have no opportunity to ask follow-up questions or discuss the potential implications.

Fourth, in instances in which a company had some suspicion that Rambus patents might apply to a particular technology, the ALJ has assumed that a suspicion is identical to concrete knowledge. Similarly, with respect to marketplace rumors heard by some companies, the ALJ equates unsubstantiated rumors to informed disclosures by the patent-holder. The ALJ is mistaken on both counts. The JEDEC disclosure policy imposed on the party with the best information – the patent holder – the obligation to disclose. The purpose was precisely to avoid the situation posited by the ALJ, where individual member companies, that lacked both accurate information about Rambus’s patent applications and any means of obtaining such information, were somehow duty-bound to ferret out the truth about Rambus’s patents. Rather, JEDEC members were entitled to rely on Rambus – the only party with reliable information – to disclose its relevant patent applications. CCFF 318-20; Tr. 1836-37 (J. Kelly) (“We rely on the participants in the process to surface patent issues to our attention.”); Tr. 6702-10 (Lee) (discounted comment from an Intel engineer regarding Rambus’s potential patent coverage because it was hearsay, it was not communicated directly by Rambus, and Rambus had not made

⁸⁹ Lemley also suggests that “even if an accused infringer is aware of the existence of a patent, it might reasonably rely on the patent owner’s statement as evidence that the patent owner doesn’t consider the patent relevant to the standard.” Lemley, *Standard-Setting Organizations*, 90 Cal. L. Rev. at 1921.

any disclosure at JEDEC); *see also* Lemley, *Standard-Setting Organizations*, 90 Cal. L. Rev. at 1921 (in a standard-setting organization with disclosure rules, it is reasonable for members to rely on another member's non-disclosure as indicating that the company does not consider any of its known patents or patent applications to be relevant to the standard).

Fifth, the ALJ assumed that suspicion on the part of a single company is equivalent to disclosure to all members of JEDEC. This is simply not the case. One or a small number of members were sufficient to prevent a technology from being adopted into a standard, especially if an objection was based on the existence of a relevant patent. CCF 250, 253-54; JX0017 at 6-7 (Quad CAS standards rejected despite initial 16-1 vote in favor (with four abstentions) when Micron revealed that its opposition was based on a patent asserted by Texas Instruments). There is no evidence that the vast majority of JEDEC members had any idea that Rambus might obtain patent rights over the technologies at issue, and even a small number would have been sufficient to change the direction of the standard.

Sixth, the ALJ again disregarded the JEDEC rule prohibiting adoption of patented technologies absent a RAND commitment because of his false assumption that Rambus would have promised RAND licensing. CCF 249. As explained below, this is flatly contradicted by the specific factual evidence. Thus, even if all JEDEC members had wanted to adopt technologies known to be covered by Rambus patents, the record evidence demonstrates that Rambus's refusal to agree to a RAND commitment would have prevented JEDEC from incorporating those technologies.⁹⁰

⁹⁰ The ALJ also assumed that JEDEC would have adopted the four technologies in question even had Rambus disclosed because Rambus's royalty rates are reasonable. He made no effort to judge the *ex ante* reasonableness of royalties for these particular technologies,

In sum, Rambus's course of conduct distorted competition by causing JEDEC to select among available alternatives in the absence of material information about Rambus's potential patent rights, and thus about the price (royalties) of the technology selected. Rambus's acquisition of monopoly power by means of its patent coverage of the technologies incorporated in the standards is the resulting anticompetitive harm.

ii) Even If JEDEC Had Adopted the Technologies In Question, A Timely Disclosure by Rambus Would Have Enabled JEDEC Members to Negotiate More Favorable Licensing Terms.

"[Intel] want us to have license deals [with all DRAM manufacturers] that . . . have long term reduction of royalty based on volume going to less than 1/2% for rdrams (at this point i choked/gasped) . . . [otherwise, Intel thinks] dram companies will . . . go spend \$100M's to find alternate solutions to avoid paying rambus a royalty"

CX0952 at 2 (e-mail from CEO Geoff Tate to Rambus executives, September 1997)

"GS Choi [an executive at Samsung] is very paranoid about Rambus. He's worried we'll bump the royalties way up (5%) once Direct [RDRAM] becomes the [de facto] standard."

