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Barriers Encountered By U.S. Exporters of Telecommunications Equipment

Terrance N. Troy

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Office of the Associate Director for Industry and Standards
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Gaithersburg, MD 20899

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U.S. DEPARTMENT OF COMMERCE, Clarence J. Brown, *Acting Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

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BARRIERS ENCOUNTERED BY

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TELECOMMUNICATIONS EQUIPMENT

Abstract

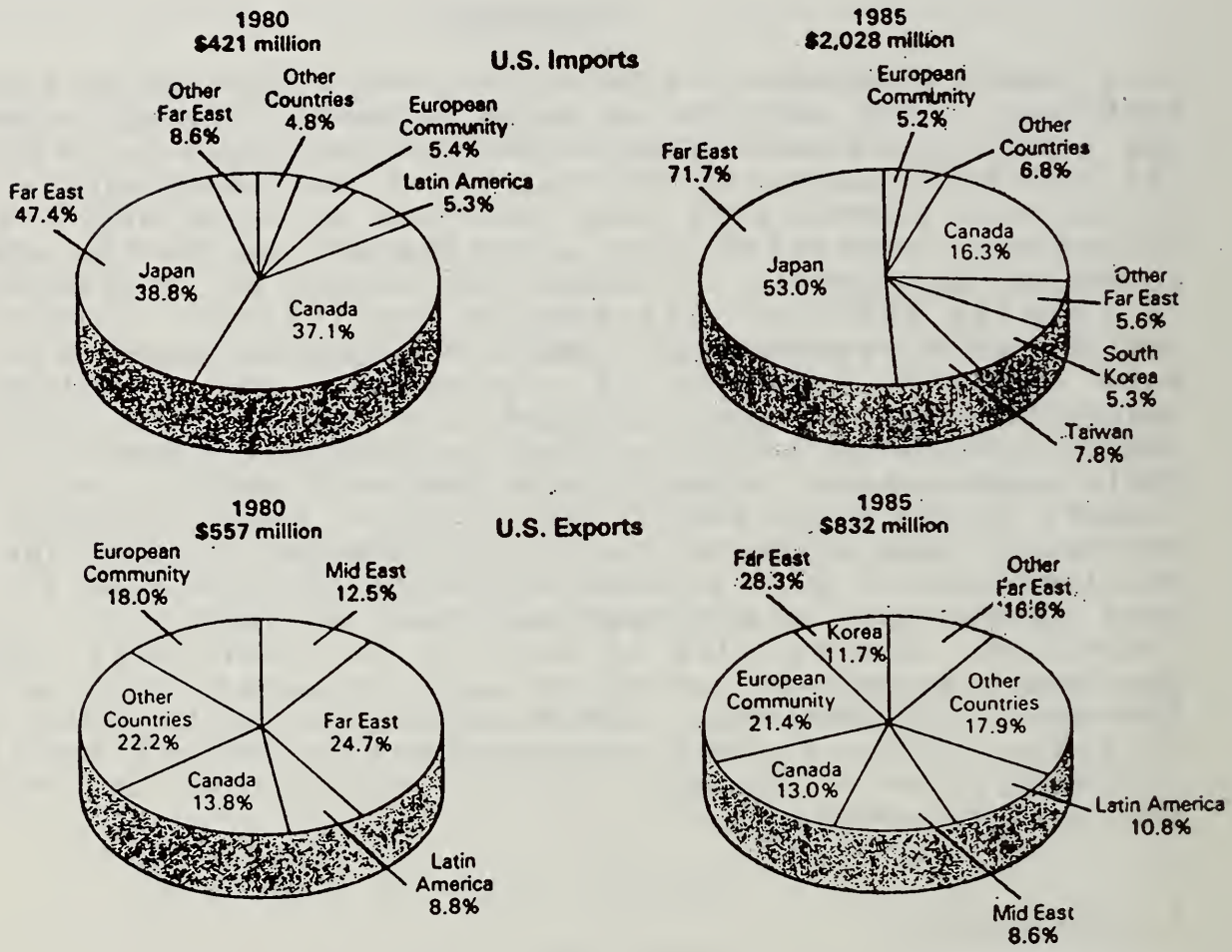
This report addresses the perceived institution of unreasonable technical trade barriers by major European trading partners to the export of telecom products and systems by U.S. companies. The DOC GATT technical office, which has responsibilities to assist U.S. exporters to take advantage of trade opportunities, informally contacted over a period of six months, telecom companies and agencies to assess the extent of unreasonableness in foreign national standards, regulations, testing and certification requirements, and accreditation procedures. In each country, examples of requirements and practices were identified that allegedly blocked U.S. exports and other non-domestic products. Promises from our trading partners to revise their systems have yielded little, and each country continues to support unique requirements and practices that constitute trade barriers. Many trade barriers instituted by EC countries would be eliminated if EC regional and international telecom standards were harmonized, their adoption made mandatory for all EC countries, and results of testing for conformity from one government accredited laboratory were required to be accepted throughout the Community. Consequently, the United States should consider as an option supporting the development and implementation of European regional requirements and practices that promote uniformity.

1. Introduction

1.1 Background

The U.S. trade deficit is large and growing in many product areas, including telecom equipment, even though U.S. companies still have state-of-the-art technological advantages for many telecom products. The U.S. telecom trade deficit ($1.7 billion for all telecom companies for 1986) is increasing, especially at the expense of medium-sized U.S. telecom companies. With most major trading partners, expected new sales and increases in business to existing customers have been disappointing. Figure 1 shows changes in U.S. imports and exports between 1980 and 1985.

Figure 1: U.S. Telephone and Telegraph Equipment Trade



Source: Bureau of the Census and International Trade Administration

U.S. exporters are excluded from European markets by Post, Telegraph and Telephone (PTT) Administrations that control foreign government purchasing practices and institute technical barriers to trade related to standards and certification. (PTTs are usually centralized government monopolies, but in this report PTT refers to any government owned, government controlled, or recently-privatized telecommunications-related agency.)

U.S. trade officials have been promised "open markets" by our trading partners for many years, but the actual sales to our trading partners has fallen short of expectations. Moreover, foreign firms have made inroads into the open telecom market in the United States, which is committed to "fair trade" and the implementation of international agreements. The U.S. open system is seen by many U.S. fair trade interests as a one-way influx of products that has resulted in many undesirable consequences, such as lost jobs for U.S. workers.

Table 1 compares total exports of telecom equipment to all other countries by the 12 leading exporting nations in 1980 and 1985 and indicates the annual growth rate between 1980 and 1985 for each country. The U.S. position is the next to the lowest in growth for the five-year period.

The General Agreement on Tariffs and Trade (GATT), an international agreement to promote trade, does not currently cover government procurement of telecom equipment, including purchases by or through a PTT. The existing Procurement Code does not include telecommunications, but PTTs can voluntarily comply with the spirit of GATT.

The Agreement on Technical Barriers to Trade (also known as the Standards Code) was developed under the auspices of the GATT to eliminate or reduce technical barriers imposed by signatories and to provide mechanisms for remedies. Hence, GATT does cover requirements and practices that might be used as barriers to trade in sales of telecom equipment to private customers, but PTTs maintain control over technical requirements and practices.

U.S. telecom companies do not have a specific Federal agency to contact for assistance, nor is one agency coordinating their trade problems. Some of the prominent U.S. government agencies that assist telecom exporters are: the U.S. State Department, the Federal Communications Commission (FCC), the Office of the U.S. Trade Representative (USTR), and the International Trade Administration (ITA) and the National Telecommunications and Information Administration (NTIA) of the Department of Commerce (DOC). The DOC has a GATT technical office to provide assistance as feasible on technically-based standards-related issues to U.S.

Table 1: Exports of Twelve Leading Countries

Country	1980 ($ millions)	1985 ($ millions)	Annual Growth Rate
Japan	602	2148	29.0
Sweden	445	946	16.3
Federal Republic of Germany	635	876	6.6
United States	557	832	8.4
Canada	211	600	23.2
France	179	486[1]	28.4[2]
Belgium/Luxembourg	222	461	15.7
United Kingdom	140	348	20.0
Taiwan	32[3]	297	45.0[4]
Hong Kong	14	206	71.2
South Korea	25	196	51.0
Italy	72	187	21.0

*Source: "U.S. Industrial Outlook 1987," -- Telephone Equipment

[1]Figure for 1984
[2]Rate for 1980-84
[3]Figure for 1979
[4]Rate for 1979-85

exporters of non-agriculture products. Technical office activities can be focused to assist exporters and to make recommendations to other agencies.

The technical office has received indications of the existence of barriers from a variety of sources, but telecom exporters have not notified the U.S. government of technically-based export problems. In particular, documented problems have not been reported to the technical office (located at the National Bureau of Standards (NBS) within the Office of Standards Code and Information). Consequently, U.S. government trade officials have limited information on the extent to which U.S. telecom exporters face unreasonable requirements and practices instituted by our trading partners, whether foreign practices are unreasonable, and why there is a reluctance to provide documented evidence.

Few telecom exporters have sought government assistance* in removing alleged technical barriers that impede trade. Exporters that do call the technical office often request only basic information, such as the names and addresses of agencies that can provide information on foreign technical requirements and practices. Primary foreign trading partners have promised cooperation and have agreed to assist individual U.S. exporters, but their performance to date has been disappointing to telecom industry officials.

> The DOC GATT technical office is authorized under Section 412.2 (k) (i) of the Statement of Administrative Actions for the Trade Agreements Act of 1979 to assist U.S. exporters to take full advantage of the opportunities provided by the Standards Code and to disseminate information on the benefits and opportunities of the Standards Code for the United States, including, new possibilities for U.S. Government agencies to pursue complaints about foreign standards-related activities.

In the belief that exporters and would-be exporters may be faced with problems unreported and that expanding export opportunities would be worthwhile, this study was initiated to identify options for effective solutions that could be generally applied. To learn about the situation, U.S. telecom companies currently offering new products at trade shows were arbitrarily selected for generalized telephone discussions without any statistical

* For more information, exporters should contact the Office of Standards Code and Information, A629 Administration Building, National Bureau of Standards, Gaithersburg, MD 20899, or phone 301-975-4039.

sampling techniques applied. Medium-sized companies (that indicated a probable range of $20 million to $200 million in sales) were selected for most interviews because trade officials often suggest that they might represent the most significant problem sector. Several companies known to the GATT technical office were added to the list.

The following goals were established for this initial study:

Seek data and information concerning unreasonable requirements and practices imposed by our trading partners;

Determine what has been done by the government and private sector to help U.S. exporters;

Suggest options to address problems as identified.

1.2 Objective and Approach

The objective of this study was to determine the extent of evidence of unreasonableness for requirements (such as technical regulations and purchasing specifications) and for practices (such as testing and approval procedures) that are imposed by foreign trading partners on the importation of U.S. telecom equipment.

The objective of this study was discussed with 25 government and private sector organizations in an effort to identify relevant experiences with telecom exporters. The author then contacted 50 telecom companies to discuss their exporting activities and to identify homologation (all of the steps necessary to get a product into a country, tested, approved and available for sale) difficulties for a variety of products and countries. On the basis of these discussions, six products were identified for further investigation. Concomitantly, four Western European countries and eight problems were selected for this study.

The eight export problems for U.S. companies, as they are associated with the six telecom products, are listed in Table 2 for four European trading partners. Selected requirements and practices for those Western European countries were then compared with those in the United States.

2. General Findings

2.1 Results from Contacts

Government agencies and private sector organizations cited several examples of attitudes and concerns of U.S. telecom companies with trade difficulties related to foreign requirements

Table 2: Selected Problems

COUNTRIES / PRODUCTS	France	Federal Republic of Germany	Italy	United Kingdom
1. Modems	Incompatible Standards	Approval Practices		
2. Multiplexers				Homologation Procedures
3. Private Branch Exchanges			Approval Practices	
4. Switches			Closed Market	
5. Local Area Networks		Testing Procedures		Interconnection Standards
6. Fiber Optics	Closed Procurement			

and practices. The following four examples are illustrative of specific concerns:

One company was satisfied with the slow progress being made.

A second company was determined to develop a program with its own resources to obtain access to every important foreign market.

A third did not want anything in print, especially the name of the company.

A fourth, a small company, had an exporting problem with a product with allegedly superior technology and lower cost. A foreign official indicated that the company would not be able to sell that product at that time in that country, but provided no specific reasons.

Lists of telecom companies with successful or innovative manufactured products were developed for further contacts. It was not difficult to identify telecom companies that export, would like to export, or which had taken steps to export without success. Getting them to examine their problems in any detail (by informal phone discussions), however, required patient probing. After technical office staff gained an understanding of those problems, many exporters voluntarily identified barriers they had encountered. Discussions were non-directed, for the most part, although exporters were encouraged to discuss foreign requirements and practices that might provide some evidence of unreasonableness.

Most exporters expect that progress in getting into new markets or removing technical barriers will be slow because the telecom industry has been a closed state monopoly in almost all countries and PTTs are not eager to change.

