ORIGINAL

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

Docket No. 9302

REVISED PUBLIC VERSION

In the Matter of

RAMBUS INCORPORATED

BRIEF OF COUNSEL SUPPORTING THE COMPLAINT ON THE ISSUE OF REMEDY

Jeffrey Schmidt
Director

Daniel P. Ducore
Assistant Director, Compliance Division

Rendell A. Davis, Jr.
Attorney, Compliance Division

Geoffrey D. Oliver
Richard B. Dagen
Robert P. Davis

Counsel Supporting the Complaint

Bureau of Competition
Federal Trade Commission
Washington, DC 20580

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INTRODUCTION

> *The proper disposition of antitrust cases is obviously of great public importance, and their remedial phase, more often than not, is crucial. For the suit has been a futile exercise if the Government proves a violation but fails to secure a remedy adequate to redress it.*
>
> *E.I. DuPont de Nemours & Co. v. United States, 366 U.S. 316, 323 (1961).*

The Commission, having found that Rambus unlawfully acquired monopoly power by deceiving JEDEC, must now restore competition to the conditions that would have prevailed absent Rambus's anticompetitive conduct.

Specifically, the Commission should enjoin Rambus from enforcing its pre-1996 patents with respect to JEDEC-compliant products. This remedy is not only called for by antitrust law, the Commission's Decision, and other record evidence; it is also supported by patent law, economics, policy concerns, and principles of administrability.

This remedy – far from being extreme – merely restores, six years later, the competitive conditions that should have prevailed. Had it not engaged in deception, Rambus likely would have received no, or at most minimal, royalties from companies practicing the JEDEC standards. This remedy is not punitive: it would permit Rambus not only to enforce all its patents against any non-JEDEC-compliant products and its post-1996 patents against all products (including JEDEC-compliant products), but also to keep the unlawfully acquired monopoly profits it collected during the past six years.

Should the Commission wish to consider alternative remedies, Complaint Counsel set forth other possible methods to determine an *ex ante* royalty rate. As we discuss below, the evidence suggests a maximum reasonable royalty rate of 0.25% for SDRAM, DDR SDRAM and DDR2 SDRAM memory chips.[1] We believe such methods are inferior, however, to enjoining enforcement of Rambus's patents.

I. The Appropriate Remedy Is An Order Enjoining Enforcement of Relevant Patents Against JEDEC-Compliant Products

The remedy question rests on a fundamental conundrum: the appropriate remedy depends on what competitive conditions would have existed absent Rambus's unlawful conduct. Yet Rambus's unlawful conduct prevents us from knowing what competitive conditions would have existed. Thus, any uncertainties in resolving this question must be construed against Rambus

[1] Although the Commission did not find a violation with respect to DDR2, the Commission still has the authority to order relief with respect to DDR2 to restore competition and prevent further harm, as explained supra 16-18.

(*see infra* 9-11).

Contemporaneous documents, testimony of most relevant fact witnesses, and the "natural experiment" involving the loop-back clock proposal (all cited favorably in the Commission's Decision) and other record evidence establish that the most likely competitive result would have been a series of JEDEC standards containing technologies free of Rambus patents. To replicate this competitive world, the appropriate remedy is an order enjoining Rambus from enforcing its patents against devices complying with JEDEC standards and products incorporating such devices.

A. The Remedy Must Fully Restore Competitive Conditions That Would Have Prevailed Absent Rambus's Deception

The principal objective in framing antitrust relief is to restore competition. *See, e.g.*, *Ford Motor Co. v. United States,* 405 U.S. 562, 573 (1972); *International Salt Co. v. United States*, 332 U.S. 392, 401 (1947) (relief should "pry open to competition a market that has been closed by defendants' illegal restraints"). Relief should, "so far as practicable, cure the ill effects of the illegal conduct, and assure the public freedom from its continuance." *United States v. U.S. Gypsum Co.*, 340 U.S. 76, 88 (1950). A Commission order should recreate market conditions that would have existed "but for the unlawful conduct." *Ekco Prods. Co.*, 65 F.T.C. 1163, 1216 (1964), *aff'd sub nom. Ecko Prods. Co. v. FTC*, 347 F.2d 745 (7th Cir. 1965).