CX1041 at 2 (e-mail from Vice President Joel Karp to Rambus executives, July 1998)

The simple fact is that JEDEC would not, indeed could not, have knowingly incorporated

however; instead, his conclusion was based on very limited evidence of after-the-fact royalties charged or advertised by other companies for unrelated technologies performing unidentified functions. ID 324-25. Once again, the ALJ excuses Rambus's interference with the workings of the marketplace – which prevented it from setting an ex ante royalty rate – by imposing his own judgment of what results he thinks the marketplace should have reached.

in its standards technologies covered by Rambus's patent rights because Rambus refused to commit to license on RAND terms. JEDEC rules were clear: JEDEC could not incorporate patented technologies into a standard without a commitment by the patent holder to license on RAND terms. CCFF 317, 347-48, 2417. The contemporaneous evidence is equally clear: Rambus refused to offer a RAND commitment. CX0873 (draft withdrawal letter: "Rambus Inc. cannot agree to the terms of the JEDEC patent [licensing] policy as it limits our ability to solely control the dissemination and use of our intellectual property."); CX0874 (draft withdrawal letter: "Rambus Inc. cannot agree to the terms of the JEDEC patent [licensing] policy as it limits our ability to conduct business according to our business model."); CX0853 at 2 (draft letter to IEEE: "Rambus will not, however, issue the letter of assurance that you have requested regarding a non-discriminatory license. . . . Rambus reserves all rights to enforce its intellectual property on whatever terms Rambus decides."); CX0855 (letter to IEEE: Rambus "will continue to license its technology in accordance with its existing business practices."); Tr. 2486-89 (Richard Crisp twice told Gordon Kelley that Rambus would not agree to JEDEC's licensing policy). With Rambus unwilling to give a RAND commitment, JEDEC would have been prohibited from using the four technologies at issue.⁹¹

Even if JEDEC had wanted to use the same four technologies, and (despite the strong evidence to the contrary) Rambus had committed to license on RAND terms, the record demonstrates that many JEDEC members would have sought Rambus's advance commitment to license on terms far more favorable than those imposed by Rambus since 2000. *See* CCFF 2441-

⁹¹ The ALJ speculated that Rambus would have offered a RAND commitment under various circumstances. He made no effort, however, to explain this concrete factual evidence to the contrary.

2464, 3021. JEDEC members had the incentive to conduct *ex ante* negotiations. The record establishes that DRAM producers sought to limit royalties because of intense pressure from their customers to minimize costs. CCF 95-111, 125-28. They were particularly concerned about patents held by non-manufacturers, such as Rambus, because they had no possibility to avoid cash royalty payments by negotiating cross-license agreements. CCF 741-43, 3035. JEDEC members also had the opportunity to conduct *ex ante* negotiations. DRAM manufacturers were engaged in license negotiations with Rambus for RDRAMs throughout this period. Had they understood the importance, they could have negotiated broader scope-of-use rights to include JEDEC-compliant DRAMs. CCF 744-45. Indeed, actual facts bear this out. Two DRAM manufacturers and Intel actually negotiated licenses broad enough to cover other types of DRAMs CCF 744, 1544-53, 1608, 1868, 2456-57. Had Rambus disclosed at JEDEC, all DRAM manufacturers would have had not only the opportunity, but also the incentive, to negotiate aggressively for favorable royalty rates for SDRAMs before becoming locked in to use of the four technologies. CCF 2441-64.

3. Rambus’s Conduct Distorted the JEDEC Decision-Making Process in a Manner Calculated to Lead to Rambus’s Acquisition of Monopoly Power.