Individual U.S. exporters often indicated that a concerted effort by U.S. agencies (as listed on page 6) was needed to get each country into a market-opening, deregulatory mood through official discussions and negotiations. Moreover, U.S. exporters indicated that, even where high level foreign officials stated a willingness to provide access to U.S. telecom companies, their PTTs still maintained political and administrative bottlenecks to restrict the importation of telecom equipment, including equipment purchased by or for private sector use.

Some company officials would, or could, only discuss their problems with unreasonable requirements and practices in a general sense. Faced with a difficult situation, U.S. exporters were reluctant to disclose details of their problems because publicizing them might cause the loss of the current and possibly future trade opportunities. All were reluctant to "put their

company's name on the line" in a confrontation with prospective customers. What appears to them to make sense is to keep "pounding away" with marketing and technical staff until sales are consummated.

Where a company knew of a violation of the Standards Code, it made no sense to them to seek bilateral negotiations that might eventually benefit their competitors. Bilateral negotiations or consultations for settling disputes or resolving conflicts are set forth in GATT Articles XXII and XXIII. Article 14 of the Standards Code states that:

> (If) any party considers that any benefit accruing to it...is being nullified or impaired...(the other) party shall give sympathetic consideration to the representations or proposals made to it, with a view to reaching a satisfactory resolution of the matter.

Generally, where sales were consummated, the difficulties encountered were resolved with assistance from foreign agencies, such as distributors, who indicated which models could be sold and what modifications (to meet unique national specifications) were necessary. The details of the requirements and practices are well known to foreign agents, but not to most U.S. exporters even though they research those markets. U.S. telecom company officials generally depended on such foreign contacts, rather than on the U.S. government, to solve or "to get around" their problems. As difficulties were resolved, U.S. exporters were reluctant to share, industry-wide, knowledge gained in getting their equipment homologated for fear that explanations of such experiences might benefit their competitors, both U.S. and foreign.

During the seven years that the Standards Code has been in effect, foreign countries have learned how to avoid conspicuous violations. Foreign governments simply do not permit government use of, or private importation of, certain products. PTTs block government telecom purchases; or they slow down homologation to block private purchases until their domestic companies achieve competitiveness.

For the most part, the U.S. telecom industry's perceptions of unreasonableness for the requirements of the four countries studied are derived from the contrast between the open, liberal U.S. system and the views of foreign officials that their requirements are justified in the name of public safety, consumer protection, and equipment quality. In the United States, those concerns are generally left to voluntary standards and the market place.

In the United States, design standards and performance requirements for quality (a major source of problems for U.S. exporters in France, the Federal Republic of Germany (FRG), Italy and the United Kingdom (U.K.)) are usually made a part of contractual agreements between suppliers and users who purchase the equipment.

Perceptions of unreasonable practices formed by telecom company officials focused primarily on foreign organizations that keep markets closed by controlling telecom purchases through government monopolies and on bureaucratic "red tape" that slows down or blocks the process for granting approvals. U.S. government agencies and private sector organizations have been working to open markets and some progress is being made, albeit slowly.

Even if international standards and International Telecommunications Union (ITU) recommendations are followed, foreign countries have been able to establish interpretations or implement options that act as trade barriers. Testing and certification practices in the United States, unlike those of our major trading partners, are well defined, relatively inexpensive and generally conducted expeditiously. In some cases where their products were blocked, U.S. company officials could not learn the technical details of the problems. None of the U.S. exporters who were interviewed seemed able to suggest what medium-sized companies, acting alone, could do to resolve these problems.

Most U.S.-based large multinational telecom companies continue to maintain their share of the market. Hence, the consequences of lost trade opportunities are being shouldered by medium-sized companies, particularly those whose facilities are located only in the United States. They see their technological advantages and potential foreign market opportunities decreasing as U.S. government agencies and private sector organizations continue to go their separate ways in attempting to remove technical trade barriers to the export of U.S. telecom equipment. They conjecture that the lack of centralized coordination, which often contributes to poor U.S. competitiveness, may be a characteristic fault of the U.S. system.

U.S. telecom exporters were aware that they were competing against the collaborative technological efforts of foreign companies in other countries. Medium-sized companies, acting alone, can do little to resolve such problems other than to turn their products and technology over to foreign agents in exchange for short-term sales. Promises from our trading partners to revise their systems have yielded little, and each country continues to support unique requirements and practices that constitute most trade barriers.

2.2 Overall Thrust of Contacts

The data provided some information and evidence that the requirements and practices of our primary European trading partners impede the sale of, and often exclude, U.S. telecom equipment. PTTs appear to be the focus of trade barriers.

Most U.S. telecom manufacturing companies do not feel that the GATT offers any protection or that they could successfully challenge a foreign standard or regulation as "unreasonable." There are unfair government procurement practices for telecom products that adversely affect U.S. exports, but such procurements are specifically excluded from the present codes.

The aggregate of foreign requirements and practices are tantamount to a system that does not seem fair to U.S. telecom companies. Medium-sized companies, which usually act independently, have little chance of getting through such barriers or of holding on to markets they have developed. Free trade in telecom products, as exists in the United States, does not exist in European Community (EC) countries.

> "Free trade" is a theoretical concept that assumes international trade unhampered by governmental measures, such as technical barriers, that control markets. The objective of trade liberalization with U.S. trading partners is to achieve "freer trade," it being generally recognized that some restrictions on trade, particularly in the telecom area, are likely to remain in effect for the foreseeable future.

Many U.S. telecom companies complain about the length of time (often years) it takes to break into a new foreign market. U.S. trading partners keep markets closed as long as possible to protect their own manufacturers. Some countries keep entire market segments closed because of purported "system differences." U.S. exporters with innovative products often are delayed from entering markets because foreign governments, as they are legally entitled to do, refuse to let products in until they complete the development of appropriate national standards or regulations.

In some cases, U.S. manufacturers followed one set of options permitted by international standards; whereas foreign countries required other options (also permitted by those international standards) that acted as trade barriers. The U.S. exporters who were interviewed seemed unsure of what they could do to resolve these problems.

Foreign distributors (within trading partner countries) are frequently in control of telecom markets because they are experienced at getting equipment approved. They are in position to take over the business if a mass market develops. U.S. firms often express fear that they will lose markets when domestic

firms are able to duplicate well-established U.S. technology. In some EC countries, U.S. exporters sell through wholly-owned subsidiaries and are therefore better able to retain their customers.

Multinational firms often help medium-sized companies to sell products by acting as their "distributor." For example, where system elements are unnecessarily tied to outdated technology in some countries, PTTs can create an excuse to block U.S. sales. Multinational companies with knowledge of the foreign system often know how to get compatible products approved.

Where U.S. products meet current needs, foreign agencies, in control of the customer base, are positioned to replace U.S. products with domestic ones. Consequently, there is an erosion of U.S. telecom equipment advantages. Not only are few new markets expected, but exporters believe that marginal markets for many products will disappear in a few years. Foreign government agencies and distributors (who appear to be affiliated closely with each other) control access to the approval procedures that must be complied with in order to market telecom products in their countries. Hence, U.S. telecom companies must contend with complex arrangements to make sales. Moreover, these foreign agents assist in transferring U.S. technology to domestic products, which are expected to become competitive with approved U.S. products.

Problems of individual exporters may be the "tip of the iceberg." U.S. exporters think that the market for small private branch exchanges (PBXs) in Europe, and in the United States as well, will be taken over by Japan; some believe that the world fiber optic market will be lost to EC countries and Japan. Many U.S. companies are not optimistic that telecom trade deficits can be reduced under current conditions. Consequently, some non-governmental telecom agencies and exporters suggest that the only solution is to ban foreign imports of telecom equipment from selected countries. Most agree that manipulation of U.S. requirements and practices holds no promise. Where U.S. industry has invested in improving technology, the U.S. government could seek to maintain the market position of U.S. firms.

Unnecessary procedural steps in the certification process for modems, multiplexers, PBXs and other customer premises equipment should not be imposed as a means for creating delays by any trading partners. If a trading partner does institute unreasonable delays, consideration of FCC retaliation against the problem country, or other U.S. government import controls on similar products, may be evaluated as an option for restoring export trade.

> Retaliation is an action taken by a country to restrain its imports from a country that has increased a tariff or imposed

other measures that adversely affect its exports in a manner inconsistent with GATT. The GATT, in certain circumstances, permits such reprisals, although this has very rarely been considered. The value of trade affected by such retaliatory measures should, in theory, approximately equal the value affected by the initial import restriction.

The U.S. government and private sector organizations are making an effort to develop a strategy to get U.S. telecom products into foreign countries. Several companies suggest that information, collected on a country-by-country, product-by-product basis, should be distributed to all telecom companies and testing laboratories. (Some of the needed information is currently available within the DOC GATT technical office.) In the opinion of some companies, unreasonable foreign trade barriers should be met by swift U.S. government retaliatory trade action. Others suggest that every possible opportunity for cooperation with our trading partners should be explored first.

Table 3 summarizes typical exporter comments on major problems that relate to requirements and practices. Many of the problems were similar for most products and countries: organizations that kept markets closed, requirements with a unique twist, practices or procedures that were usually costly and time consuming.

3. Comments or Responses by Companies for Five Products

Discussions held with 50 telecom companies concerned problems associated with the export of approximately 20 different telecom products. Salient problems, such as unique standards and the lack of transparency in standards development activities, applied to several products in more than one country.

> Transparency, under the GATT Standards Code, is the visibility and clarity of regulations and standards and the associated development activities. The lack of transparency is, itself, a technical barrier that impedes trade.

All contacted U.S. exporters had marketing experiences where they had clear technological advantages for some blocked products. Additionally, many products required costly modifications to meet foreign national specifications, e.g., "quality" features had to be added that were not desired by the customer and not needed for the network, in order to comply with the mandatory requirements of the importing countries.

Companies acting independently in foreign markets often seemed unsure of what was required by each country. Some believed that they must have domestic legal representation and/or a local technical presence to assure 24 hour service. One exporter thought that if foreign regulations were violated by a U.S.

Table 3: Typical Comments From Telecom Companies

	Requirements	Practices
Blocked Market	Buy-national policy PTT monopoly on products Government controlled system No national standards	No tests for conformance No competitive product
Protected Manufacturers	Local manufacturing required Limit number of suppliers PTT prefers domestic products	Block attachment to network Competitors issue approvals
Information Unavailable	Contact agency is unknown Development not transparent Modifications not documented	Approvals by trial & error
Unique Elements	Restrict regional standard Unique purchasing specs Int'l standards options	Test to extreme limits
Excessive Time	Wait on standards development	Approvals take many months Retesting for all elements
Excessive Cost	24 hour technical service Equipment modifications	No reciprocal type approval Additional tests Installation/maintenance fees
Foreign Control	Domestic legal representative	Distributors control customers Distributors get approvals

(investigated) by foreign approval authorities for years. It is not clear if those fears are justified. However, U.S. exporters might well fear harassment or reprisals if they were to charge that the GATT Code had been violated by a signatory nation. This may explain why companies are reluctant to complain about their export problems.

The products listed in Table 2 (because of relevant differences noted below, switches and PBXs are sometimes treated separately) that were causing U.S. exporters problems with more than one primary trading partner were selected for in-depth study. In Sections 3.1 through 3.5, problems associated with exporting modems, multiplexers, switching equipment (large switches and PBXs, which are small switches, are treated together), local area networks, and fiber optic systems are described.

3.1 Modems

3.1.1 Definition: Modems are devices that enable computers, data terminals and word processors to "talk" through telephone lines, converting digital signals at one end to analog tones for transmission across the phone line and back to digital signals at the other end. To permit data transmission, the modems at both ends of a line must use the same modulation/demodulation technique and must operate at the same speed. Dial-up modems allow users to access a variety of resources using public telephone lines.

3.1.2 Closed Market: Some foreign countries (e.g., France and the FRG) have kept markets closed to protect their own modem manufacturers. One company complained that France, behind technologically, has maintained protectionism (the deliberate use or encouragement of restrictions on imports to enable relatively inefficient domestic producers to compete successfully with foreign producers) for French modem manufacturers "to the bitter end." A useful strategy suggested by one U.S. export trading company is to judiciously avoid trying to sell those models that compete with domestic products in countries that are protecting their domestic companies. (Typically, each company circumvents the trade barrier if possible; but taken together, U.S. exporters are acquiescing to protectionism.)

Countries can use the absence of, or incompleteness of, national standards or regulations, which innovative U.S. products would have to comply with, to keep markets closed. Hence, U.S. exporters cannot enter those markets because all products must conform to some standards. Often there are no test methods to check products for conformance. U.S. exporters must hold back their products until standards writers in those countries complete development of new standards and test methods.

Regional standards offer hope for opening markets, but U.S. exporters predict that full reciprocity (which will presumably also benefit non-EC countries) through European regional standards, under development within the European Conference for Posts and Telecommunications (CEPT), is four to five years away. Present European regional telecom standards allow individual countries to make further restrictions.

3.1.3 Technical requirements: Design requirements and the lack of uniformity among European standards for minor specifications generally create the need for a different product for each European country. Even seemingly trivial requirements can act as trade barriers. Two adjacent European countries, France and the FRG, have different modem requirements for different phone shapes.