The Commission has broad discretion to deprive Rambus of any "fruits" of its wrongdoing, *United States v. United Shoe Mach. Corp*., 391 U.S. 244, 250 (1968), and Rambus "should, so far as practicable, be denied future benefits from their forbidden conduct." *Gypsum,* 340 U.S. at 89; *FTC v. National Lead,* 352 U.S. 419, 430 (1957) (Commission must assure that a violator will "relinquish the fruits of his violation."). The Commission's ultimate objective must be to protect the public from the continuing effects of Rambus's unlawful conduct. *See, e.g., Hoffman-La Roche Ltd. v. Empagran S.A.,* 542 U.S. 155, 170 (2004) ("[a] government plaintiff, unlike a private plaintiff, must seek to obtain the relief necessary to protect the public from further anticompetitive conduct and to redress anticompetitive harm.").

To restore competitive conditions, protect the public and deprive Rambus of the future "fruits" of its unlawful conduct, the Commission must determine what competitive conditions likely would have prevailed absent Rambus's deception. *Massachusetts v. Microsoft Corp.*, 373 F.3d 1199, 1232 (D.C. Cir. 2004) ("the fruits of a violation must be identified before they may be denied"). The Commission's Decision goes a long way towards answering this question. Resolving the remaining issues will clarify the need for an order enjoining enforcement of Rambus's relevant patents.

B. The Commission's Decision Demonstrates That The Likely Competitive Result Would Have Been A Series Of Standards Free Of Rambus's Patents

1. JEDEC Likely Would Have Avoided Rambus Patents By Selecting Alternatives

Evidence cited in the Commission's Decision establishes that, had Rambus not deceived JEDEC members, they would have selected alternative technologies for the SDRAM and DDR SDRAM standards rather than pay Rambus royalties.[2] The Commission found that patents, and Rambus patents in particular, significantly influenced JEDEC's selection of technologies. The Commission found, for example, that "JEDEC members – DRAM manufacturers and customers – were highly sensitive to costs, and that keeping costs down was a major concern within

[2] DDR2 is treated separately in Section II.E.

JEDEC." Decision 74; *see also* fn. 404. The Commission credited evidence that JEDEC members would select alternatives with lesser performance in order to avoid cost. Decision 75 & fn. 406. The Commission also cited to JEDEC minutes recounting, "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." Decision 75 fn. 407. JEDEC members feared that Rambus, a non-manufacturing, IP-licensing company, would reject cross-licenses, and demand cash payments. Tellingly, the Commission found that "the one time that JEDEC members had advance knowledge that a Rambus patent was likely to cover a standard under consideration, the members took deliberate steps to avoid standardizing the Rambus technology." Decision 74 & fn. 403.

The Commission further found that "[a]lternative technologies were available when JEDEC chose the Rambus technologies, and could have been substituted for the Rambus technologies had Rambus disclosed its patent position." Decision 76. The Commission explained that JEDEC members "gave these alternatives serious, searching consideration; in fact, the technologies as to which Rambus subsequently revealed patent claims sometimes were chosen only after prolonged debate." *Id.* The Commission also quoted the testimony of multiple JEDEC members that they likely would have opposed using the technologies in question and instead selected alternatives had they known of Rambus's patent applications. Decision 75 (Bechtolsheim: "I personally and Sun [Microsystems] as a company would have strongly opposed the use of royalty-bearing elements . . . in an interface specification."), 75 fn. 407; *see also* 76 fn. 413. Indeed, Rambus representative Richard Crisp was among the JEDEC members who believed that JEDEC would have selected alternatives rather than patented Rambus technologies. *See* CX0711 at 73 (Crisp: "it makes no sense to alert them to a potential problem they can easily work around."). Thus, the Decision cites substantial evidence from multiple sources confirming that, had Rambus disclosed its patent position, JEDEC members would have selected alternatives, leaving Rambus with no claim to royalties.