“ddr meaning . . . in a year or two: Doubled DRAM Royalties (for Rambus)”

CX1084 (e-mail from Richard Crisp, November 1999)

As explained above, Rambus engaged in a calculated course of conduct, over a period of years, that deprived JEDEC of precisely the patent-related information that it sought to obtain, and that would have permitted JEDEC members to work around Rambus’s patent rights or negotiate

lower royalty rates. Rambus cannot now avoid the consequences of its conduct by asserting that the record evidence regarding a hypothetical but-for world in which Rambus was assumed to have made full and timely disclosures is insufficient to prove precisely how JEDEC would have reacted. This is specifically what the *Microsoft* court had in mind when it wrote, “To some degree, ‘the defendant is made to bear the uncertain consequences of its own undesirable conduct.’” 253 F.3d at 79 (*quoting* 3 Areeda & Hovenkamp, *Antitrust Law*, ¶ 651c, at 78 (1996)).

III. Restoration of Competition Requires Entry of the Proposed Order.

“I am and have been concerned that [the non-disclosure and subsequent enforcement of patents] can destroy the work of JEDEC. If we have companies leading us into their patent collection plates, then we will no longer have companies willing to join the work of creating standards.”

CX2384 (letter from Gordon Kelley, JEDEC Subcommittee Chairman, to Buf Slay, Texas Instruments, January 1994)

For the reasons explained above, in order to undo the effects of Rambus’s unlawful acquisition of monopoly power, restore competition in the technology markets associated with the JEDEC standards, and preserve the integrity of JEDEC’s industry-wide standards, the Commission should adopt an order substantially in the form of the proposed order contained at Attachment 2. *See* Complaint Counsel’s Pretrial Brief at 257-70 (April 25, 2003); Complaint Counsel’s Post-Hearing Brief at 121-134 (September 5, 2003); CCFF 3100-3261.

CONCLUSION

The importance of this case justifies careful Commission review. The outcome will determine whether Rambus can continue to assert monopoly power, through its patents, over technologies incorporated in the supposedly open JEDEC standards that govern the worldwide DRAM memory chip industry. The royalties collected by Rambus would apply to virtually all DRAMs sold by the \$20 billion memory industry. DRAM chips are used throughout the economy in products including personal computers, mainframe computers, consumer electronics products, and telecommunications routers and switches. Rambus has also sought royalties on memory controllers and other components that interface with DRAMs. Rambus estimates that these royalties could amount to \$1-3 billion, a cost likely to be imposed on consumers.

Of equal concern is the potential harm to the ability of JEDEC to continue to set open consensus-based standards. Members' failure to participate in JEDEC in good faith or to observe the JEDEC patent disclosure policy could "destroy the work of JEDEC" because JEDEC "will no longer have companies willing to join the work of creating standards." CX2384. The activities of other standard-setting organizations also are likely to be hurt.

The Commission should correct the mistakes of law contained in the Initial Decision. Although the ALJ's erroneous interpretation of the scope of Section 5 is of utmost concern, his standards for causation and anticompetitive harm also could have serious implications if followed by other judges or courts and could set dangerous precedent if not corrected by the Commission.

For the reasons set forth above, Complaint Counsel believe that the Commission should vacate the initial decision in this matter, substitute its own findings and decision holding that Rambus violated Section 5 of the FTC Act, and adopt the proposed Order.

Respectfully submitted,

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Richard B. Dagen
Assistant Director

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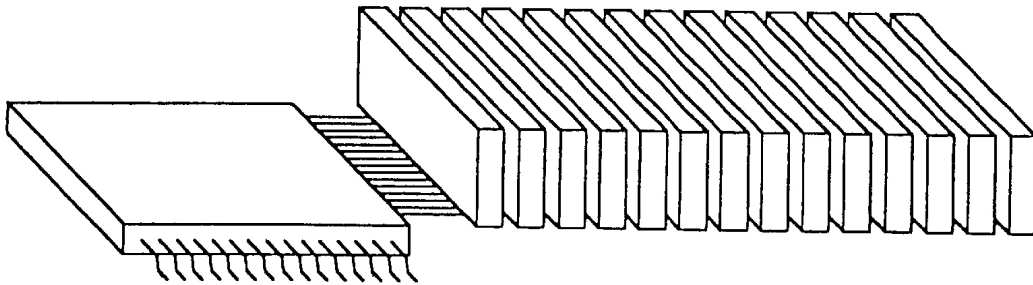
Hiram R. Andrews
Non-Attorney Staff