France is adopting the requirements recommended by the International Telecommunications Union for modems (CCITT V.22, V.23, etc). (CCITT is the International Telegraph and Telephone Consultative Committee of the International Telecommunications Union, a specialized United Nations agency.) These requirements are not compatible with U.S. standards. The French PTT adds modem specifications for automatic dialback, power levels, and frequencies that differ from U.S. industry standards (a characteristic dilemma between most countries).

Moreover, the French PTT is adding other requirements that are not contained in the international standards, such as specifications purportedly for personal safety. (The GATT Standards Code, Article 2.1, states that "Parties shall ensure that technical regulations and standards are not prepared, adopted or applied with a view to creating obstacles to international trade...." However, Article 2.2 states that "...Parties shall use (international standards)...as the basis for the technical regulations or standards except where...such international standards or relevant parts are inappropriate for...such reasons as...protection for human health or safety....")

One exporter complained that the FRG prohibits sales of U.S. equipment to the U.S. Air Force facilities in Europe by not permitting attachment of high-speed modems to the public network, even though the equipment meets the requirements of international standards. The Air Force allegedly does not want to use political leverage to force the issue.

3.1.4 Practices and Procedures: EC countries, unlike some trading partners, do not have a program to accept test results on modems from U.S. testing and inspection bodies designated to conduct testing for specified products made in the United States. Using

the data from U.S. testing laboratories, an exporter can apply for type approval in some non-European countries without the need for on-site inspections, as are often required by the FRG, thus sharply reducing the cost of such approvals in other countries.

Type approvals are required for each country in the EC. U.S. exporters indicate that the FRG is apparently not living up to the EC agreement to make approvals in a reasonable time (the U.S. government has complained to the EC and the FRG, but is waiting for improvement). The FRG will not allow registration until a standard is developed. New standards can take two years for completion. Other EC countries also have imposed requirements resulting in excessive costs and delays in providing type approvals, thus effectively excluding products from the market for extended periods.

One U.S. exporter said that to get certification for U.S. telecom products (or to get around the requirements) in certain countries, foreign original equipment manufacturers must act as agents. In some EC countries, U.S. exporters sell through wholly-owned subsidiaries; otherwise separate foreign technical and legal representatives are required to obtain approvals.

The National Bureau of Standards' National Voluntary Laboratory Accreditation Program (NVLAP) has one program specifically for telecommunications and emissions regulations. In time, this program could be helpful for the export of telecom products. The U.S. has agreements with the U.K. for reciprocal recognition of testing services provided by specifically accredited laboratories, such as Underwriters Laboratories, which has a telecom accreditation program. However, at the time of this report, no exporter had submitted test results from a NVLAP accredited laboratory to U.K. approval officials.

One exporter complained of Italian installation practices which unnecessarily raised product costs. For example, installation of privately supplied modems is under control of a PTT agency which charges maintenance fees even though no maintenance may be necessary. Several exporters complained that in the FRG, until recently, only the PTT could install modems.

3.1.5 Other Trade Problems: When the French government permitted modem sales to be made directly to customers of the French PTT, PTT officials complained that the business, which went to U.S. firms, should have gone to a domestic firm. France, as a party to the GATT Standards Code, is required to ensure that other central government bodies, local government bodies, and non-government bodies comply with the letter and the spirit of the Code. They brought about a successful resolution by not condoning the PTT's attempts to dictate to liberated customers.

U.S. exporters were barred from selling high-speed modems in foreign countries except where they were at least partly made by a domestic company. U.S. exporters, faced with difficult FRG requirements and practices based on outdated, protected FRG product technology, are forced to ship modems through friendly open-market countries which do not have the same barriers to trade with the FRG. These modems are attached to the public network and used extensively, but apparently result in no technical difficulties. Outdated designs and systems can be used as an excuse, whether valid or not, to block U.S. sales.

Another exporter cited the use by the FRG of design standards that set forth details of a telecom interface that have nothing to do with performance or safety. (Interface standards can be as effective as equipment standards if used as technical trade barriers.)

3.2 Multiplexers

3.2.1 Definition: Multiplexers are devices that allow a single communications line to do the work of many lines simultaneously. Digital multiplexing is the process of taking information signals from different sources and transmitting them simultaneously, in digital form, at high speeds over a single line. Some multiplexers have internal microprocessors that enable them to perform error detection, collect statistics on the amount of data passing on each line, and provide diagnostics to speed repairs. Statistical multiplexers can increase the efficiency of line-sharing by allowing only active channels to use the line, and they can accommodate overbooking (i.e., incoming data exceeds capacity for temporary periods) by temporarily storing incoming channel data before sending it over the line.

3.2.2 Closed Market: One exporter of U.S. multiplexers (and several others for other products) complained that local content (domestic manufacturing contribution) evaluation methods are often used to protect foreign manufacturers. These laws make cost bids of U.S. products manufactured totally in the U.S. much higher and tend to keep markets closed.

3.2.3 Technical Requirements: Each EC country has a different set of multiplexer standards, a condition that reduces U.S. chances to manufacture a single product for all of Europe. Apparently there is no common multiplexer standard on the horizon. (Intra-European trade is diminished to a lesser extent.) The standards are varied just enough to constitute a European-wide trade barrier. Each country can give its specifications a unique twist. In the U.K., for example, specifications cover noise and inside coatings that are not required by other European countries

or required by the FCC or even included in voluntary standards issued by Underwriters Laboratory. FRG standards call for an apparently unnecessary and unique two to one compression ratio.

3.2.4 Practices and Procedures: Getting a U.S. multiplexer approved in an EC country may take three months or more. In the FRG, procedures regularly take six months. In the U.K., approvals must be obtained from the PTT; this is true even though the telecom business has been privatized. In other EC countries, exporters must sell multiplexers to or through the PTT. This practice was required even though the product was to be installed within the customer's local area network. The exporter, who had to sell the multiplexer to the PTT, said he was "permitted" to lease it back and install it himself.

2.2.5 Other Trade Problems: In the U.K., sales can be made directly to private companies, but most requests for sales generally come from distributors. U.S. exporters often express the fear that they will lose markets when foreign domestic firms are able to duplicate the technology. One multiplexer manufacturer complained that intellectual property rights (software copyrights) of U.S. companies need better protection because products of a foreign manufacturer openly violate his U.S.-copyrighted software for his computerized telecom equipment. Efforts are being made by the U.S. government to explore use of the GATT as a mechanism for protecting intellectual property rights owned by private firms.

3.3 Switches and PBXs

3.3.1 Definition: The basic function of a circuit switching system is to interconnect two or more users on demand. Traditional switching systems consist of three basic functional building blocks: user services, a switching network, and the control system. A private branch exchange (PBX) provides local switching services for customer premises equipment. The first generation of automatic PBXs (or PABXs) was based on early electro-mechanical switching technology used in telephone central offices. The advent of analog electronic switching with intelligent internal control produced second generation equipment. The digital technology that has evolved in central office switching has also found its way into PBXs.

Switches and PBXs are similar in function, but they are regulated (and purchased) on different bases. Switches are part of the public network, coming under heavy government regulation, and usually purchased by PTTs under government monopolies. PBXs are customer premises equipment. PBXs can usually be sold directly to private customers, consequently they should move more freely in foreign commerce.

3.3.2 Closed Market: Exporters complain of the length of time it takes to break into a new foreign market. U.S. Department of Commerce officials said that Japan took 10 years before permitting the sale of switches made in the United States to its PTT. One exporter, for over two years, was consistently told by Italian and other European PTT officials that "the market for his products was not favorable" so that he would not attempt to make any sales.

One exporter made contacts in the U.K., requesting information on standards and regulations applicable to central office switching, but never received a reply. Another exporter was told by a U.K. official that the market would remain closed to his sales efforts even though his product was designed to enhance and extend the life of existing systems. In Italy, U.S. companies have to prove to government officials that they have a product that is superior in performance, or else comparable but much lower in cost, before their products can enter the protected market.

3.3.3 Technical Requirements: Each European country develops unique purchasing specifications for switching equipment. Exporters complain that, unlike those of the United States, foreign standards for switches and PBXs are generally neither clear nor specific. This gives foreign companies that have experience with PTT requirements a clear advantage when selling at home and an equal chance when selling in the United States. Moreover, amendments are made over time with no consolidation of changes. U.S. exporters think that some requirements are totally unnecessary, such as providing a digital access point to determine attenuation in order to comply with FRG standards. Efforts by U.S. government officials, who have verified this scenario, to use legal and persuasive mechanisms to resolve this difficulty have not been successful.

U.S. exporters are unable to comply with some international standards because of the cost of implementing all the options that foreign officials capriciously select. The international signaling standard (CCITT Fascicle VI.7 Specifications, for signalling system no. 7, Recommendation Q.701 through Q.714) differs from corresponding U.S. signaling standards. (CCITT X.1 Recommendation, for signaling speeds, is consistent with American National Standards Institute (ANSI) X3.1-76 standards.) ANSI X3.1-76: Synchronous Signaling Rates for Data Transmission provides a group of signaling rates for synchronous binary data transmission. Equipment must be compatible with the international CCITT standard to be sold in Europe. Compliance with both standards can be achieved with the same equipment, but only at a higher cost. (Harmonized standards would reduce barriers on both sides of the Atlantic, and could reduce costs for all manufacturers and probably for consumers as well.)

3.3.4 Practices and Procedures: Italy has two sets of certification procedures for PBXs: conformance to the network requirements and conformance to the electrical safety codes, especially as to the power supply. The Italian PTT approvals cover safety shielding, protection against surges, and accessibility. With a European power supply pre-approved in another EC country, self-certification is usually permitted for that element.

To maintain control of the marketplace, PTTs in the EC do not accept U.S. developed test data for switches or PBXs; a product must be submitted to European testing laboratories for all tests (including retesting although U.S. results provide sufficient means of proving conformity to regional or international telecom standards). Most U.S. firms object to retesting because it is costly and causes unnecessary delays and uncertainties.

Most EC countries take three to nine months to approve U.S. PBXs. Recently, the FRG took two years to certify a PBX. One exporter complained that there is little information about the Italian organizational structure (e.g., which agency provides, and where one should go to apply for, certification). These delays hurt U.S. exporters.

3.3.5 Other Trade Problems: "National security" (under the Standards Code a permissible trade barrier) is often cited as a reason for not relying on a U.S. supplier as a source for central office switches. Sometimes European countries require U.S. products to be modified to meet competition from other, more-favored foreign suppliers rather than to comply with established national standards.

Selling switches in Italy must be done through an Italian subsidiary with Italian directors and, in some cases, through Italian distributors. But even this may not help exporters to sell switches in Italy. Italy already has more than what they consider to be the optimum number of suppliers to sell switches to the PTT. All U.S. exporters recognize that the developed countries have entrenched systems to protect their own suppliers; other countries usually do not manufacture switching equipment.

U.S. exporters cannot sell large switches to lesser developed countries if those countries' funds cannot be used for imported products. There is no right of exchange. Nevertheless, some EC countries have financial programs that make it possible for their exporters to sell to those countries without difficulty. (The U.S. Export-Import Bank has recently completed negotiations with Indonesia for a $100 million line of credit for high technology products.)

U.S. exporters believe that U.S. PBX manufacturers are going to lose the entire world market for small PBXs to "highly

competitive foreign manufactured products," hence there may be no need to attempt to eliminate trade barriers or to stay competitive. Additionally, they believe, the world market for large switches will soon be left to a few multinational companies.

3.4 Local Area Networks

3.4.1 Definition: A local area network (LAN) is a communications system used to interconnect computers, terminals and other peripheral devices within a building or campus. LANs permit work stations to be used for multiple purposes. A LAN may extend for as little as ten feet or, rarely, as far as tens of miles.

Early local area networks were provided by mainframe computer vendors. Data switches and multiplexers were later introduced by communications components suppliers. Ethernet, a de facto U.S. industry standard, is probably the best known LAN standard. When many vendors develop LAN products that are compatible with a major vendor's LAN standard, that standard becomes (in fact) an industry standard despite not being issued by a recognized standards organization.

3.4.2 Closed Market: European market access appears to be a difficult problem for U.S. firms that specialize in local area networks. One telecom company official said that the FRG will not let his agents approach a dealer to determine if his LAN products are marketable. FRG regulations do not permit his LAN devices to be offered for sale; hence, his products are not allowed inside the border. (In most cases, however, such products may be exhibited at trade shows.) Another telecom company said that an FRG PTT official indicated that the market was closed to innovative U.S. products if the particular LAN product was not also available from an FRG manufacturer.

3.4.3 Technical Requirements: U.S. exporters complain that European national regulations affecting LANs are a major trade barrier because it is difficult to determine which requirements apply. Even when requirements can be determined, those exporters sometimes encounter problems with undocumented modifications. Medium-sized exporters, in particular, cannot keep pace with the intricacies of the system.

International requirements may offer no refuge. European standards-writers influence international telecom standards, which extend even to the color of the light-emitting diodes. Another exporter added that signal "beeps" must be of the "correct" EC frequency.

One exporter complained that the U.K. standard is excessively restrictive for any LAN product that could affect the power supply of customer premises equipment. The FRG has more restrictive severity levels for radiated electromagnetic energy than the International Electrotechnical Commission (IEC) standard (IEC 801-3 Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment Part 3: Radiated Electromagnetic Field Requirements First Edition).