The principal contrary evidence comes from Rambus's retained experts. They hypothesize, based on a string of unsupported assumptions, that had Rambus disclosed, JEDEC members would have calculated to a fraction of a percent the costs of using various alternatives, and concluded that use of Rambus technologies subject to some positive royalty was optimal. This is a nice theory. There is, however, absolutely no evidence that JEDEC members ever did this. *See* Tr. 7255-7256 (McAfee: JEDEC members selected technologies by satisficing – selecting satisfactory, non-objectionable technologies). Indeed, JEDEC's rejection of the loop-back clock technology involved no such calculations. CCFF 2436-2440. The Commission should base its remedy decision on the actual factual record, not unsupported theory. That record, as reflected in the Decision, establishes that JEDEC members would have adopted alternative technologies in its standards, and Rambus would not have had any royalty claims over those standards.

2. Alternatives Would Have Limited Rambus To Zero Or, At Most, De Minimis Royalties

Even if the Commission credited the Rambus experts' theories (adjusted for reasonable assumptions), *ex ante* negotiations likely would have resulted in zero or, at most, *de minimis* royalties. Economics indicates that the royalty for a particular technology depends on the cost of available alternatives and the additional value of the particular technology, if any, over that of the alternatives.[3] Evidence relied upon in the Decision strongly suggests that equally attractive alternatives cost no more than the technologies in question:

> – *Fixed CAS Latency* – The Commission found that at most two latencies were required, and cited evidence that some manufacturers' inventory systems supported multiple latency values without cost increase and yield problems were solved quickly. Decision 83-84, fn. 443. If the Commission were to find that yield improved quickly, and either that only one latency was required or that manufacturer inventory systems could support two latencies, this alternative would have cost less than programmable CAS latency. *See also* CCFF 572, 2139, 2142-44; CCRF 812.
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> – *Setting CAS Latency with a Fuse* – The Commission cited evidence that OEMs could blow electric fuses themselves. Decision 84. Even assuming two latency values were needed, if the Commission were to find that yield problems can be solved quickly and OEMs could blow electric fuses, this alternative would have cost the same as programmable CAS latency. *See* CCRF 846, 852.
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> – *Use of a Separate Pin to Set CAS Latency* – In addition to finding that, at most, two latency values would have been required, the Commission cited evidence that nearly all configurations had extra pins available and no additional wiring would have been necessary. Decision 85 fn. 456. If the Commission were to enter these as findings, the expected cost of this alternative would have been zero.
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> – *Fixed Burst Length* – The Commission noted that, if JEDEC members required only two burst lengths, the "entire projected cost increase would have disappeared," and cited evidence that partial elimination of the mode register would have saved cost. Decision 87. If the Commission were to enter these as findings, CCRF 918, this alternative would have cost less, and if the Commission found that JEDEC required only a single burst length, CCRF 979, it would have cost substantially less, than programmable burst length.
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> – *Burst Terminate Command to Set Burst Length* – The Commission found that this

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3 A royalty is deemed reasonable only when it "is or approximates the outcome of an auction-like process appropriately designed to take lawful advantage of the state of competition existing ex ante . . . between and among available IP options." Swanson & Baumol, "Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power," 73 Antitrust L.J. 1, 57 (2005). Specifically:

> The greater the number of technologies that compete in advance of standard selection and the closer their IP solutions are to being perfect substitutes (so that the difference in value among alternatives approaches zero), the more likely a reasonable royalty will approach incremental cost.

alternative would not have cost any more than programmable burst length, and was "unconvinced" by Rambus's argument that it was not viable. Decision 87, 87 fn. 473. If the Commission were to so find, this alternative would have been no more expensive than programmable burst length.

– *Doubling the Clock Speed* – The Commission stated, "the record does not support" the contention that an on-DIMM clock was required to double the clock frequency, and that Rambus failed to consider design, construction, and testing cost savings. Decision 89-90. The Commission also cited testimony that doubling clock speed "would not have any additional cost." Decision 90 fn. 492. If the Commission were to so find, this alternative would have been no more expensive than dual edge clocking.[4]

– *DLL on the Controller* – The Commission found no evidence indicating that this alternative would have been more expensive than on-chip PLL/DLLs. Decision 91. The Commission credited evidence that this alternative was "workable and desirable." Decision 92. If the Commission were to enter these as findings, this alternative would have been no more expensive than on-chip PLL/DLL.[5]

– *Vernier* – The record indicates no extra cost for this alternative over the cost of on-chip PLL/DLL; indeed, it likely would have been cheaper.[6] The Commission cited to evidence that Vernier circuits perform well enough to be viable. Decision 92-93. If the Commission were to so find, this alternative would have been no more expensive than on-chip PLL/DLL.