Dated: April 20, 2004

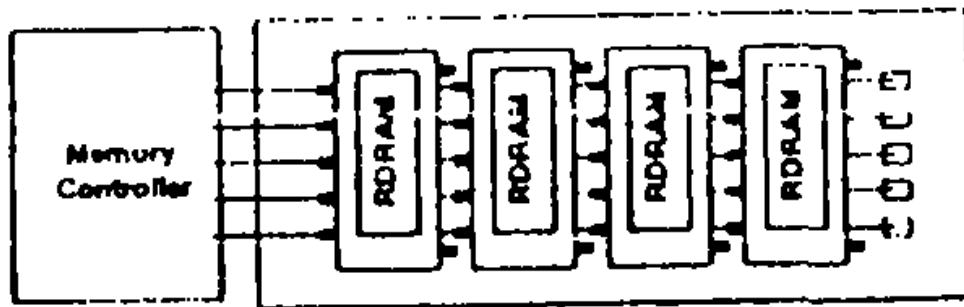
Attachment 1

Comparison of RDRAM and SDRAM Architectures

RDRAM was a narrow bus, multiplexed, packetized system. CCFF 717-24. As originally envisioned, the Rambus architecture, individual RDRAM chips were set vertically in a row along a small number of bus lines:



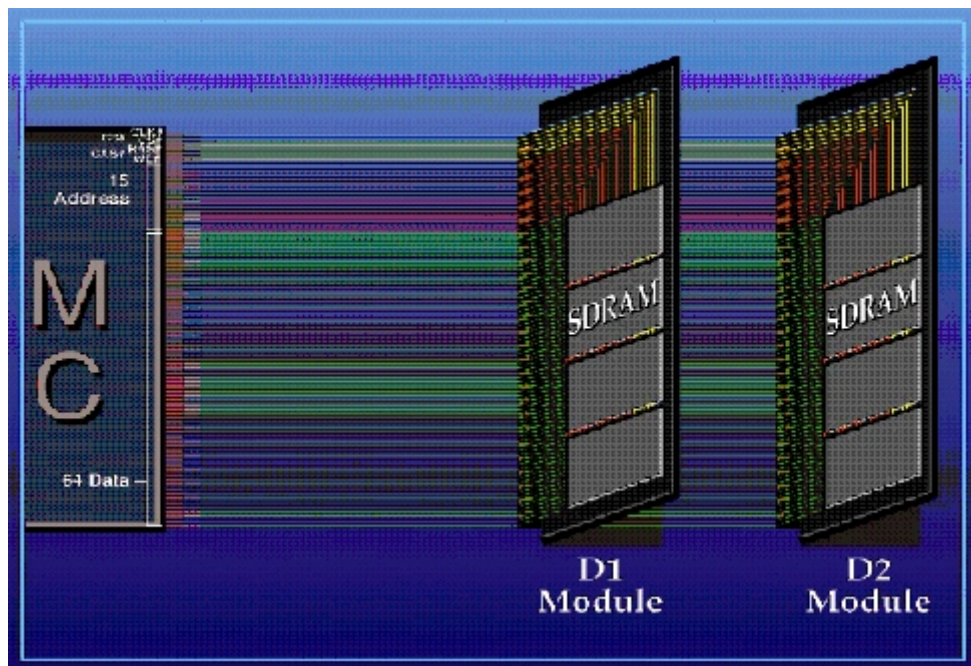
See CX1543 at 7; CCFF 717-19. The RDRAM was characterized by its narrow bus. Rambus's own schematic diagrams emphasize the small number of bus lines, each of which connects to all RDRAM chips in series:



CX1320 at 5. The RDRAM was a multiplexed architecture. Each bus line in the RDRAM architecture carried all types of signals – control, address and data signals. CCFF 721. The

RDRAM was also a packetized architecture. RDRAM sent information over its narrow bus in packets, or sequential waves of signals. The RDRAM had a unique “loop clock” arrangement, whereby the clock signal was sent from the memory controller past each of the RDRAM chips in sequence, turned around, and returned past each of the RDRAM chips again back to the controller.