FRG standards create major difficulties for U.S. Ethernet LAN equipment and the FRG requirements may be adopted by the EC as a regional standard for all of Europe. The FRG apparently is the only country in Europe that requires extensive LAN tests for safety and emissions. The FRG PTT has strict limitations on cable length (how far LANS can extend), and the PTT has its own LANs for sale.

3.4.4 Practices and Procedures: Some exporters indicate that U.S. LAN devices that are based on new technology not found in products of European countries will not be approved until there are applicable standards to comply with.

U.S. companies find certification of LANs to be a problem in virtually every Western European country. Each analog component can require a type approval with separate approval for each LAN system. Homologation costs for LAN systems installed in the U.K. can run as high as $10,000, with long delays and uncertain results. (The U.S. FCC does not regulate LANS.)

One exporter complained that the time before obsolescence of some LAN products is often shorter than the time consumed in getting approvals. Another exporter indicated that if the country has good standards -- one can eventually get necessary approvals even though there are delays. But not many countries have standards where proof of conformity can be easily shown. As a result, U.S. exporters indicate that foreign distributors are in control because they are successful at getting equipment approved. They are, therefore, in position to substitute domestically made products to take over the business, which they would especially like to do if a mass market develops.

3.4.5 Other Trade Problems: Exporters presume that the U.K. privatized PTT can continue to block sales by requiring LAN devices to be installed in the "telephone room." Exporters are not sure who controls these facilities after the liberalization of the U.K. system and the end to the monopoly of the PTT.

In Italy, an installer of a LAN is required to sell most of the LAN equipment to the PTT then lease it back. In several EC countries, LANs designed by U.S. companies must be competitive with heavily subsidized domestic companies.

One exporter who had worked extensively with potential customers said he gave up his prospective customers because he had too much business in the United States and because of disadvantages created by the strength of the U.S. dollar against other currencies at that time. (The strong U.S. dollar at that time was often cited as a major trade barrier. The value of a national currency in terms of the currencies of other nations can affect the domestic demand for imports and foreign demand for exports. Lowering the value of the U.S. dollar is expected to reduce domestic demand for higher-priced imports and to raise foreign demand for U.S. exports because their prices are lower in terms of foreign currencies.)

Government telecom officials maintain that short-term business considerations by U.S. exporters often lead to bad trade decisions for the United States for the long term, because obsolescence of U.S. telecom products can be delayed if such products can penetrate world markets.

3.5 Fiber Optic Systems

3.5.1 Definition: The transmission of information by fiber optics has been made possible through the development of ultra-high-purity glass fiber light guides, diode lasers, light-emitting diodes, and photodiodes. Glass fiber cables are strong, flexible, lightweight, immune to electromagnetic disturbances and secure. They also provide electrical isolation from transmitter to receiver, require no surge protectors and allow spans between repeaters much longer than those obtainable with metallic paired or coaxial cable.

3.5.2 Closed Markets: Foreign countries can keep their entire market closed because of maintained system differences. One U.S. company indicated that France claims to have a system that is not compatible with U.S. technology. French officials do not look at fibers the way U.S. industry does. Cable design and splicing are different; consequently, U.S. fiber optic technology is not compatible with French networks.

In France, the fiber-optic cable networks will be considered the province of the PTT. The networks for broad-band transmission will not be built separately from the existing public telephone network. These networks have room available for fiber-optics in the telecom channels and the PTT has personnel experienced in laying the cables; hence France does not see any advantages in eliminating this monopoly.

3.5.3 Technical Requirements: The variety of options available under international standards are sometimes used as barriers for fiber optic products. Selections can be in opposition to U.S.

voluntary or industry standards. The PTTs can impose requirements for specific options that customers do not want or need, making the U.S. product too costly.

One exporter hopes to sell the optical fiber portion for LANs that meet a U.S. industry LAN standard of the Institute of Electrical and Electronics Engineers (IEEE) to integrate voice and data (IEEE Std 802.5-1985, Token Ring Access Method and Physical Layer Specifications). This company is concerned that an International Organization for Standardization (ISO) draft standard, an incomplete international version, (ISO/DP 8802/5) is being used as a trade barrier in EC countries.

3.5.4 Practices and Procedures: In order to verify the integrity of a fiber optics system, French officials say they must test all equipment and components. Pre-approvals, prior to testing, are also required. France also prohibits the installation of fiber optic cable that extends beyond a building or campus and crosses public lines. French officials consider this to be an infringement on the PTT's monopoly.

3.5.5 Other Trade Problems: One potential exporter complained that the recently privatized U.K. PTT still uses government administrative restrictions to delay entry to its markets. However, a second company has operating agreements with two U.K. firms, the only firms other than the privatized PTT licensed to install fiber optic systems. But this means that the second company must sell through a potential competitor which will eventually supply its own fiber optic products.

Distribution is yet another problem for U.S. firms. To market fiber optic products in Italy, as with other products, an Italian subsidiary with Italian directors or domestic distributors are usually required. One exporter complained about the discounts in the prices of the U.S. products which are required in order to compete with domestic vendors in Italy. A multinational U.S. company which markets fiber optic systems in all countries of the free world feels compelled to develop joint ventures in foreign countries in order to avoid trade barriers.

Some telecom companies think that U.S. exports will suffer significantly when fiber optic patents owned by U.S. industry run out. France and Japan already have technological advantages that reduce U.S. export opportunities. One U.S. exporter predicted that all installations in the United States will eventually be controlled by foreign companies. When queried as to how this could happen, he said the same way that it happened for TVs and VCRs -- foreign competitors, heavily subsidized by nationalistic governments, have targeted selected markets for takeover.

4. Overview of Country Systems

Organizations, requirements and practices for the four selected countries are defined in this part of the report. The elements for those countries include the specific organizations that affect the telecom industry, their regulations and standards, and their testing and certification practices. For the problems described in this initial assessment, limited to two examples in each country as listed in Table 2, comparisons will be made with the U.S. system.

4.1 French Telecom System

This section focuses on problems that impede the sale or installation under the French approval procedures for U.S. fiber optic systems and on French standards and certification procedures for modems. In Sections 4.1.1 through 4.1.3 the key organizations, information on fiber optic and modem standards, and practices for procurement and certification are discussed. Section 4.1.4 will compare these French requirements and practices with those of the United States.

4.1.1 French Organizations

MPT, the Ministry of Posts and Telecommunications, is the French PTT. All telecom services are provided or regulated by the MPT.

DGT, the Direction Generale des Telecommunications, is the telecom branch of the French PTT. Primary responsibility for French telecom needs, matters and policies rests with DGT.

DAII, DGT's Department of Industrial and International Affairs, establishes policies with regard to equipment attachment, industrial strategies, and international service agreements.

CNET, Centre National d'Etudes de Telecommunications, is responsible for technical standards, testing and type approval of equipment. CNET is the French equivalent of Bell Labs (Bellcore) and provides technical services for DGT.

CNCL, Comission National de la Communication et des Libertes, is coming into existence and will have functions similar to the U.S. Federal Communications Commission.

AFNOR, the Association Francaise de Normalisation, is the official French standards organization. AFNOR is the only organization with the authority to publish national standards. AFNOR represents France in non-treaty, non-governmental international and regional standards organizations.

NOREX, a subsidiary of AFNOR for trade, provides technical assistance to French exporters. They have 35 employees and have 6,000 case files. NOREX has an office in Washington, DC with nearly 4,000 French standards in English, but no telecom standards.

The major suppliers to the telephone network are CIT-Alcatel and Thomson-CSF, government controlled French companies.

4.1.2 French Requirements: Regulations and Standards

French modem regulations, which are issued by the DGT, are contained in:

> No. 500-85 General Telecommunications Directorate, Telematics and Commercial Affairs Directorate.

General instructions on telecom services are set forth in:

> TC-2 Subscriber's Installations other than Telephone Systems Created and Maintained by Private Industry and Connected to a Switched Telephone Network.

Other key standards include:

> NF Z 66-200: Connecteurs pour les Circuits d'Echange Entre Equipment Terminal de Donnees et Equipement de Tranmission de Donnees - Affectations des Broches. Provides specifications of the 25-pin connector and pin number assignments for the interface between data terminal equipment and data circuit-terminating equipment or automatic calling equipment for voice-band modems and public data networks.
>
> NF Z 70-001: Systems de Traitement de l'Information - Modele de Reference de Base pour l'Interconnexion de Systemes Ouverts. Defines a reference model for coordination of standards development for open systems interconnection. Establishes the architecture for interfaces and protocols.

Modem suppliers must comply with CCITT recommendations and CNET specifications. For example, the interface standards are subject to international standardization (CCITT Recommendation V.24, V.25, etc). Utilization of acoustic couplers for data transmission is subject to CCITT Recommendation V15. Modems limited to 300 bit/s are subject to CCITT Recommendation V.21 and modems limited to 1200 bit/s are subject to V.22 (full duplex) and to V.23.

Understanding the CCITT recommendations is not difficult. Experience has shown, however, that the CNET specifications cannot be understood and applied by U.S. exporters without several passes through the approval process.

France has been active in the development of European regional standards (CEPT). U.S. officials are seeking to have CEPT standards development forums opened to U.S. participants. Transparent standards development, required by the GATT Standards Code, would apply to the EC, a signatory, but not to CEPT, which does not come within GATT rules. The EC acts as a "government" in some senses of the GATT.

French fiber optic standards are not yet available; however, it should be noted that the French transmission data rates are different from those in the United States (64 kbit/s v. 56 kbit/s). The optical fiber portion of LANs may have to conform to an incomplete international LAN standard (ISO/DIS 8802/5), constituting an unreasonable requirement in France.

Compliance with French regulations and standards does not assure the right to market a product (nor does it assure approval); regulations and standards are minimum requirements. The PTT administration has the exclusive right to grant or deny authorization without being required to justify its position.

4.1.3 French Practices: Testing and Certification

Approval procedures conducted by the French PTT are mandatory and time-consuming; but, according to some U.S. exporters, getting products through is worth the effort. All equipment must be tested by French government telecom laboratories and approved by CNET before being marketed and utilized. CNET takes six to 12 months to approve large telecom products such as PBXs; small products such as modems may take two to six months. Additionally, the connection to the public network has to be approved by the PTT in order to assure that the technical requirements of the connection are fulfilled.

Current procurement practices are contained in the Code des Marches Publique. The procurement process in France is as follows:

A tender offer for telecom products issued by the PTT is announced in the official journals of the EC and France (the offer is open two to three months).

Bids are evaluated against technical specifications (the evaluation takes one to six months).

A company is chosen and the award is published in the journals.

An ad hoc commission is created to evaluate the award including the proper use of government funds.

Certification of telecom equipment, in France, is a five-step process:

1) Importer submittal of required product and company information to the procurement Secretariat;

2) Secretariat review and forwarding to an acquisition review commission, which meets monthly, for evaluation or acceptance for testing;

3) CNET testing of the equipment for conformance to technical standards;

4) CNET preparation of a test report summarizing their decision and rationale for commission approval;

5) Commission issuance of a certification number.

A U.S. manufacturer wishing to have his telecom equipment approved must inform the DGT of any French company assigned to represent him in France. If terminal equipment can be approved without testing, paperwork still takes up to six months. None of the U.S. manufacturers were aware of any laboratory accreditation programs in France.

4.1.4 Comparison of French and U.S. Systems

U.S. telecom regulations and standards include technical elements which can be grouped into four categories:

Safety standards
Emission regulations
Telecom regulations
Interconnection standards

They are represented respectively by: Underwriters Laboratory (UL) listings; FCC regulations Title 47 Code of Federal Regulations (CFR) "Telecommunication," Part 15 "Radio frequency devices;" FCC regulations 47 CFR Part 68 "Connection of terminal equipment to the telephone network;" and open systems interconnection (OSI) standards and the integrated services digital network (ISDN) standards of international organizations ISO and ITU.

FCC Terminal Equipment Compatibility Regulations (for type approvals for telecom products) include the following methods from 47 CFR Part 68 Subpart D:

68.304 Leakage current limitations;
68.306 Hazardous voltage limitations;
68.308 Signal power limitations;
68.310 Longitudinal balance limitations; and
68.312 On-hook impedance limitations.

Modems are characterized by the speed of the data stream they are capable of handling. Speeds up to 1800 bit/s are generally processed asynchronously. With data rates of 2400 to 9600 bit/s, modems are clocked by a timing provision synchronized to other elements in the data communications network. At lower data transmission rates, modulation can be accomplished through a frequency shift keying technique. At higher data rates, the technique is augmented by phase-shifting. To communicate, modems must employ the same speeds and modulation methods. In the United States, modem characteristics conform to the standards originally established by the Bell System and to protective guidelines, such as voltage surges, established by UL. Some CCITT standards have also been adopted by the U.S. government such as FED-STD-1005 Telecommunications - Coding and Modulation Requirements for Nondiversity 2400 bit/s Modems and FED-STD-1006 Telecommunications - Coding and Modulation Requirements for 4800 bit/s Modems. French modem standards follow CCITT Recommendations V.21 (300 bit/s), V.22 (1200 bit/s, full duplex) and V.23 (1200 bit/s).

