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**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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JUN 14 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
Amendment of Part 68 of)
the Commission's Rules to)
Accommodate Terminal)
Equipment Providing 1.544)
Mbps Digital Services)

RM-_____

To: The Commission

PETITION FOR RULE MAKING

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PETITION FOR RULE MAKING

Pursuant to Section 1.401 of the Commission's Rules,¹ Alcatel Network Systems, Inc. ("ANS"), by its attorney, hereby petitions the Commission to amend Part 68 of its Rules so that 1.544 Mbps digital terminals using a DSX instead of a T1 interface² can be marketed to private users without being registered and without using costly and unnecessary protective circuitry.

I. SUMMARY

In this Petition for Rule Making ("Petition"), ANS requests that the Commission:

- Recognize that Part 68 technical specifications are inapplicable for digital terminals which use a "DSX" interface in a controlled office environment and which do not use network terminating voice processing; that equipment manufacturers, including ANS, cannot sell digital terminals using a DSX interface to private users for interconnection into the network in compliance with Part 68 unless they are protected by channel service units ("CSUs"); and that this restriction is arbitrary and unnecessary

¹47 C.F.R. Section 1.401 (1992).

²The "DS-1" nomenclature is applied to terminals which could be interconnected with different interfaces: (1) a DS-1 connection with a cable length in excess of 1500 feet using the traditional T1 span line interface for office-to-office systems; and (2) a DS-1 connection with a cable length of 1500 feet or less (the industry standard is 1310 feet) using the "DSX" interface for controlled intra-office systems. ANS and most other 1.544 Mbps equipment manufacturers produce terminals that are used with DSX interfaces in controlled intra-office systems.

because a CSU does not improve network protection, but it increases the overall cost of interconnecting the digital terminal by approximately 300%.

- Recognize that digital terminals using a DSX interface are sold for network use subject to strict industry standards and that these standards are inconsistent with and eliminate the need for Part 68 registration.
- Define "digital terminal" to be "a digital device operating at a 1.544 Mbps or lower rate which contains voice channel equipment terminating in the public switched telephone network or which interconnects the public switched telephone network with a cable exceeding 1500 feet in length."
- Adopt ANS' approach so that equipment using traditional metallic DS-1 T1 span line interfaces remain subject to registration requirements and so that equipment in a controlled office environment using DSX interfaces are exempt from registration requirements because the network is adequately protected from harm by prevailing industry standards.
- Recognize that ANS' proposal is consistent with the Part 68 goals of setting technical standards for protecting against network harm caused by interconnected equipment and of ensuring interconnection for registered equipment.

II. INDUSTRY CHANGES COMPEL ADOPTION OF THE PROPOSED REVISION TO PART 68

- A. Part 68 Does Not Include Technical Specifications for Digital Terminals Using a DSX Interface.

Even though it continues to serve an extremely useful purpose, Part 68 is not current with industry practices regarding Special Access service (i.e., private carrier-to-private carrier). In the aftermath of the AT&T divestiture, customers increasingly are engaging in Special Access services, where they provide their own terminal equipment using a DSX interface at both ends of the 1.544 Mbps or DS-1 circuit. The public switched telephone network ("PSTN") is used merely as a bridge for transmission between these customer-provided circuits. A customer's terminal equipment does not terminate or originate in the PSTN. When this Special Access service configuration is deployed, it is appropriate for terminal equipment specifications to be defined by the user instead of by the carrier.

ANS manufactures high-data rate (or "high-capacity") digital terminal equipment using a DSX interface. These products include DS-1 terminals (1.544 Mbps) used for operational-fixed point-to-point microwave, lightwave, SONET, and cross-connect services. ANS' digital terminals meet industry standards. Consequently, for the past 20 years, Bell Operating Companies ("BOCs"), other local exchange carriers ("LECs"), and interexchange carriers ("IXCs") have made these digital terminals, which use a DSX instead of a T1 interface, a significant part of the PSTN by purchasing them for incorporation into their networks. Large private network operators, such as public utilities, also purchase these digital terminals and connect them to the PSTN.

Driven by a concern that network carriers would not interconnect certain customer premises equipment ("CPE"), the Commission established Part 68 to ensure competitive provision of such equipment and to achieve the attendant benefits of lower prices, faster innovation, improved quality and service, and increased consumer choices. The Commission's registration program meets these goals by: (1) prescribing technical standards that safeguard against network harm caused by interconnected equipment; and (2) requiring that carriers permit interconnection of equipment meeting such technical standards.³

Under Part 68, ANS' DSX digital terminals must be registered.⁴ However, as detailed herein, this requirement is inconsistent with industry practices and is not required to satisfy the goals of Part 68.