The SDRAM architecture worked on by JEDEC was fundamentally different. It was a wide-bus system, with up to 200 bus lines in a typical arrangement:

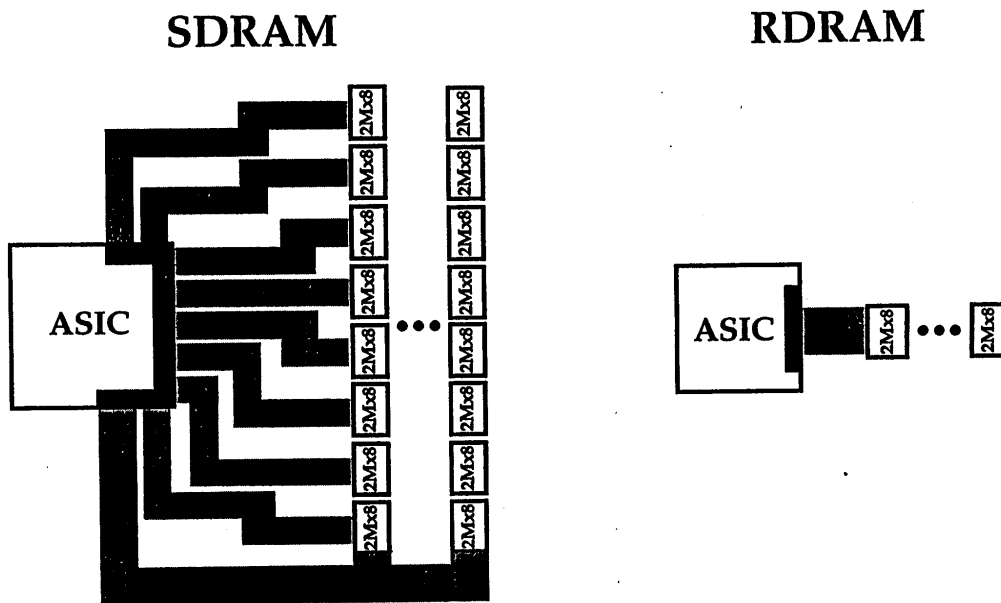


DX382 at 28; Tr. at 400-01 (Rhoden); CCFF 718. SDRAM chips were connected in parallel; only a portion of the bus lines connected to any individual SDRAM. The bus lines were not multiplexed. Rather, each bus line was dedicated to a particular type of signal (indicated by different colors in DX382; control lines = yellow; address lines = red; data lines = green). The

system was not packet-based; rather, signals were sent as a simultaneous wave. The clock was a simple one-directional signal from the memory controller to the SDRAM chips.

To achieve high levels of operation over a small number of bus lines, the RDRAM operated at a very high frequency. SDRAM and DDR SDRAM operated at much lower frequencies, but were able to achieve overall system levels of performance on par with that of RDRAM by accessing memory chips in parallel. Although the SDRAM's frequency of data transfer was slower than RDRAM, more data was transferred on each cycle over the SDRAM's wide bus; as a result, the overall rates of data transfer were similar:

Equivalent Performance Approaches



CX1309 at 28.