In the United States, the 300 bit/s modem follows the Bell 103/113 specifications with center frequencies of 1170 and 2125 Hz and a one bit (or mark or high) sent as the higher frequency. The French use center frequencies of 1080 and 1750 Hz while a one bit is the lower frequency. This means that in France (where European-dominated ITU standards are being adopted), the data is encoded upside down relative to U.S. practices. Consequently, the Bell 103/113 modem and modems designed to CCITT V.21. are incompatible. (Dual-system modems and harmonized standards are useful for resolving these kinds of problems.)

At 1200 bit/s there are two key types: frequency shift keying and phase shift keying. The frequency shift keying modems in the United States and in France are similar enough to operate together some of the time, and phase shift keying modems are compatible at 1200 bit/s. But CCITT options and alternative configurations can create problems. U.S. exporters will often make variable modems (which can be set to different characteristics such as speed) to overcome incompatibilities based on options. At higher data transmission rates, 4800 and 9600, the Bell 208 and 209 cannot communicate with the CCITT V.27 and V.29 modems.

The U.S. certification process, conducted by the FCC under Part 68, is designed to protect the network; French regulations and testing also seek to protect the users of the system against hazards. (CCITT recommendations are silent on the subject of personal protection.) U.S. regulations reflect the belief that competition has a strong self-regulating effect, and that the benefits of open market access outweigh the possible benefits of mandatory testing.

Competitive value added networks, which could use fiber optics, are not permitted by French regulations. Such services are not regulated in the United States. France is pushing its own network (for terminals operating in the packet mode), Transpac, which has 86,000 terminals worldwide. In the United States, there are no restrictions on who can use fiber optics, and competitive value added networks are encouraged.

In the United States, getting approvals is not very difficult. Preventing harm to the network is the only concern of the FCC regulations. FCC defines "harm" in Title 47 CFR 68.3 (g) as electrical hazards to telephone company personnel, damage to telephone equipment, malfunctioning of telephone billing equipment, and degradation of service to persons other than the user of the subject terminal equipment, his calling or called party. Two months is the average time to complete approvals and FCC does not usually do any testing.

Important international standards include:

IEC 693: Dimensions of Optical Fibers
IEC 793: Optical Fibers
IEC 794: Optical Fiber Cables

The desirability for fiber optic installation standards in the United States has been recognized by the National Utility Contractors Association. (See the ANSI Reporter, a biweekly publication of ANSI, Vol 21, No 19, of January 30, 1987, page 1.) The ANSI Fiber Optics Coordinating Committee is currently encouraging the development of a U.S. voluntary standard for underground installation of fiber optic cables in public rights-of-way. There is some concern that some companies are installing fiber optic cables without appropriate protection or adequate marking.

4.2 West German Telecom System

Two telecom problems, the approval of modems and the procedures that keep local area networks from being tested, are reviewed in the context of the FRG telecom system. In Section 4.2.1, the West German organizations are listed and described; in 4.2.2 the

important West German standards are identified; in 4.2.3 the practices are reviewed; and in 4.2.4 a comparison is made of the West German system with the U.S. system.

4.2.1 West German Organizations

DBP, Deutsche Bundespost, is the West German PTT. DBP is a quasi-governmental agency loosely controlled by the Minister of Posts and Telecommunications. DBP is responsible for the standards development process. Its procedures, exempt from the GATT, are not transparent as would be required by the GATT Standards Code.

FTZ, Fernmeldetechnisches Zentralamt, the telecom technical office and engineering center, is a division of DBP. Some of its functions are similar to the U.S. FCC. Standards for all terminal equipment are developed by FTZ.

ZZF, Zentralamt fuer Zulassungen im Fernmeldewesen, is the central approval office for telecommunications equipment and is a division of DBP. ZZF approves all terminal equipment not supplied by DBP. Applications must be submitted by a West German agent.

ZVEI is the telecom section of the West German Electrical and Electronic Manufacturers Association.

DIN, the Deutsches Institut fur Normung, is by the West German Standards Treaty the competent standards organization for the FRG and corresponds to ANSI for the United States. DIN works closely with West German testing laboratories.

VDE, Verband Deutsche Elektrotechniker, is the West German Electrical Engineers Association. VDE conducts electrical safety testing.

TUV, Technischer Ueberwachnungs e.V., is the largest organization for technical safety, inspection, certification and quality assurance in the FRG.

Until recently, DBP was the sole provider of modems for the FRG public telephone network. Pressure from the EC and others encouraged them to open the market. DBP supplied no equipment on the customer side of the modem. DBP is the main buyer of switches and other telecom equipment, but national railways and cities are also purchasers. DBP can purchase terminal equipment where there are commonly approved specifications.

4.2.2 West German Requirements: Regulations and Standards

Regulations are promulgated under the Telecommunications Installation Act (1928) and the Postal Administration Law (1953). Standards published in the German Official Federal Gazette become legally binding.

The following translated modem standards were reviewed:

> German TL 5805-3002: Data communications equipment for use in the public telephone network: Insert modem for 1200 bit/s.
>
> German TL 5805-3002, Appendix 2, Supplement: Description of automatic calling with modem assembly MDB 1200-01 in accord with new CCITT Recommendation V.25 bis (bis indicates a second variation).

The first document indicates that there are a number of modifications for the basic modems. Standards are termed "simplified" versions of CCITT recommendations and the modem assemblies are required to follow CCITT recommendations "unless otherwise specified in the performance description." The first standard also sets forth design requirements. The second standard seems to follow the CCITT recommendation without variation.

U.S. telecom exporters and secondary sources report that:

> DBP regulates the level of equipment performance and attempts to ensure minimum standards of service.
>
> DBP considers the subscriber's premises to be inseparable from the network; consequently, standardization extends from a terminal through the network to another terminal.
>
> DBP imposes extensive installation and maintenance requirements on terminal equipment attached to the network.
>
> The DBP uses standards to assure the technical integrity of the network. Standards are intended to prevent harm to the network and to the user. They also cover equipment reliability and interoperability.
>
> DBP asserts that detailed standards are needed to avoid litigation.

Standards specify technology and equipment characteristics. For example, the maximum distance that lines can extend is specified for PBXs. Standards also stipulate the interface, system size, performance, and implementation requirements.

Key DIN VDE telecom standards, not available in English, include:

E DIN VDE 0800 Part 11-13: Telecom fundamentals for safety of facilities and apparatus

E DIN VDE 0804 Part 1-2: Telecom construction and testing of apparatus

DIN VDE 0805 / IEC 435 & 0805A1 / IEC 435A1: Safety of data processing equipment

E DIN VDE 0816 Part 1-3: External cables for telecom and data processing systems

DIN VDE 0845: Protection of telecom systems against excessive voltages

DIN VDE 0848 Part 1-3: Hazards by electromagnetic fields (Part 2 covers protection of persons in the frequency range from 10 kHz to 3000 GHz)

DIN VDE 0871 Part 1, 100, and 102: Radio interference

DIN VDE 0875: Radio interference suppression

DIN VDE 0877: Measurement of radio interference

DIN VDE 0878: Radio interference suppression for telecom systems

DIN VDE 0887 Part 1-3: Radio frequency cables

DIN VDE 0888 Part 1-4: Optical waveguides for telecom systems

DIN VDE 0891 Part 1-10: Use of cables and insulation wires for telecom systems and information processing systems

4.2.3 West German Practices: Testing and Certification

Exporters must have a West German presence to assure 24-hour service for any equipment attached to the public network. German representation is always necessary to market network equipment. (Exceptions are made to permit sales of terminal equipment without an established West German business office; decisions are made on a case-by-case basis.) U.S. exporters consider that establishing an office in the FRG, which can be costly in dollars and set-up time, is nevertheless necessary to keep from losing market control to foreign distributors.

All electrical testing must be conducted under VDE authority (but not necessarily at the VDE facilities). VDE will not accept manufacturers test data, but they will accept test reports from specifically approved foreign laboratories under contract, such as Underwriters Laboratories. Electrical Testing Laboratories also has an agreement with TUV for mutual acceptance of test data. (Both U.S. laboratories participate in the NBS laboratory accreditation program.) Additionally, some UL evaluations of products to West German safety standards have been accepted.

U.S. exporters consider West German testing and certification procedures to be very complicated and burdensome. FTZ allows self-certification for small computer equipment. ZZF tests other terminal equipment. Tests must be done at the ZZF testing laboratory or at an approved third-party facility within the FRG.

Every applicant to the FTZ for approval of use of equipment by the DBP, and every applicant to the ZZF for approval of use of equipment within the FRG, but not exclusively by DBP must have its headquarters or subsidiary in the European Community, or have a representative in the FRG.

Anything used in connection with approved equipment, such as LAN products, requires separate ZZF approvals in order to be used legally within the FRG. Applications to ZZF for approvals of terminal equipment must be submitted by a West German agent that is either a legal entity within FRG territory or a firm with its headquarters or subsidiary within the European Community.

One U.S. exporter stated that approvals for terminal equipment took six months and cost $4,000 to $6,000 for each product. Approvals for other telecom equipment can take two years; however, one case took nine years. U.S. exporters suggest that FRG conformance testing sometimes lacks precision and accuracy, and results are unpredictable. In theory, DBP purchases on the basis of Federal government regulations not its own specifications. But, DBP regulates the level of equipment performance and guarantees minimum standards of service.

4.2.4 Comparison of West German and U.S. Systems

The closed FRG system is considerably different from the open U.S. system for modems and LANs, as illustrated by this example. When FTZ lacks adequate information to develop standards, it establishes working groups from industry to advise on the contents of draft standards. All information discussed within these working groups is considered confidential and may not be discussed publicly. In contrast, discussions on standards that relate to modems and LANs conducted in the United States are in meetings open to all concerned.

The U.S. technical requirements can be grouped into four categories: safety standards, emission regulations, telecom regulations and interconnection standards. They are represented by UL listings, FCC regulations in 47 CFR Part 15, FCC regulations in Part 68, and OSI/ISDN standards of international organizations.

Approvals are made by UL (Standard for Power Supplies UL 1012, Third Edition is one listing) in the United States and by such European test houses as the German VDE. Telecom manufacturers can generally sell throughout the United States and Europe without major difficulties with general safety standards. The FRG is the most stringent of the Western European Countries. (The major difficulties alluded to in this report stem from foreign national telecom regulations for the attachment of telecom equipment.)

U.S. emission regulations cover electromagnetic compatibility as determined by the following test methods:

> Conducted emissions, power lines, 450 kHz to 30 MHz
> FCC Method -- 47 CFR Part 15 Subpart J; and
>
> Radiated emissions, 30 MHz to 1000 MHz
> FCC Method -- 47 CFR Part 15 Subpart J.

Most European emission standards are centered around the German VDE standards. For Class A limits, testing by a VDE engineer is required. Arranging for these tests is a major logistics problem that inhibits U.S. exports. For Class B limits, self-certification by manufacturers is permitted, but VDE has extended the lower end of the frequency range to 10 kHz, a major problem for LAN products. The requirement is in West German standard:

> DIN VDE 0878: Radio interference suppression for telecom systems; Part 1, Section 5.84.

The U.S. requirement comparable to DIN VDE 0878 Part 1, Section 5.48 is under 47 CFR 15.832. It states that:

> A Class B computing device that is designed to be connected to a low voltage public utility power line...shall limit radio frequency voltage conducted back into the power lines...over the frequency range 450 kHz to 30 MHz....

U.S. exporters find this West German requirement to be unreasonable; apparently the requirement would be less unreasonable if they knew it would be an EC standard. One product could then be made for all EC countries.

Anything used in connection with approved equipment, such as LAN products, requires separate ZZF approvals in order to be used legally within the FRG. Interconnection standards and protocols (conventions developed to insure the transfer of data in an orderly and organized manner) for LANs threaten to become major barriers unless the United States and the EC can harmonize their efforts.

The purpose of the FCC Part 68 is to provide uniform standards for the protection of the public network. Direct connection is permitted for all terminal equipment, all PBX or similar equipment, and all customer premises wiring associated with business telephone service. If the products have all been approved, there is no requirement for a separate approval for the LAN.

The means of connection in the United States is, generally, through standard plugs and standard telephone company-provided jacks or equivalent. In contrast, the DBP imposes extensive installation (and maintenance) requirements on terminal attachment equipment.

4.3 Italian Telecom System

This Section describes the organizations that affect the selling of switches and the practices that control the selling of PBXs in Italy. No translated Italian standards or regulations for switching equipment were available. The market for switches is closed to medium-sized companies unless they sell through an authorized supplier. The most important difficulty for PBX exporters is certification, discussed in Section 4.3.3.

4.3.1 Italian Organizations

MPT, the Ministry of Posts and Telecommunications, technically the PTT for Italy, has authority for overall policy, regulation and supervisory control of telecom activities.

STET, Societa Finanziaria Telefonica, the government controlled group of quasi-private companies, fulfills many, if not most, of the functions provided by PTTs in other European nations. Currently, MPT divides responsibility for the provision of telecom services with STET, but reorganization is underway.

