Statement of

APPLE COMPUTER, INC.

Hearing Before the
Committee on Energy and Commerce
Subcommittee on Telecommunications and Finance
United States House of Representatives

on H.R. 531
"Emerging Telecommunications Technologies Act of 1991"

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Introduction.

Mr. Chairman and Members of this subcommittee, I am Isaac R. Nassi, the Director of Research and Technology for Apple Computer's Eastern Region.

I appreciate the opportunity to appear before this subcommittee on H.R. 531. Apple shares your belief that the future of the U.S. telecommunications and information industries is tied to the availability of adequate radio spectrum for new technologies.

Our Purpose in Testifying.

Our primary interest in testifying before you today is to support your initiative to secure adequate radio spectrum for new technologies. Apple recently petitioned the FCC to allocate frequencies for a new wireless personal communications service that is optimized for data communications. We call this new technology "Data-PCS." It will permit low-power, but high-speed, high-capacity digital communications between and among people using personal computers. It will be a new kind of network covering a local radius of perhaps 150 feet. This represents the area where a great deal of learning takes place in classrooms, where business is done, and where people interact with each other in professional settings.

The number of potential benefits from Data-PCS, which could be provided by any make of personal computer, not just Apple's, is limited only by the users' creativity. Data-PCS could, for example, provide communications:

- among a group of people working together on a report;
- among teachers and students in a classroom;
- between a doctor and her file of x-rays; or
- from a scientist to a network "trailhead" that connects him to a national data network.

As we become increasingly dependent on the contribution of service industries to our national economic well-being, it becomes all the more important to increase the efficiency of those industries, by increasing their ease of access to information. Likewise, the advantages of Data-PCS to education, which has long been a prime concern of Apple, are profound. As teachers move students among reading, math, and writing groups, for example, Data-PCS will eliminate the need for hard-wiring among computers, eliminating that expense in both time and funds. The possibility of free networking configurations will enable the kind of spontaneous interaction that is the hallmark of learning.

Apple's Petition to the FCC seeks an allocation of 40 MHz -- between 1850 MHz and 1990 MHz -- for this new technology. As conceived by Apple, a Data-PCS radio service would:

- be accessible to users of personal computers without imposition of licensing obligations, network connection fees, or air-time charges;
- be open to any computer manufacturer's products and any network access and usage scheme that complies with the regulatory requirements;
- be regulated in a manner that assures non-discriminatory access to assigned frequencies by compatible devices for like purposes; and
- have flexibility built into the initial regulatory scheme to encourage innovation in and the evolution of Data-PCS technologies and services.

We believe that others in our industry, as well as a wide variety of private and public sector groups will support our Petition.

Although the need to find spectrum for Data-PCS is too urgent for the timetable established for reallocation of the frequencies covered by H.R. 531, Data-PCS is a good case in point supporting swift enactment of H.R.531. It well embodies the goals to be served by H.R. 531's

"relative worth" analysis which points decision-makers in the direction of:

- devoting frequencies to new, spectrum-dependent technologies that would not exist but for those frequencies;
- making frequencies available for technologies that will increase the productivity and efficiency of the United States' public and private sectors; and
- using our spectrum resources in a manner that will foster U.S. competitiveness in the worldwide marketplace.

Comments on H.R. 531,
"The Emerging Telecommunications Technology Act of 1991."

Innovation.

H.R. 531 would require government spectrum managers to determine whether a particular spectrum use promotes "the development and use of new communications technologies." Data-PCS is a new communications technology. It is born of converging developments in the personal computer world:

1. the increasing portability of personal computers. Lap-top and smaller personal computers are now the fastest growing segment of the market; most observers predict a growth rate of 40 to 60% per year for portable computers until they represent at least one-third of U.S. personal computer sales by 1993. I might add that this market segment is now dominated by our Japanese competitors;

2. the rapid growth of networked PC's. More than 70 percent of Macintosh computers, for example, are connected to communications networks. This value-added feature is rapidly becoming the reason that people use PC's; and

3. the vastly increased requirement for higher speeds and greater bandwidth, not only to move more information over digital communications networks, but also to

move qualitatively-different kinds of information -- particularly images and, soon, moving images.

To exploit these converging developments, the communications, or network, capability of the PC must become just as portable as the PC itself and just as mobile as the people using PC's. This need did not exist five years ago. Five years from now, the new Data-PCS technology to serve this need will be as ubiquitous and as indispensable as the personal computer is today.

Lack of Alternatives.

Combined with the "new technologies"test, H.R. 531 must impose a "but for" test — that is, but for use of the radio spectrum, would this technology be possible: are there alternate means — particularly non-spectrum dependent means — to provide the same service; and are there alternative frequency allocations, already made, that can be used for this service?

Given the requirement for portability and mobility of the communications networks that must serve laptop and notebook-sized PC's, Apple concluded that wired and infrared local area networks were not feasible and that Data-PCS requires a new frequency allocation.

There are at the present time no regulatory-permitted technologies and no radio services that can be used to create the shared electronic space necessary for collaborative computing. No existing technology or service — whether cellular telephone networks, SMR-based mobile data networks, or the newly-proposed voice personal communications services — can assure consistent, high-quality, high-capacity Data-PCS in a spectrum-efficient manner.

We also have looked at frequencies that are already allocated to see if they could be adapted to Data-PCS use. Such frequencies in the 18 GHz and higher range do not provide the coverage,

range or mobile connectivity necessary to make Data-PCS effective. Similarly, the already allocated Industrial, Scientific, and Medical ("ISM") radio bands are inadequate for Data-PCS. The ISM bands do not work for digital data transmission because of the strong likelihood of unpredictable, and essentially uncontrollable, interference from a wide variety of radio devices that are permitted in the ISM bands. These devices are more powerful than Data-PCS transmitters would be and have operating characteristics and bandwidth needs vastly different from and incompatible with those of Data-PCS.