The different architectures provided advantages and disadvantages in specific applications. The RDRAM was thought to be particularly effective in providing long, continuous, unidirectional streams of data. As a result, RDRAM was perceived as possibly being well suited

to use in game consoles and digital set-top boxes. Tr. 5051-52 (Kellogg); Tr. 2538-39 (G. Kelley); Tr. 8206-07 (Farmwald). SDRAM and DDR SDRAM were understood to operate better in environments calling for shorter bursts of information travelling both to and from the memory. Thus, the traditional, wide-bus architectures were thought to be better suited for use in personal computers, servers, mainframes, and other computer environments. Because computer uses drove approximately 80% of the memory market, the majority view during the early and mid-1990's was that the traditional SDRAM and DDR SDRAM architecture would dominate the mainstream memory market and RDRAM would be used in certain specialty applications. Tr. 1441-42 (Sussman); Tr. 2538-39 (G. Kelley); CCFF 827. This view changed sharply in 1996 when Intel announced that its Camino 820 chipset designed to support Pentium III and IV processors would interface exclusively with RDRAM. The industry expectation that SDRAM and DDR SDRAM would dominate mainstream uses was gradually restored between November 1998 and early 2000, when a series of technical problems caused repeated delays in Intel's launching of its Camino chipset, leading Intel to change its position and launch a chipset supporting SDRAM and DDR SDRAM.

Attachment 2

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

COMMISSIONERS: Timothy J. Muris, Chairman
Mozelle W. Thompson
Orson Swindle
Thomas B. Leary
Pamela Jones Harbour

In the Matter of

RAMBUS INCORPORATED,

a corporation.

Docket No. 9302

**COMPLAINT COUNSEL'S
PROPOSED ORDER**

Upon Consideration of all of the evidence on the record in this matter:

I.

IT IS HEREBY ORDERED that for purposes of this Order, the following definitions shall apply:

- A. "Respondent" or "Rambus" means Rambus Inc., a corporation organized and existing under the laws of the State of Delaware, its directors, officers, employees, agents, representatives, predecessors, successors, and assigns; its joint ventures, subsidiaries, divisions, groups and affiliates controlled by Rambus Inc., and the respective directors, officers, employees, agents, representatives, successors, and assigns of each.
- B. "JEDEC" means the JEDEC Solid State Technology Association, a non-stock corporation organized and existing under the laws of the State of Virginia, its successors and assigns, and its divisions, subsidiaries and affiliates controlled by JEDEC.
- C. "JEDEC-Compliant Products" means

(1) any Dynamic Random Access Memory (“DRAM”) that complies with the JEDEC SDRAM Standard, published as JC 21-C, Release 4, as revised, the JEDEC SDRAM standard, published as JC 21-C, Release 9, as revised, the JEDEC DDR SDRAM specification, published as JESD 79, as revised, or with any future version of the JEDEC SDRAM standard, DDR SDRAM standard or DDR SDRAM specification, including, but not limited to, the JEDEC DDR-2 SDRAM standard;

(2) any product that interfaces with any DRAM defined in Paragraph I.C.(1); and

(3) any product that contains any product defined in either Paragraph I.C.(1) or C.(2), unless the product also contains one or more DRAMs that are not defined in Paragraph I.C.(1).

- D. “Action” means any lawsuit or other action, whether legal, equitable, or administrative, as well as any arbitration, mediation, or any other form of private dispute resolution, in the United States or anywhere else in the world.
- E. “Relevant U.S. Patents” means all current or future United States patents that claim priority back to U.S. Patent Application Number 07/510,898, filed on April 18, 1990, or to any other U.S. Patent Application filed by or on behalf of Rambus Inc. before June 17, 1996.
- F. “Relevant Foreign Patents” means all current or future patents issued by a foreign government that claim a priority date before June 17, 1996.
- G. “License Agreement” means any contract, agreement, arrangement or other understanding between Respondent and any other party or parties that requires, calls for, or otherwise contemplates, payment of fees, royalties or other monies, in cash or in kind, associated with the manufacture, sale or use of any product defined in Paragraph I.C.
- H. “Compliance Officer” means the officer, director, or full-time employee of Respondent employed pursuant to Paragraph VII. of this Order.
- I. “Standard-Setting Organization” means any group, organization, association, membership or stock corporation, government body, or other entity that, through voluntary participation of interested or affected parties, is engaged in the development, promulgation, promotion or monitoring of product or process standards for the electronics industry, or any segment thereof, anywhere in the world.