– *DQS Strobe* – The record indicates no additional cost for this alternative; the Commission cited evidence that "most JEDEC members believed this technology offered adequate performance." Decision 94; CCFF 2403-2410. If the Commission were to so find, this alternative would have been no more expensive than on-chip PLL/DLL.

Thus, based on the evidence already cited in the Commission's Decision, there are at least 18

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4 Elimination of the on-DIMM clock would leave only four cents of additional cost, Decision 89-90, which would be offset by the design, construction and testing cost savings.

5 In fact, record evidence suggests that DLL on the controller would be less expensive because DRAM manufacturing would be cheaper. *See, e.g.,* Geilhufe, Tr. 9612-13 (removing DLL from the DRAM would have reduced costs by 3 cents per unit); *see also* DX-301.

6 *See, e.g.,* Geilhufe, Tr. 9612-13 (removing DLL would have reduced costs); *see also* DX-301.

combinations of alternatives likely to have resulted in a zero royalty in a competitive environment.[7]

3. The Commission Must Resolve Any Reasonable Doubts Against Rambus

The record evidence establishes that competitive conditions, absent Rambus's conduct, would have involved no royalty payments to Rambus. If the Commission is uncertain, however, the Commission must resolve any reasonable doubts against Rambus.

The Supreme Court has emphasized that "once the Government has successfully borne the considerable burden of establishing a violation of law, all doubts as to the remedy are to be resolved in its favor." *DuPont*, 366 U.S. at 334; *New York v. Microsoft*, 224 F.Supp.2d 76, 148

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7 Record evidence also indicates that additional alternatives, not discussed in the Commission Decision, likely would not have cost any more than the technologies at issue:

– *Identifying CAS Latency in the Command – See* Geilhufe, Tr. 9580-81; DX-298 (variable cost negligible unless extra pin needed); *see also* CCFF 2227 (no extra pin needed).

– *Setting Burst Length with a Fuse* – The discussion of fuses for CAS latency (*see supra*) also applies here. *See generally,* CCFF 2261-2269.

– *Use of a Separate Pin to Set Burst Length* – The discussion of pins for CAS latency (*see supra*) also applies here. *See generally,* CCFF 2270-2295.

– *Identifying Burst Length in the Command – See* Geilhufe, Tr. 9596; DX-299 (variable cost negligible unless extra pin needed); *see also* CCFF 2305; CCRF 980 (no extra pin needed).

– *Use an Asynchronous Architecture to Replace Programmable CAS Latency and Burst Length – See, e.g.,* CCFF 2228- 2233; CCRF 894; Tr. at 9592 (Geilhufe: lower test cost); *see also* DX-298 (1 cent decrease in cost per unit); DX-299 (same).

– *Interleave On-Chip Banks – See* CCFF 2345, 2349-50; *see also* CCRF 1003; Geilhufe, Tr. 9601-9606; DX-300 (assuming yield improves quickly over time, increased testing cost of only 2 cents).

(D.D.C. 2002) ("any doubts as to the extent of even this narrow remedy are to be resolved against the defendant"); *id.* at 163 ("The most elementary conceptions of justice and public policy require that the wrongdoer shall bear the risk of the uncertainty which his own wrong has created.") (quoting *Bigelow v. RKO Radio Pictures*, 327 U.S. 251, 265 (1946));[8] III Areeda & Hovenkamp, Antitrust Law ¶ 653f, at 104 (2002) ("the proper relief is to eradicate all the consequences of the act and provide deterrence against repetition; and any plausible doubts should be resolved against the monopolist.").