IRI, the Institute for Industrial Reconstruction, owns 65 percent of STET and is the Italian agency responsible for supervision of government controlled activities.

SIP, Societa Italiana per l'Esercizio Telefonico, is the largest member of STET and Italy's most important telecom element. SIP plans, installs, operates and maintains the local telephone networks. SIP is currently one of six franchised companies that provides enhanced telecom services, but they are gaining control over all domestic telecom activities.

ISPT, the Instituto Superiore Poste e Telecommunicazioni, manages standards development activities and conducts equipment testing. ISPT officials are concerned that the multinational companies will reduce or eliminate their management authority within the Italian telecom system. (STET may also lose some authority as the result of organizational changes in the Italian telecom system.)

ITALTEL, the largest telecom equipment manufacturer in Italy, is also a part of the STET group. ITALTEL controls over 50 percent of the installed public switching and over a third of the installed PBX equipment. Changes scheduled to be made within the Italian telecom system by the Italian government may give ITALTEL control over all international telecom activities.

4.3.2 Italian Requirements: Regulations and Standards

Italian regulations and standards were rarely discussed by U.S. exporters, nor were translations of requirements for switches or PBXs available. Exporters indicated that Italian telecom regulations specify characteristics for voice-band and base-band transmission and ensure functionality as well as compatibility with their national telecom network. Any short circuits must not be harmful to the operator in addition to not being harmful to the network.

U.S. exporters expect that Italy will follow the European regional telecommunication norms or standards of CEPT more closely than the international recommendations of CCITT. (Each country can establish its own standards, and CEPT coordinates standards issues that may arise among EC countries.) Draft standards are not published for comment. U.S. companies are sometimes able to participate in the development or revision of these standards through Italian companies, e.g., where there is a joint venture.

The CCITT issues recommendations for network signaling and switching, and is currently developing standards for an ISDN which will have field trials in Italy. (U.S. companies have to know these standards to ensure development of compatible products.)

4.3.3 Italian Practices: Testing and Certification

Foreign test data is not accepted by ISPT; type approvals are mandatory for PBXs. Manufacturers must declare that each device complies with safety regulations, particularly regulations on the power supply. (These declarations are subject to ISPT verification or testing and approval and should not be viewed as self-certification.)

Apparently, U.S. exporters must hire Italian attorneys to represent their firms. Products must get technical approval at the national level and by local telecom agencies. Unlike the FRG, Italy permits products to be approved (by ISPT) if no standards exist, but the approval is limited to a specific product and a specific user.

Certification is a two-step process: certification of conformance to network and safety standards and then permission to attach to the network. The total process can take 12 to 18 months. Spare parts must be available for a period of at least five years.

4.3.4 Comparison of Italian and U.S. Systems

In Italy the number of companies that can sell a particular telecom product may be limited (as for switches). In the United States, there are no legal restrictions on the total number of suppliers.

U.S. exporters feel that it is difficult to know which Italian government agency or organization is responsible for requirements or approvals. (Many of the requirements and practices, after they are known, also seem unreasonable.) However, if effective rapport is established with the appropriate official, approval practices for safety and network attachment for switches and PBXs may cause no major difficulties in Italy.

In the United States, getting approvals for switches and PBXs is not difficult. Preventing harm to the network is the only concern. Italian organizations can be openly unconcerned and excessively bureaucratic. Italian requirements can also regulate against harm to the operator of the telecom equipment. Italy requires two certifications for PBXs: conformance to the network and electrical safety, especially as to the power supply. The PTT approvals cover safety shielding, protection against surges, and accessibility. UL's safety standards are not as rigid, and do not present the difficulties associated with the small and subtle Italian changes to international and European regional standards.

No information was available on Italian Telecom standards. Terminal Equipment Compatibility Regulations (type approvals for telecom products) in the United States include the methods from 47 CFR Part 68 Subpart D.

One important voluntary U.S. standard, issued by the Electronic Industries Association (EIA) is: EIA RS-464: Private Branch Exchanges (PBX) Switching Equipment for Voiceband Applications.

Similar to the regulation of the U.S. telecom system, where there is often an absence of strict enforcement of FCC rules, the Italian system gives some U.S. exporters the perception of a lack of uniformity in the enforcement of rules, particularly in certifications. This probably militates more strongly against medium-sized companies that lack a strong presence in Italy and, consequently, do not know the "rules of the game."

Mutual type acceptance may be available in a few years under a new EC program. Manufacturers will be able to have PBX equipment type-approved by the British Standards Institution, for example, and then have reciprocal acceptance of test data in Italy.

4.4 The British Telecom System

This Section describes two telecom equipment problems: the introduction of multiplexers into the U.K. and some current and anticipated difficulties with interconnection standards and protocols for LAN products. Sections 4.4.1 through 4.4.4 cover British organizations, requirements and practices, and a comparison of the British system with the U.S. system is made.

4.4.1 British Organizations

The British Telecommunications Act (1981) gave the Secretary of State for Trade and Industry the authority to liberalize regulations pertaining to equipment for connection to the public networks and the authority to grant licenses (formerly the exclusive privilege of the PTT monopoly).

BT, British Telecom, is the organization that had the PTT monopoly. BT is now a private sector telecommunications operator in competition with Mercury Communications Ltd and with the Kingston-Upon-Hull Corporation (and with private sector telecom equipment manufacturers including U.S. firms). The Telecommunications Act (1984) removed BT's exclusive privilege of running U.K. telecom systems.

OFTEL, the Office of Telecommunications, is a new (1984) government department which has been given independent responsibility for supervising telecom activities in the U.K.

The Director General of Telecommunications ensures that holders of telecom licenses comply with license conditions and the Director, OFTEL, promotes effective competition in telecommunications. OFTEL is also responsible for providing consumer protection.

BABT, British Approval Board for Telecommunications, approves telecom equipment for attachment to the public networks and accredits laboratories to test British telecom standards.

DTI, Department of Trade and Industry, has regulatory authority and can specify an interim standard or code of practice, if no British standard exists.

NATLAS, the National Testing Laboratory Accreditation Scheme, at the National Physical Laboratory, has a Memorandum of Understanding (MOU) with NBS that provides for the mutual recognition of the accredited status of testing laboratories under systems administered by the parties to this MOU.

BSI, the British Standards Institution, is the source of British standards and, purportedly, the first national standards body in the world. BSI is independent, operating under a Royal Charter.

THE, Technical Help to Exporters, was established by BSI in 1966 to assist U.K. manufacturers in marketing British products abroad. THE identifies foreign government requirements, as well as marketing practices, and has a product testing and certification program.

4.4.2 British Requirements: Regulations and Standards

The U.K. has a unique set of multiplexer standards, even though the British strive to have their standards recognized as international standards. In July, 1986, BSI News, a monthly journal of BSI, estimated that 24 percent of all British Standards were identical with international standards, with another 7 percent technically equivalent and a further 12 percent related (some very closely). BSI NEWS concluded that 43 percent of British Standards were connected with the international standards system.

Important U.K. standards (DD is a draft document of a provisional nature and not to be considered as a British Standard) for multiplexers and other telecom terminal equipment are:

> BS 6301: 1982 Safety requirements for apparatus for connection to British telecommunications networks

BS 6505: 1984 Code of practice for installation of private branch exchanges for connection to the British telecommunications public switched telephone network

BS 6701: (Part 1: 1986 General recommendations) Code of practice for installation of apparatus intended for connection to certain telecommunications systems

BSI DD 138: 1985 (will supersede BS 5850: 1981 and BS 6204: 1982) Safety of information technology equipment including electrically operated business equipment

BS 5850: 1981 Specifications for safety of electrically energized office machines (corresponds with European Committee for Electrotechnical Standardization (CENELEC) Harmonization Document HD 372, which is based on IEC publication 380)

BS 6204: 1982 Specification for safety of data processing equipment (based on IEC publication 435)

Some examples of Local Area Network Standards include:

BSI DD 99: 1986 Logical link control for local area networks (based on IEEE 802.2)

BSI DD 100: 1985 Token bus local area networks, Part 1: Technical specifications (identical with ISO DP 8802/4; IEEE 802.4)

Important Open Systems Interconnection Standards include:

BS 6568: 1984 Description of basic reference model for open systems interconnection (identical with ISO 7498-1984)

BSI DD 102: 1985 Open systems interconnection: connection-oriented presentation protocol presentation (identical with ISO DP 8823.2)

BSI DD 105: 1985 Open systems interconnection: job transfer and manipulation concepts and services (identical with ISO DP 8831)

If British protocols and file transfer standards are harmonized with U.S. OSI versions during the developmental stages, trade between the U.K. and the United States should be enhanced.

4.4.3 British Practices: Testing and Certification

Medium-sized exporters cannot keep pace with changes in the U.K. system. Each analog component requires individual approval.

Homologation costs in the U.K. can run as high as $10,000 per LAN system, with uncertain time requirements and uncertain results. OFTEL certification officials claim they do not have sufficient resources to complete all approvals expeditiously.

Licenses to provide network services are granted through OFTEL. The requirement for an independent third-party for certification is not as important in the U.K. as it is in the rest of Europe. U.K. industry is traditionally wedded to self-certification. Even though U.S. exporters complain about the approval backlogs, one exporter said his British distributor gets LANs approved in one week.

A U.K. consortium was established in 1986 to develop test methods for OSI standards to ensure that LAN products can communicate with each other. A test center located in the U.K., but established under EC jurisdiction, will produce test data for telecom and information equipment that will be accepted by all Western European countries.

NATLAS was not known to any of the U.S. telecom companies because the MOU with NBS just became operational within the past year. U.S. laboratories accredited by the NBS NVLAP program may now be able to perform some telecom tests that should not have to be repeated in the U.K.

4.4.4 Comparison of British and U.S. Systems

The U.K. has a unique set of multiplexer standards; no harmonized CCITT or CEPT multiplexer standard is on the horizon. The U.K. standards are sufficiently different from U.S. standards to create problems for U.S. exporters. In the U.K., specifications cover noise and inside coatings that are not required by either UL or FCC. These specifications do not relate to environmental safety nor to harm to the network, as U.S. requirements do.

U.S. multiplexer standards and regulations can be grouped into two categories: safety standards and telecom regulations. They are represented by UL standards and FCC regulations in Part 68 of the CFR.

Safety testing is a private sector activity; in the United States provided by UL, and in the U.K. by such organizations as BSI. Telecom manufacturers can generally sell throughout the United States and Europe without major difficulties with safety standards. In time, U.S. products can consistently get European safety approvals. However, most exporters find major difficulties with U.K. telecom standards because of the "unique twists" such as specifications for multiplexer noise.

Terminal Equipment Compatibility Regulations for type approvals for multiplexers are also included in the methods from 47 CFR Part 68 Subpart D.

Examples of voluntary U.S. LAN standards include:

ANSI X3.140: Information Processing Systems - Open Systems Interconnection - Connection Oriented Transport Layer Protocol Specification

ANSI X3.148: Fiber Distributed Data Interface Physical Layer Protocol (designed for token ring architecture)

Certification of LANs in the U.K. can be a major problem. No certification of LANs is required in the United States and currently there is no ITU recommendation. The United States is fearful that the U.K. and other EC countries will use different protocols to exclude U.S. products. Customers in all countries are beginning to ask about interconnectability and interoperability. Some companies talk of "certifying" the interconnectability and interoperability of network installations, but this may be just "sales talk."

Open Systems Interconnection (OSI) standards, which will enable different telecom systems to be interconnected through networks, are still, for the most part, on the drawing board. They will probably be voluntary in the United States, but there is always the possibility that mandatory requirements will emerge in other countries. Moreover, conformance to interconnection standards is not the only consideration: two products may conform to the required interconnection standards but not be interoperable. Legitimate retesting for each set of elements by each country may be insisted on. However, tests for interoperability could give foreign governments "open season" to exclude U.S. products.

In the United States, the Corporation for Open Systems (COS) is developing test methods for interconnectability and interoperability of LAN products. (See Corporation for Open Systems, Prospectus, dated April 1986; 8619 Westwood Drive; Vienna, VA 22180.) COS plans to provide the testing facilities that will serve as the mechanism for the acceleration of the introduction of multi-vendor telecom products. COS hopes to be able to assure widespread customer acceptance of an open network architecture in international telecom markets.

In the U.K., a consortium, established in 1986 to develop comparable test methods for OSI standards, could develop tests which are different from those developed in the United States. The U.K. test center, the Standards Planning and Applications Group (SPAG), established under the auspices of the EC, expects to produce test data for telecom equipment that will be accepted across all European borders.

COS is just getting started and SPAG is even further behind the needs of the marketplace. COS is having discussions with SPAG which could lead to an agreement on the reciprocal acceptance of test results.

5. Discussion

Full reciprocity in telecom trade with our major European trading partners probably will not be achievable in the near term, although the possibility of moderate success with the U.K. exists. Reciprocity is the practice by which governments extend similar concessions to each other, as when one government eliminates technical barriers impeding its imports in exchange for equivalent concessions from a trading partner on barriers affecting its exports (a "balance of concessions"). However, the United States has already opened its telecom market, unilaterally, to all trading partners. Consequently, the United States is not in a favorable negotiating position to demand a "quid pro quo" or mutual benefits.