II.

IT IS FURTHER ORDERED that Respondent shall cease and desist any and all efforts it has undertaken by any means, either directly or indirectly, in or affecting commerce as “commerce” is defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44, including, without limitation, the threat or prosecution of, or assertion of any affirmative defense in, any Action, pursuant to which Respondent has asserted that any person or entity, by manufacturing, selling, or otherwise using any JEDEC-Compliant Product, infringes any of Respondent’s Relevant U.S. Patents. Respondent shall dismiss or cause to be dismissed, with prejudice, all such prosecutions and all such affirmative defenses within thirty (30) days from the date this Order becomes final.

III.

IT IS FURTHER ORDERED that Respondent shall not undertake any new efforts by any means, either directly or indirectly, in or affecting commerce as “commerce” is defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44, including, without limitation, the threat or prosecution of, or assertion of any affirmative defense in, any Action, pursuant to which Respondent asserts that any person or entity, by manufacturing, selling, or otherwise using any JEDEC-Compliant Product, infringes any of Respondent’s Relevant U.S. Patents.

IV.

IT IS FURTHER ORDERED that Respondent shall cease and desist all efforts it has undertaken by any means, either directly or indirectly, in or affecting commerce as “commerce” is defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44, including, without limitation, the threat or prosecution of, or assertion of an affirmative defense in, any Action, pursuant to which Respondent has asserted that any person or entity, by manufacturing, selling, or otherwise using any JEDEC-Compliant Product for import or export to or from the United States, infringes any of Respondent’s Relevant Foreign Patents.

V.

IT IS FURTHER ORDERED that Respondent shall not undertake any new efforts by any means, either directly or indirectly, in or affecting commerce as “commerce” is defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44, including without limitation the threat or prosecution of, or assertion of any affirmative defense in, any Action, pursuant to which Respondent has asserted that any person or entity, by manufacturing, selling, or otherwise using any JEDEC-Compliant Product for import or export to or from the United States, infringes any of Respondent’s Relevant Foreign Patents.

VI.

IT IS FURTHER ORDERED that Respondent shall cease any and all efforts by any means, either directly or indirectly, in or affecting commerce as “commerce” is defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44, to collect any fees, royalties or other payments, in cash or in kind, relating to the manufacture, sale or use of any JEDEC-Compliant Product pursuant to any existing License Agreement.

VII.

IT IS FURTHER ORDERED that,

- A. Within thirty (30) days from the date this Order becomes final, Respondent shall employ, at Respondent’s cost, a Compliance Officer who will be the sole representative of Respondent for the purpose of communicating Respondent’s patent rights related to any standard under consideration by any Standard-Setting Organization of which Respondent is a member.
1. The employee serving as the Compliance Officer shall be employed subject to the approval of the Commission, which approval Respondent shall seek pursuant to § 2.41(f) of the Commission’s Rules of Practice, 16 C.F.R. § 2.41(f).
 2. Respondent shall provide the Compliance Officer with full and complete access to Respondent’s books, records, documents, personnel, facilities and technical information relating to compliance with this Order, or to any other relevant information, as the Compliance Officer may reasonably request; and Respondent shall assure that the Compliance Officer has all information necessary to represent Respondent for the purpose of communicating Respondent’s patent rights related to any Standard under consideration by any Standard-Setting Organization of which Respondent is a member. Respondents shall cooperate with any reasonable request of the Compliance Officer, including, but not limited to, the development or compilation of data and information for the Compliance Officer’s use. Respondent shall take no action to interfere with or impede the Compliance Officer’s ability to represent Respondent for the purpose of communicating Respondent’s patent rights related to any Standard under consideration by any Standard-Setting Organization of which Respondent is a member.
 3. If at any time the Commission determines that the Compliance Officer has ceased to act or failed to act diligently, or is unwilling or unable to continue to serve, the Commission may require Respondent to employ a substitute to serve as Compliance Officer in the same manner as provided by this Order.