Under the facts of this case, in particular, doubts should be resolved against Rambus. The disclosure policy was specifically intended to permit *ex ante* discussion about the relative merits of alternatives. Rambus's conduct deprived JEDEC members of this discussion. The record evidence establishes that the Rambus-claimed technologies and the alternatives were essentially equivalent. Rambus, having "distort[ed] choices through deception" thereby "prevent[ing] the efficient selection of preferred technologies," Decision 29, is itself responsible for any uncertainty as to what JEDEC would have done and should be held to a finding that JEDEC "would have excluded Rambus's patented technologies from the JEDEC DRAM standards." Decision 74.

General legal principles apply with particular force here where Rambus has engaged in

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8. *See also Sugar Industry Antitrust Litigation*, 73 F.R.D. 322, 354 (D. Pa. 1976):

> [I]f defendants are found to have precluded the existence of an actual competitive price in the market, the most elementary conceptions of justice and public policy require that they bear the risk of any uncertainty as to the actual damages that they created by their violations. No wrongdoer should be entitled to complain that damages cannot be measured with the precision that would have been possible had the situation it alone caused been otherwise.

massive, wholesale destruction of documents. Decision 116-117. Complaint Counsel respectfully submit that the Commission cannot adopt a remedy permitting Rambus to collect royalties on JEDEC-compliant products without first deciding the issue of spoliation of evidence.

C. Law, Economics and Policy All Support An Order Enjoining Enforcement of Rambus's Patents

The Commission's remedy must restore as fully as possible competitive conditions – a series of JEDEC standards free of Rambus's patent claims. This requires an order enjoining enforcement of Rambus's relevant patents against JEDEC-compliant products. This remedy is supported by antitrust precedent, principles of equity, economics, and policy considerations.

The Commission has used its broad remedial authority to restrict enforcement of patents for nearly forty years. *American Cyanamid Co.*, 72 F.T.C. 623, 690 (1967) ("We have no doubt that, where the circumstances justify such relief, the Commission has the authority to require royalty-free licensing."),[9] *aff'd*, *Charles Pfizer & Co. v. FTC*, 401 F.2d 574 (6th Cir. 1968); *Xerox Corp.*, 86 F.T.C. 364, 373-83 (1975) (consent order); *Eli Lilly & Co.*, 95 F.T.C. 538, 546-52 (1980) (consent order); *Bristol-Meyers Squibb Co.*, 2003 F.T.C. LEXIS 59, *66–67 (2003) (consent decree forbidding respondent from making certain patent infringement claims or receiving certain patent royalties); *see United States v. National Lead*, 332 U.S. 319, 349 (1947) ("it may well be that uniform, reasonable royalties computed on some patents will be found to be but nominal in value. Such royalties might be set at zero or at a nominal rate.").

The Commission has twice remedied Rambus-type conduct by precluding the wrongdoer

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[9] The Commission majority explained that, but for the unique history in *American Cyanamid*, it might have prohibited collection of royalties. The dissent found "absolutely no basis [for permitting collection of royalties] either in logic, reason, equity, fact, or law." 72 F.T.C. at 691.

from enforcing patents against those practicing the standard. *Dell Computer Corp.*, 121 F.T.C. 616 , 620-622 (1996) (consent order); *Unocal Oil Company of California,* Docket No. 9305 (August 2, 2005) (consent order).[10] In *Dell,* the Commission recognized that equitable doctrines found in patent law also support an order enjoining a patent-holder from enforcing its relevant patents under even less egregious circumstances than here. *Dell* 121 F.T.C. at 624-25.[11]

Equitable estoppel, and the related equitable doctrine of laches, apply even where, unlike here, there is no intent to deceive. *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1043 (Fed. Cir. 1992). Rambus's intent to deceive only reinforces the authority for such relief.[12]

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[10] The Commission regularly requires the divestiture or licensing of, or placed other limitations on, patent rights as a remedy for a Section 7 violation. *See, e.g., Cephalon, Inc., and Cima Labs Inc.*, 2004 F.T.C. LEXIS 162, *22 (2004) (consent decree ordering the respondent to "grant irrevocable, perpetual, fully paid-up and royalty-free license(s)" to intellectual property, including patents, to a third party).