International Competitiveness.

H.R. 531 makes the finding that the availability of frequencies for certain uses affects the international competitiveness of the U.S. economy and requires the consideration of "the activities of foreign governments in making spectrum available for experimentation on commercial components in order to support their domestic manufacturers of equipment." This is a key criterion for Data-PCS as well.

Information and communications technology has long been the United States' competitive edge in world markets. Worldwide, the personal computer industry still has a strongly American flavor. In a report released last week by the Electronic Industries Association, the U.S. trade deficit in electronic products was reported to have been cut in half in 1990, with much of the improvement coming from sales abroad of U.S. computers.

However, this U.S. leadership is being challenged by foreign countries, notably Japan, and particularly in the fast-growing portable computer market segment. Since Data-PCS is a next requisite step in the evolution of personal computers, the U.S. computer industry must be the first to develop this new technology in order to hold on to its world leadership position.

To do so, the U.S. must be the first country to devote an adequate number of frequencies to Data-PCS and to use our influence in world radio allocation forums -- such as the upcoming WARC-92 conference -- to assure that other nations allocate compatible frequencies bands for this purpose. If we can accomplish this, we will have a lot to say about the software, protocols, and standards for the communications capabilities of personal computers. Unlike the case with too many new technologies, the United States can set the de facto worldwide standard for Data-PCS, but only if we act now.

Auctions/User Fees.

Apple is encouraged by the focus on the spectrum needs of new technologies that is contained is the recent NTIA Spectrum Report and the soon-to-be-introduced Administration spectrum bill. We have reviewed the principal recommendations of the NTIA report and have seen the press reports of the Administration's bill. We believe that the improvements in federal spectrum management that will result when the recommendations of the Report are adopted, and the increased coordination of spectrum planning between the FCC and NTIA, will lead to more efficient spectrum use generally and will ease the way for a varied array of new technologies that otherwise would not come to pass without the additional frequencies that will be freed by the combined efforts of the FCC and NTIA. Apple particularly endorses the accelerated schedule for reallocation of 30 MHz of federal frequencies, which has been reported as a feature of the Administration's spectrum bill.

The public debate engendered by H.R. 531, the NTIA report, and the Administration bill also has focussed attention on mechanisms for selling, leasing or taxing the use of the radio spectrum in order to raise revenues for the federal government and to substitute marketplace incentives for regulation as a means to assure more efficient spectrum usage. The Administration and the FCC,

for example, have gone on record as supporting spectrum auctions as such a mechanism for frequency assignments or licensing.

Apple believes that marketplace mechanisms, including competitive bidding, in certain circumstances, should be authorized as one of the FCC's and NTIA's spectrum management tools. Apple, moreover, does not have any quarrel with the government's deriving more revenues from the use of the spectrum allocated for Data-PCS and we certainly want to assure the highest level of efficiency in the use of Data-PCS. Our proposal to the FCC stresses spectrum efficiency as one of the principal objectives of creating a digital, packet radio transmission medium for local area wireless communications. Even without requiring radio licenses for individual users of Data-PCS equipped PC's and even without licensing Data-PCS "carriers" or "network operators," fees could be collected from Data-PCS users much as software license fees are collected. That is, computer manufacturers and vendors could collect spectrum license fees from users and pass them on to the Treasury.

A spectrum auction, however, should not be used to allocate spectrum for Data-PCS and cannot be used as a licensing tool, since Data-PCS should be an unlicensed radio service. One must distinguish between auctions as a spectrum allocations tool and auctions as a frequency assignment or licensing tool. As a spectrum allocations tool, the auction would be used to determine which one of a number of different activities would have access to spectrum: computer communications, broadcasting, mobile satellites, etc. As a frequency licensing tool, auctions could be used, once the broad allocation of spectrum to the activity was made, to determine which computer manufacturer, which broadcaster, which satellite operator receives a license for the frequencies.

In neither instance would auctions be compatible with Data-PCS. Data-PCS will work only as an open resource -- open to any manufacturer and any user -- which no service provider or

network operator controls. If frequencies were allocated by auction, a computer manufacturer who had submitted a winning bid could control access to Data-PCS frequencies for the future — possibly excluding other manufacturers who might develop innovative technologies — better "mousetraps. Our hypothetical winning bidder might also seek to recoup his expenditures in the auction through excessive and unregulated user fees. With respect to frequency assignments, auctions are, in many instances, a valid spectrum management tool that emphasizes use of marketplace incentives to foster efficient spectrum use. Given the very nature of Data-PCS, this tool is not needed to assure efficient spectrum use. Moreover, there will not be individual licensing of Data-PCS frequencies. It is essential to the success of Data-PCS that individual users have free and unconstrained access to the allocated frequencies to meet their communications needs without a licensing delays, without service or airtime charges, and without having to bid against other users for the privilege of becoming more productive and efficient, using Data-PCS.

Conclusion.

As Chairman Markey noted upon the introduction of H.R. 531, this legislation would reallocate additional radio spectrum "to ensure that the United States fully invests in its technological future," providing economic growth and world leadership in this area. Apple and others in the computer industry strongly support that goal -- it is also our goal in proposing an adequate frequency allocation for Data-PCS. But, Mr. Chairman, time is of the essence. WARC-92, emerging computer technologies, offshore competition and user requirements will not wait. We must speed up the process of identifying the frequencies to be reallocated from the federal government. We must speed up the process of allocating and assigning those frequencies once they are under the aegis of the FCC. In this worthy effort, you, the Administration, NTIA, and the FCC have Apple's pledge of assistance. Thank you.