VIII.

IT IS FURTHER ORDERED that:

- A. Within thirty (30) days after the date this Order becomes final, Respondent shall distribute a copy of this Order and the complaint in this matter to JEDEC, to those members of JEDEC that Respondent contacted regarding possible infringement of any of its patents by JEDEC-compliant SDRAM and DDR SDRAM products, and to any other person or entity that Respondent contacted regarding possible infringement of any of its patents by JEDEC-compliant SDRAM and DDR SDRAM products.
- B. Within ten (10) days after the date this Order becomes final, Respondent shall distribute a copy of this Order and the complaint in this matter to every officer and director of Respondent, to every employee or agent of Respondent whose responsibilities include acting as Respondent's designated representative to any Standard-Setting Organization, and to every employee or agent having managerial responsibility for any of Respondent's obligations under this Order.
- C. For a period of five (5) years after the date this Order becomes final, Respondent shall furnish a copy of this Order and the complaint in this matter to each new officer and director of Respondent and to every new employee or agent of Respondent whose responsibilities will include acting as Respondent's designated representative to any Standard-Setting Organization or who will have managerial responsibility for any of Respondent's obligations under the Order. Such copies must be furnished within thirty (30) days after any such persons assume their position as an officer, director or employee. For purposes of this paragraph VIII.C., "new employee" shall include without limitation any of Respondent's employees whose duties change during their employment to include acting as respondent's designated representative to any Standard-Setting Organization, group or similar body of which respondent is a member.
- D. For a period of ten (10) years after the date this Order becomes final, Respondent shall furnish each Standard-Setting Organization of which it is a member and which it joins a copy of this Order and Respondent shall identify to each such organization the name of the person who will serve as Respondent's designated representative to the Standard-Setting Organization.

IX.

IT IS FURTHER ORDERED that:

- A. Respondent shall file a verified written report with the Commission setting forth in detail the manner and form in which it intends to comply, is complying, and has complied with

this Order: (i) within sixty (60) days after the date this Order becomes final; and (ii) annually for five years on the anniversary of the date this Order becomes final.

- B. Respondents shall include in its reports, among other things required by the Commission, a full description of the efforts being made to comply with the this Order, a description of all substantive contacts or negotiations relating to Respondent's participation in any Standard-Setting Organization of which Respondent is a member, the identity of all parties contacted, copies of all written communications to and from such parties, internal documents and communications, and all reports and recommendations concerning Respondent's participation in any Standard-Setting Organization of which Respondent is a member.
- C. For a period of ten (10) years after the date this Order becomes final, Respondent shall maintain records adequate to describe in detail any action taken in connection with the activities covered by Paragraphs II through VIII of this Order.

X.

IT IS FURTHER ORDERED that, for the purpose of determining or securing compliance with this Order, and subject to any legally recognized privilege, and upon written request with reasonable notice, Respondent shall permit any duly authorized representative of the Commission:

- A. Access, during office hours and in the presence of counsel, to all facilities and access to inspect and copy all books, ledgers, accounts, correspondence, memoranda and other records and documents in the possession or under the control of Respondent relating to any matter contained in this Order; and
- B. Upon five days' notice to Respondents and without restraint or interference from them, to interview the Compliance Officer and any other of Respondent's officers, directors, or employees, who may have counsel present, regarding any such matters.

XI.

IT IS FURTHER ORDERED that Respondent shall notify the Commission at least thirty (30) days prior to any proposed change in the corporate Respondent such as dissolution, assignment, sale resulting in the emergence of a successor corporation, or the creation or dissolution of subsidiaries or any other change in the corporation that may affect compliance obligations arising out of this Order.

XII.

IT IS FURTHER ORDERED that, this Order shall terminate twenty (20) years from the date this Order becomes final.

By the Commission.

Donald S. Clark, Secretary

SEAL

Issued: _____, 2004