Our trading partners rarely impose telecom equipment requirements or approval procedures that are conspicuous violations of the GATT Standards Code because they would then be required to submit to formal dispute settlement procedures. Additionally, where a bilateral dispute settlement cannot be reached, USTR can use the Standards Code Committee as a mechanism for resolving violations.

Each major European country has a unique telecom system and individualized standards. Unlike U.S. standards, foreign standards are generally not clear nor specific. Amendments are made "piecemeal" over time, with no consolidation of changes. This gives telecom companies in those countries a clear advantage when selling at home and, because the United States has a well-defined system and requirements, equal prospects when selling in the United States.

The variety of options contained in international standards is sometimes used in different but reasonable ways by each European country, but proving that any one requirement is unreasonable is very difficult. The implementation of all these technical options, which customers rarely want or need, can make U.S. products too costly to be competitive.

Current regional European standards allow individual countries to impose additional product restrictions, including certification requirements. With CEPT, approval in one EC country, through the development and acceptance of new European telecom norms, should mean automatic entry to all countries. However, full reciprocity may be four to five years away.

European systems can create major barriers for exporters confronted with the difficulty of establishing which regulations are applicable. Additionally, each country can give its specifications a unique twist, making them incompatible with other European countries even though those countries have similar specifications. In particular, medium-sized exporters cannot keep pace with the systems and are totally at the mercy of their foreign distributors.

Compliance with foreign national regulations and standards does not assure the right to market a product; regulations and standards are often minimum requirements. The PTT administration has the exclusive right to grant or deny authorization to a U.S. exporter to market a given product without being required to justify its position.

In EC countries, exporters usually must sell to or through the PTT. PTTs in developed countries generally protect their domestic suppliers. Moreover, sales must often be made in direct competition with heavily subsidized domestic companies.

Most medium-sized exporters must operate through foreign distributors who know how to get around the barriers that permeate the homologation process. Nevertheless, these distributors seem to be addressing the need to get some telecom products into a market -- for the short term. Multinational companies, which are not overly cooperative in sharing their expertise in meeting requirements and practices, will act as distributors when it is in their interest.

Unlike companies in other countries, U.S. telecom companies compete individually to address export problems. Company representatives "just have to keep pounding on the door until it opens." One U.S. company, which has a large percentage of the standard U.S. modem market (1200 bit/s), hopes to make modems to meet standards in 33 countries with a set of products developed by cross-checking with its own resources the translated regulations of each country. (NBS got the documents and had them translated for this company. Some governments do this routinely.)

U.S. government officials receive technical support for discussions and negotiations from trade organizations such as the American Electronics Association (AEA), Association of Data Processing Services Organization (ADAPSO), Computer and Business Equipment Manufacturers Association (CBEMA), Electronic Industries Association (EIA), and the Exchange Carriers Standards Association (ECSA). Groups of manufacturers, with assistance of trade associations such as the EIA, join together to develop international positions. One "working party" on modems acts through the State Department to represent U.S. interests in the workings of the CCITT.

In an effort to obtain greater access to European telecom markets, the Department of Commerce initiated in August 1985 a series of market access fact-finding (MAFF) discussions with several European countries. These discussions give U.S. officials the opportunity to express concerns to European officials. Moreover, officials of U.S. government agencies (DOC (ITA and NTIA), FCC, STATE, and USTR) and officials from telecom associations and large U.S. telecom companies have been working together in an attempt to open European markets. Few interviewees have seen significant benefits for the medium-sized companies, but it is probably too soon to make a judgement.

6. International Standards

6.1 U.S. Participation in International Standards Activities

Some U.S. telecom companies participate in official U.S. delegations to meetings of treaty organizations such as the International Telecommunications Union (ITU) and its International Telegraph and Telephone Consultative Committee (CCITT) as well as in ANSI delegations to meetings of non-treaty organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

> The reader who is interested in obtaining more information (including recommendations) is referred to a report entitled Benefits Perceived by U.S. Industry From Participating in International Standards Activities, (National Bureau of Standards, Office of Products Standards Policy; September 1984, NBSIR 84-2886). The report found, inter alia, that companies expressed interest in international product standards and test methods as doubly beneficial to U.S. industry sectors, both for permitting export on a worldwide basis and for establishment of profitable operations abroad. One conclusion of the report was that there is considerable concern that international standards written without U.S. participation may adversely affect the exports of U.S. goods and services.

Six of the medium-sized companies that are active in exporting indicated some participation in international standards activities. Multinational and other large telecom companies actively participate through memberships in virtually all important international committees.

In one case, a multinational company official said he knew of six or seven CCITT study groups where scientists and engineers employed by his company participated. Because of particular

Table 4: U.S. Government Involvement in International Standards Activities

International Committee		Support Agency
ITU/PC	World Administrative Telegraph and Telephone Conference	NTIA
CCITT SC.07	Data Communication Networks	NTIA
WG.05	Message Handling Facilities	NBS
WG.35	Directory Systems	NBS
CCITT SC.08	Terminal Equipment for Telematic Services	NTIA
CCITT/IEC	Optical Fibers	NBS
IEC TC046	Cables, Wires, and Waveguides for Telecommunications Equipment*	
SC.46D	Connectors for RF Cables	NBS
WG.05	Determination of Upper-Frequency Limits of Coaxial Connectors	NBS
ISO TC097	Information Processing Systems**	
SC.02	Character Sets and Information Coding	NBS
SC.06	Telecommunications and Information Exchange Between Systems**	NBS
WG.01	Data Communications Control Procedures	NTIA
WG.02	Network Layer*	NBS
SC.07	Software Development and System Documentation	NBS
SC.11	Flexible Magnetic Media for Digital Data Interchange**	NBS
SC.13	Interconnection of Equipment	NBS
SC.18	Text and Office Systems	
WG.03	Text Structures and Interchange	NBS
SC.21	Information Retrieval, Transfer and Management for OSI*	NBS
WG.01	Architecture	NBS
WG.03	Database	NBS
WG.04	OSI Management*	NBS
WG.06	Session, Presentation and Common Application Services*	NBS
SC.22	Programming Languages	
WG.04	International Cobol*	NBS
SC.23	Optical Digital Data Disk**	NBS

*U.S.(non-ANSI) holds the secretariat.

**ANSI holds the secretariat.

interest in ISDN, his company had several participants. He was, himself, a chairman of an ITU study group.

Five companies participated in various CCITT standards activities. Two were interested in ISDN standards. Other standards of interest include: V.22, etc., series for modems, X.25 packet switching, and X.400 electronic mail.

Important international committees that impact telecommunications and have U.S. government technical support are shown in Table 4.

6.2 Comparison of ITU and Foreign Requirements and Practices

International telecom standards, generally, do not match those in the United States, and are more compatible with standards of those European countries that actively support their development. ITU standards primarily follow European standards which extend to the color of the light-emitting diodes and to the "beeps" which must be of the correct frequency. Consequently, the United States must have more impact on ITU recommendations before they push for universal adoption of international standards.

The variety of options contained in international standards are sometimes used as barriers to U.S. imports by European countries. The implementation of options, which customers usually do not want or need, can make the U.S. product too costly to be competitive. Additionally, CCITT alternative configurations can create problems. Each European country can select a different set. (U.S. exporters will often make a set of variable modems to overcome incompatibilities based on nationally selected alternatives.)

Suppliers of telecom equipment to European countries, such as modems to France, attempt to follow CCITT recommendations. For example, the interface standards are subject to international standardization (CCITT Recommendation V.24, V.25, etc). Utilization of acoustic couplers for data transmission is under CCITT Recommendation V.15. Modems limited to 300 bit/s are under CCITT Recommendation V.21 and modems limited to 1200 bit/s are under V.22 (full duplex) and V.23. But, the French issue additional specifications (beyond the CCITT) requirements which have to be followed.

Finding the specifications that are at variance with the ITU standards, as in France and the FRG, is a monumental task. Special features and options may be described in up to 100 pages of text, usually only in French or German. On the other hand, some national standards, particularly those from the U.K., are in accord with the available international standards.

The technical office learned from the FRG modem standard, TL 5805-3002, that there are a number of German modifications to the basic international CCITT modem standards. Standards are termed "simplified" versions of CCITT recommendations and the modem assemblies follow CCITT recommendations "unless otherwise specified in the performance description." The TL 5805-3002 standard also set forth design requirements.

CCITT recommendations do not cover protection of audio and power supplies and are silent on the subject of personnel protection. Each country appears to have different rules and practices for items such as the insulation breakdown voltage in transformers, the transformer isolation method specified, and surge and shock protection.

Another common practice is to make the national severity levels more restrictive than the international standards. One example (although not ITU) is the FRG standard for radiated electromagnetic energy, which has more restrictive requirements than those contained in the international standard (IEC 801-3).

Foreign national standards are sometimes harmonized first with European regional standards, such as CEPT or CENELEC and sometimes harmonized directly in line with international standards. In the U.K., for example, the requirements in BS 6204: 1982 "Specification for safety of data processing equipment" are taken directly from IEC publication 435. However, BS 5850: 1981 "Specifications for safety of electrically energized office machines" corresponds with CENELEC Harmonization Document HD 372, which is a modified version of IEC publication 380. This means that the U.K. safety standards are IEC-equivalent for data processing equipment but not for other business equipment.

The testing and approval procedures conducted by the four countries set forth the engineering rules for direct connection of equipment to the telephone network. In all countries, the process is considered necessary to protect the network. The Europeans, however, also seek to protect the customer. CCITT recommendations are silent on the subject of protection for users of telecom equipment. Additionally, these countries apparently do not want to deprive their testing laboratories of the economic benefits of mandatory testing nor their manufacturers of the non-tariff barriers such testing provides.

Certification of LANs and LAN products in the four European countries can be a major problem. Using a variety of complex practices, these countries are able to force U.S. telecom companies to turn their LAN technology over to domestic distributors to get approvals. There are no ITU recommendations or practices for certification of LANs to provide comparable guidance.

New rules are being proposed by ITU that would ensure that enhanced or value-added telecom services would follow European requirements and remain firmly fixed under the regulatory jurisdiction of European PTTs. Many U.S. telecom companies oppose this proposal since it would further close telecom markets.

7. Selected Options for Consideration

The U.S. government may wish to consider and evaluate instituting retaliatory import controls (that would not have negative domestic consequences) in response to the kinds of situations uncovered in this report in European countries that deny trade benefits to U.S. exporters under the GATT. Special attention should be given where U.S. telecom companies have made major investments in improving telecom technologies.

> This action authorized under Chapter 1 of Title III of the Trade Act of 1974, Public Law 93-618, approved January 3, 1975, 19 U.S.C 2411, as amended (commonly referred to as Section 301) is a more direct way to hold on to U.S. markets than would be actions to manipulate U.S. requirements and practices, which hold little promise. Section 301 was further amended under Title IX of the Trade Agreements of 1979 in two principal respects to constitute the basic statute: (1) to include specifically enforcement of U.S. rights and responses to actions by foreign countries inconsistent with or otherwise denying U.S. benefits under trade agreements; and (2) to place specific time limits...for investigating and taking action on petitions.

The following specific options address the problems described in this report, with possible actions by U.S. government agencies, as well as private sector organizations, relating to standards, testing, certification, and accreditation (including bilateral and/or multilateral agreements).

7.1 Standards

If the Department of Commerce develops and promotes a cooperative arrangement with telecom companies to document and report (on a confidential basis) any standards, regulations or approval practices that those companies believe (including suspected untranslated documents) are being used as technical barriers to trade, it will be possible to create a database of hard evidence. Government officials could obtain and translate (paid by contributions from interested telecom companies) into English copies of those foreign national and regional requirements or practices that are identified by U.S. exporters as barriers that impact the sale of U.S. telecom products in Western Europe.

Under government contract or agreement, knowledgeable U.S. or foreign organizations could then compare each requirement and practice with those in effect in the United States. The resulting documentation could be made available (through DOC GATT technical office/industry workshops and through trade associations and other telecom organizations) to all interested U.S. telecom companies. The technical office has some experience in this activity and would be able to suggest when to take action.

With assistance from industry, government officials serving on international treaty-organization standards committees could attempt to effectively factor U.S. telecom technology into requirements to be incorporated into international standards. Efforts might be made to increase membership or representation from medium-sized companies on U.S. delegations to international and regional standards development organizations. More participation by U.S. government officials actively involved in such committees is needed, particularly in non-treaty standards organizations such as ISO and IEC, to provide strength to U.S. positions in voluntary international standards development activities. Options and alternatives in the requirements contained in international standards should be eliminated from final drafts, where possible, because they can be used as barriers and prevent the development of products that can be sold internationally.

7.2 Testing

The U.S. government may wish to obtain and translate all European requirements that are recognized by the EC for conformance testing for telecom products (and the concomitant test methods) regardless of their potential as trade barriers. These documents could be distributed to U.S. exporters to use to determine which products are good candidates for exporting. U.S. telecom testing laboratories should also be given all the information collected. Foreign testing laboratories should be a good information source and may be helpful, through reciprocal agreements, in getting U.S. counterparts accredited in their countries.