[11] The Commission may utilize the "complete array of essentially equitable remedies" in fashioning relief. *Ekco*, 65 F.T.C. at 1213. Pursuant to equitable estoppel, courts routinely preclude enforcement of patents following conduct suggesting that patent rights would not be enforced. *See, e.g., Stambler v. Diebold, Inc.*, 11 U.S.P.Q.2d 1709 (E.D.N.Y. 1988), (intentionally misleading silence in standard-setting organization resulted in barring both past and future patent enforcement), *aff'd mem.*, 878 F.2d 1445 (Fed. Cir. 1989); *Potter Instr. Co. v. Storage Tech. Corp.*, 1980 U.S. Dist. LEXIS 14348 at *17-*18 (E.D. Va. 1980), *aff'd*, 641 F.2d 190 (4th Cir. 1981) (accord); *Stryker Corp. v. Zimmer, Inc.*, 741 F. Supp. 509, 512-15 (D.N.J. 1990) (patentee estopped where it had for years "mis[led] a purported infringer ... [and others] to believe that there was and is no problem, lying in wait until...it has become 'commercially and economically worthwhile' to do something ...."). *See also Wang Labs., Inc. v. Mitsubishi Elecs. Am., Inc.*, 103 F.3d 1571, 1575-76, 1581-82 (Fed. Cir. 1997) (implied license barred patentee's infringement action after patentee presented technology to JEDEC, encouraged its use, and did not disclose pending patent applications).

[12] The Supreme Court has indicated that the Commission can take such willfulness into account in crafting a remedy. *FTC v. National Lead Co.,* 352 U.S. 419, 429 (1957) ("Those in utter disregard of law, as here, 'call for repression by sterner measures than where the steps could reasonably have been thought permissible.'").

The proposed remedy is fully consistent with the remedy phase of *Microsoft*. There, the court identified "Microsoft's freedom from platform threats posed by makers of rival middleware" as the fruit of Microsoft's unlawful conduct. *Massachusetts v. Microsoft*, 373 F.3d at 1229. The court rejected, *inter alia*, Massachusetts' "open-source IE proposal" to grant others a royalty-free, perpetual right to use Microsoft's Internet Explorer as inappropriate because it "'ignores the theory of liability in this case'." *Id.* at 1228. The court rejected the idea that "IE was the fruit of Microsoft's anticompetitive conduct, finding,'neither the evidentiary record from the liability phase, nor the record in this portion of the proceeding, establishes that the present success of IE is attributable entirely, or even in predominant part, to Microsoft's illegal conduct.'" *Id.* 1231-32 (quoting district court decision).

Here, we have precisely the opposite situation. Rambus's power over the JEDEC standards is attributable to its conduct. The Commission has already found that "Rambus engaged in exclusionary conduct that significantly contributed to its acquisition of monopoly power" in the relevant markets. Decision 118. Absent its deception, Rambus would not have power over the JEDEC standards.

Principles of economics also support enjoining the enforcement of Rambus's patents. Professor McAfee testified that it is impossible to restore completely the competitive conditions that likely would have prevailed in the absence of Rambus's conduct. McAfee, Tr. 7511-7516. From an economic perspective, a prohibition on enforcement of Rambus's pre-1996 patents against JEDEC-compliant products would not undo all of the harmful effects of Rambus's conduct, but it would restore competitive pricing to the markets in question. McAfee, Tr. 7178-7179, 7518-7522.

Policy considerations further support enjoining enforcement of a patent as a remedy for abuse of standard-setting. The Commission has already explained that standard-setting "potentially yields significant efficiencies," and requires assurances that "other participants will not exploit the process by acting deceptively," but that deceptive conduct "may cause considerable harm to competition" if it reduces the efficiencies gained through standard-setting. Decision 25-26, 33. To fully restore competitive conditions, the Commission's relief must be sufficiently comprehensive to restore confidence in the standard-setting process.

The relief will do so without creating any significant disincentives to procompetitive conduct. The remedy merely replicates the "but for" world, so will not create any cognizable disincentives to innovate. The Commission has acknowledged that deception does not have any efficiency-enhancing attributes (*Unocal*); thus, the remedy will not deter socially beneficial conduct. Finally, patent law already condemns far less egregious conduct, and IP holders in the SSO context must already consider the risk that deception will render their patents unenforceable.

Notably, the major standard-setting umbrella organization stated:

> ANSI agrees with the Dell consent agreement [prohibiting enforcement] to the extent it applies to situations when a participant in the standards development process intentionally and deliberately fails to disclose that his or her organization holds a patent relating to the standard in question in an attempt to gain an unfair competitive advantage.

Testimony of Amy Marasco before the FTC (December 1, 1995). If, contrary to *Dell* and *Unocal*, Rambus is permitted to continue to collect royalties, future companies may take their chances on non-disclosure, expecting to retain all monopoly profits gained during litigation and still benefit later from favorable inferences when a "reasonable" royalty is set (even after its own conduct created the uncertainties that made inferences necessary).

D. Principles of Administrability Favor An Order Enjoining Enforcement of Rambus's Royalties

A non-zero royalty would be difficult to administer. A royalty requires not only setting the royalty rate, but also defining the parameters of the products against which it can be assessed. Administering a rate for controllers integrated into other products (such as microprocessors) will be exceedingly complex and on-going. Although a stand-alone memory controller might cost at most a few dollars, integrated products often cost tens or even hundreds of dollars, yet only a small portion of the value may be attributable to controller functions. Nonetheless, Rambus has demanded royalties based on the selling price of the entire product. The Commission could not administer an effective cap on Rambus's royalty rates unless it also set a method to determine the portion of the value of such integrated products (some not yet developed) against which the royalty rate would apply. Because many such integrated controllers do not have a market price, such determination would be highly regulatory.

The problem is worse with respect to users. Rambus has begun asserting that OEMs are liable for infringement of Rambus's patents, even if they purchase both DRAMs and controllers from licensed manufacturers. The Commission could not effectively cap Rambus's royalties unless it determined how to apply that cap to computers, handheld devices, telephones and automobiles.

With any royalty, "ongoing supervision may be necessary to regulate the price and nonprice terms of the resulting licenses." III Areeda & Hovenkamp, Antitrust Law ¶ 653b, at 99-100 (2002). For example, compensation for patents may be extracted through cross-license or grant-back requirements. The Commission would have to ensure that not just the royalties, but the value of the total compensation, did not exceed the cap. The Commission might also become entwined in any future disputes between Rambus and prospective licensees.

E. The Remedy Should Include DDR2 SDRAM and Future JEDEC Standards

The Commission's remedy should include products that conform to JEDEC's DDR2 SDRAM standard and follow-on standards. Although the Commission found that the evidence failed (albeit narrowly) to support a finding of liability regarding DDR2, the Commission is obligated to fully correct for the effects of Rambus's unlawful conduct regarding SDRAM and DDR SDRAM.

The Commission has the authority to order relief broader than the specific violation if reasonably necessary to restore competition and prevent further harm. *See, e.g., United States v. Paramount Pictures, Inc.,* 334 U.S. 131, 148 (1948) ("uproot all parts of an illegal scheme – the valid as well as the invalid – in order to rid the trade or commerce of all taint"); *United States v. Bausch & Lomb,* 321 U.S. 707, 724 (1944) ("equity has power to eradicate the evils of a condemned scheme by prohibition of the use of admittedly valid parts of an invalid whole."); *New York v. Microsoft,* 224 F. Supp. 2d at 148 (citing "the need to 'undo the various effects of the act'"). Commission orders are not limited to either the specific products or the specific practices involved in the violation. *FTC v. Ruberoid Co.*, 343 U.S. 470, 473 (1952) ("the Commission is not limited to prohibiting the illegal practice in the precise form in which it is found to have existed in the past."); *see also FTC v. Cement Inst.*, 333 U.S. 683, 726 (1948).

Thus, although the Commission did not find a violation with respect to DDR2, it still has the authority to order relief with respect to DDR2 because it bears a "reasonable relation to the