The United States may wish to consider supporting EC directives for harmonized telecom requirements and mutual recognition of telecom equipment standards. Testing for all EC countries will become less burdensome if regional CEPT standards and international CCITT recommendations (telecom standards) can be harmonized under an EC directive in the same way that the EC Low Voltage Directive harmonized the CENELEC and IEC electronic safety standards. The United States may also consider support for the development and implementation of a joint effort with the EC for a reciprocal testing agreement so that a U.S. product tested and accepted for use in one country will be acceptable in

all other EC countries without further testing. U.S. exporters could then notify the technical office if their products are subjected to duplicate type approval testing in a second EC country after obtaining approval in one member state.

7.3 Certification

Within an adequate framework for all levels of certification, the U.S. telecom industry may wish to continue to support the acceptance of self-certification when there is little doubt that a product conforms to the necessary standards. The acceptance of manufacturers test data, in whole or in part, can also be considered as a means of expediting third-party certification, technically or legally required for conformance to some foreign national and international standards. Section 5.2 of the GATT Standards Code states that Parties shall ensure, whenever possible, that their central government bodies accept test results, certificates or marks of conformity issued by...other Parties; or rely upon self-certification by producers in the territories of the other Parties. Self-certification should be encouraged especially in situations where risk to the network (or the public) is minimal.

7.4 Accreditation

NBS, in cooperation with the private sector, could expand the Telecom Laboratory Accreditation Program, which now covers only FCC emissions and telecom attachment regulations, to include international open systems interconnection (OSI) standards. OSI standards will make it possible (and feasible) for telecom products and services from many different vendors to operate together within the same network. NBS could continue to support the development of conformance test methods for (OSI) standards for telecom equipment and begin to support a program for the accreditation of laboratories that conduct those conformance test methods.

ACRONYMS AND ABBREVIATIONS

AEA.....American Electronics Association
ADAPSO.....Association of Data Processing Services Organization
ANSI.....American National Standards Institute

BT.....British Telecom (privatized PTT in the U.K.)

CBEMA..Computer and Business Equipment Manufacturers Association
CCITT.....Int'l Telegraph and Telephone Consultative Committee
CENELEC..European Committee for Electrotechnical Standardization
CEPT.....European Conference for Posts and Telecommunications
COS.....Corporation for Open Systems (U.S.)

DBP.....Deutsche Bundespost (West German PTT)
DOC.....Department of Commerce

EC.....European Community
ECSA.....Exchange Carriers Standards Association
EIA.....Electronic Industries Association

FCC.....Federal Communications Commission
FRG.....Federal Republic of Germany

GATT.....General Agreement on Tariffs and Trade

IEEE.....Institute of Electrical and Electronics Engineers
IEC.....International Electrotechnical Commission
ISDN.....Integrated Services Digital Network
ISO.....International Organization for Standardization
ITA.....International Trade Administration (DOC)
ITU.....International Telecommunications Union

LAN.....Local Area Network

MAFF..Market Access Fact Finding (discussions with EC countries)
MPT.....Ministry of Posts and Telecommunications (PTT in France)

NBS.....National Bureau of Standards
NTIA....National Telecommunications and Information Agency (DOC)

OSCI.....Office of Standards Code and Information (NBS)
OSI.....Open Systems Interconnection

PBX.....Private Branch Exchange
PTT.....Post, Telegraph and Telephone Administration

STET..Societa Finanziaria Telefonica (functions as PTT in Italy)

U.K.....United Kingdom
UL.....Underwriters Laboratory
USTR.....Office of the U.S. Trade Representative

Appendix A

Primary European Markets and Efforts to Address Problems

This appendix presents a summary of the current markets of our primary Western European trading partners: France, the FRG, Italy, and the U.K. Descriptions of current and previous U.S. efforts to address these problems are presented.

A) 1 France

A) 1.1 Current French Market

The market in France for telecommunications equipment is largely "closed" to U.S. exports for the short term. The French telecom market is expected to rise from $3.7 billion in 1985 to $6.1 billion by 1989. With this expansion and the high regard for U.S. technology, U.S. exporters should gradually gain greater access, since France is committed to the concept of free trade and is a vigorous supporter of the GATT. However, to foster the development of its communications and computer industries, France continues to subsidize domestic producers. In order to give domestic producers time to become competitive, access to major segments of the French market continue to be denied to U.S. companies.

To keep potential customers from buying non-French products, major restrictions are applied against imports. A centralized authority or legalized monopoly provides all telecom services. (Service industries, such as telecommunications services, have become increasingly important and now account for about 25 percent of world trade. Traditionally GATT rules have not applied to trade in services, but efforts are underway to include services within the jurisdiction of the GATT.) Competitive "value added" networks are not permitted since they are viewed as unnecessary complications of the French system. Consequently, two major U.S. companies that offer "value added" networks cannot do business in France.

Some French authorities say that France is allowing competitive networks and a competitive terminal equipment market. French representatives have expressed doubt to U.S. government officials that competition in basic network services will be allowed due to constraining economies of scale, even under the new liberalized system. Moreover, they add, consideration must be given to maintaining current subsidies by the telecom branch of the French PTT. Government officials of both countries have maintained a continuing dialogue to increase understanding and opportunities for U.S. exporters.

A) 1.2 Efforts to Address Problems

U.S. and French telecom officials initiated MAFF talks in Paris in July 1986. The discussions gave the United States the chance to learn about the French system and to encourage the French to open their markets. U.S. officials have been encouraging liberalization of the French telecom system, and the French officials seemingly agree. They indicate, however, that change will be evolutionary rather than abrupt. French officials promised to decide by January 1988 which telecom services will remain under DGT monopoly control and which services will be opened for competition.

With assistance in the development and analysis of issues from the DOC GATT technical office, bilateral negotiations on modem standards were held in April 1985 by the USTR. The USTR complained that modems built in the United States were subject to excessive and discriminatory approval procedures in France. Information on conformance to French standards and on authorizations for attachment to the public network was helpful for U.S. modem manufacturers. For fiber optic systems, however, U.S. telecom companies were not aware of any specific actions to assist them in exporting to France.

A) 2 Federal Republic of Germany

A) 2.1 Current West German Market

The FRG does not plan to deregulate its telecommunications system on the same scale as was done in the United States or the U.K. Consequently, the FRG telecom markets are expected to remain restricted. Expectations of increased telecom trade to help reduce the overall trade deficit with the FRG, which was $12.1 billion in 1985, will not be fulfilled.

The FRG PTT, a quasi-governmental agency, has a virtual monopoly over their telecom market. If a U.S. company seeks to penetrate that market, they must first comply with the PTT regulation which requires that a local representative be appointed. That representative can be a subsidiary that manufacturers telecom equipment or just a "distributor." A U.S. company, through its local representative, can then seek a permit for the type of equipment for which bids to the PTT are to be submitted, and the firm is eligible to receive a license after the equipment has undergone extensive acceptance testing.

Federal telecom procurement is essentially closed to U.S. exporters that do not maintain subsidiaries that manufacture in the FRG. Those U.S. exporters, without such subsidiaries,

accounted for 0.3 percent of German PTT procurement in 1984. The PTT received only four bids from such U.S. exporters in the three years ending in 1984.

A) 2.2 Efforts to Address Problems

Last year, the Secretary of Commerce presented objections to the DBP Minister on the non-acceptance of test data and the need for a manufacturing presence. FCC has received promises that U.S. telecom companies will have the same chance to sell to the DBP that West German companies have to sell in the United States. Additionally, the USTR, with technical support from the DOC GATT technical office, held bilateral negotiations in 1985 with West German trade and testing officials involving VDE testing procedures.

The FRG is a signatory to the GATT Code on Government Procurement; however, the Code excludes telecom equipment. Therefore, U.S. Government officials do not have legal authority to charge the FRG with technical barriers within the government procurement area.

MAFF discussions were held with telecom experts from the FRG in December 1985, March 1986, and February 1987. In addition, U.S. experts continued to hold consultations with FRG officials regarding the development of a revised telecommunications law that will eliminate perceived unfair requirements and practices and provide more opportunities for U.S. exporters. The U.S. government is continuing to hold these fact finding discussions to develop more information on opening FRG markets.

In the private sector, some U.S. laboratory evaluations of U.S. products manufactured to West German standards have been accepted for application of the FRG safety mark. The U.S. government, through the NBS National Voluntary Laboratory Accreditation Program, also contributes to this effort which could shorten approval times for U.S. products.

A) 3 Italy

A) 3.1 Current Italian Market

Italy is currently "studying" the issue of liberalizing and modernizing its present government-controlled telecommunications monopoly, and is continuing to promise a "more open" market. The U.S. government expects fair access to the Italian market, one of the largest in Europe. However, an open, competitive system is not likely to evolve in the near future. Italy does not plan to follow the U.S. and U.K. models of deregulation and privatization.

Italian officials feel that Italy does not discriminate against U.S. suppliers willing to adapt to the Italian system. They strongly suggest that U.S. telecom companies seeking to become exporters must: write in Italian, ask to bid, demonstrate superior technology (or fill a void), offer lower prices, and guarantee service. Nevertheless, Italian national practices significantly restrict efforts of U.S. exporters to enter the telecom market. Additionally, it is difficult to know which Italian government agency or organization is responsible for requirements or practices, many of which seem unreasonable.

Five manufacturers, two Italian and three multinational, account for 100 percent of the installed public switching market, with the largest having a market share of over 50 percent. These companies also account for over 60 percent of the PBX and related equipment market, the largest having a market share of over a third of the installed equipment. The largest manufacturer in both cases is an Italian company and part of a quasi-private group. Two of the multinational companies are subsidiaries of U.S. based companies.

A) 3.2 Efforts to Address Problems

Market Access Fact Finding talks held in April 1986 and February 1987 have been very positive in establishing good rapport between the telecom establishments of Italy and the United States. A key issue -- how can U.S. firms compete within the complex telecom organization structure? -- is being resolved consonant with plans to eliminate the complexity by reducing the number of Italian telecom agencies. One agency will, apparently, have all authority for domestic telecommunications.

Multinational firms have offered to, and do, provide knowledge of and access to Italian markets for other U.S. telecom companies. One multinational company is a distributor for several U.S. telecom exporters. All telecom companies agree that discussions and pressure from U.S. officials can help to open Italian markets. But multinational firms have indicated that they can be hurt by U.S. retaliation threats against our trading partners.

PBX manufacturers were not aware of any specific action by the U.S. government to assist sales in Italy. Moreover, they indicate that there probably is no possibility of opening the market for switches short of retaliation. (One company, however, indicated that the threat of retaliation in Senator Danforth's bill opened the market for switches in Japan.)

A) 4 United Kingdom

A) 4.1 Current British Market

The U.K. is currently undergoing deregulation and privatization of their previously government owned and operated telecom system, and the British are experiencing growing pains. The Telecommunications Act of 1984 removed the PTT's monopoly and created competition in telecom service areas. The PTT has been privatized and now has one moderate-sized competitor and one small, local competitor. There are no longer any official barriers to trade, but U.K. purchasers are encouraged to "think British."

The "privatized PTT" still has administrative restrictions to delay entry of products from U.S. telecom companies into the market. Sometimes U.S. exporters have to go through BT, as a competitor, to get to customers. U.K. telecom agencies sometimes do not respond to requests for help from U.S. exporters. In one case, the exporter was told that BT would not buy from his company even though his product could extend the life of their existing telecom systems.

A) 4.2 Efforts to Address Problems

U.S. government officials have encouraged privatization and have been patient as new approval procedures have been worked out. ITA officials helped companies to find distributors who knew how to get LANs certified in the U.K.

In the United States, the Corporation for Open Systems (COS) is developing test methods for interconnectability and interoperability of LAN products. The U.K. consortium, established in 1986 to develop comparable test methods for OSI standards, could develop tests different from those developed in the United States. The U.K. test center, established under the auspices of the EC, expects to produce test data for telecom equipment that will be accepted across all European borders. No immediate impact is expected because COS is just getting started and the European counterpart to COS is even further behind. COS and its European counterpart, SPAG, are having discussions on how best to establish an agreement to accept each others test data.

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This report addresses the perceived institution of unreasonable technical trade barriers by major European trading partners to the export of telecom products and systems by U.S. companies. The DOC GATT technical office, which has responsibilities to assist U.S. exporters to take advantage of trade opportunities, informally contacted over a period of six months, telecom companies and agencies to assess the extent of unreasonableness in foreign national standards, regulations, testing and certification requirements, and accreditation procedures. In each country, examples of requirements and practices were identified that allegedly blocked U.S. exports and other non-domestic products. Promises from our trading partners to revise their systems have yielded little, and each country continues to support unique requirements and practices that constitute trade barriers. Many trade barriers instituted by EC countries would be eliminated if EC regional and international telecom standards were harmonized, their adoption made mandatory for all EC countries, and results of testing for conformity from one government accredited laboratory were required to be accepted throughout the Community. Consequently, the United States should consider as an option supporting the development and implementation of European regional requirements and practices that promote uniformity.

12. KEY WORDS *(Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)*

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