³Hush-A-Phone Corp. v. United States, 238 F.2d 266 (D.C. Cir. 1956). See also Use of the Carterfone Device in Message Toll Telephone Service, 13 F.C.C.2d 420, reconsideration denied, 14 F.C.C.2d 571 (1968); Proposals for New or Revised Classes of Interstate and Foreign Message Toll Telephone Service (MTS) and Wide Area Telephone Service (WATS), First Report and Order (Docket No. 19528), 56 F.C.C.2d 593 (1975) (subsequent history omitted).

⁴47 C.F.R. Sections 68.1 et seq. (1992).

B. Registration Is Unnecessary For Digital Terminals Using A DSX Interface.

ANS and most other 1.544 Mbps equipment manufacturers produce terminals that are used with DSX interfaces in the controlled office system environment. Specifications for interconnecting DS-1 terminals used with T1 span lines are prescribed in Part 68, Subpart D.⁵ Unfortunately, specifications for DS-1 terminals, used with DSX interfaces, are not set forth in Part 68, Subpart D.⁶ Instead, private sector national and international industry standards have been developed to accommodate and codify the DSX private carrier-to-private carrier interfaces used for equipment in a controlled office environment.⁷

⁵In 1984, the Commission expanded the scope of Part 68 to include 1.544 Mbps digital services. See Telephone Network Interconnection (Terminal Equipment), 57 Rad. Reg. (P&F) 2d 257 (1984). At that time, the only 1.544 Mbps interface available between users and common carriers were T1 span lines. This DS-1 interface is included in Part 68 and is used for equipment in an otherwise unprotected office-to-office configuration. Traditionally, a customer's 1.544 Mbps circuit connected PBXs and other terminal equipment directly to the PSTN. ANSI, Bellcore, and AT&T have specific standards for this T1 interface, which are consistent with Part 68. These standards purposely are different from the standards set forth in note 7, infra.

⁶After the AT&T divestiture, the number of services tariffed by common carriers increased significantly. This change expanded the user's ability to interface the network directly. Traditional common carrier-to-common carrier interfaces for digital terminal equipment were supplemented by direct interfaces for private users into the PSTN. These DSX interfaces are used for Special Access services and allow for generic digital applications that were not contemplated when the Part 68 registration program was implemented or was expanded to include 1.544 Mbps digital services. Instead of having the 1.544 Mbps circuit terminate or originate in the PSTN, the Special Access customer provides both ends of the circuit and merely uses the PSTN as an intermediate link.

⁷These standards include the American National Standard Institute, Inc. ("ANSI") T1.102-1987, American National Standard for Telecommunications - Digital Hierarchy - Electrical Interfaces, Section 2, DS1 Level Specification ("ANSI DS-1 Standard"); International Telecommunication Union, Telecommunications Standards Bureau (ITU-TSB, formerly CCITT) Rec. G.703, General Aspects of Digital Transmission Systems, Terminal Equipments, Physical/Electrical Characteristics of Hierarchical Digital Interfaces, Section 2 - Interface at 1.544 Kbits/s (1991) ("ITU Recommendation"); Bellcore Technical Reference TR-INS-000342, High-Capacity Digital Special Access Service, Transmission Parameter Limits and Interface Combinations, Section 4, DS1 (HC1) Requirements, Issue 1 (Feb. 1991) ("Bellcore Standard"); AT&T Compatibility Bulletin No. 119, Interconnection Specification for Digital Cross-Connects, Section 2, DSX-1 Interconnection Specification (Issue 3, Oct. 1979) ("AT&T Standard"). The ANSI DS-1 Standard is consistent with the ITU Recommendation, Bellcore Standard and AT&T Standard.

Network providers do not require Part 68 registration protection for 1.544 Mbps terminals using a DSX interface. This requirement is not needed to satisfy the network protection, interconnection, and competition goals of Part 68.

The DSX digital terminals are not located outside or in any environment subject to lightning or other abnormal voltages. Nor are they interconnected with CPE where PSTN terminating voice signal processing occurs. Indeed, network providers require that 1.544 Mbps digital terminals, using a DSX interface, meet industry standards instead of Part 68.⁹

The Special Access service private carrier-to-private carrier intra-office configuration is described in the SWBT Standard at Section 3.1:

[T]he High-Capacity Digital Special Access Service signals [are] delivered to the [interexchange carrier or] IC and the End-User [or EU]. The Point of Termination (POT) is the physical point where the access service begins and the division of responsibility occurs. The POT can be provided as a DSX-1 or DSX-3 per ANSI T1.102-1987 where possible. In these cases, the IC or EU must provide appropriate power and space for the Telephone Company provided equipment. In some DS1 arrangements, the POT will be provided as a non-DSX1 described in ANSI T1.403, Metallic DS1 interface specifications. Design information for this arrangement is provided in Bellcore TR-TSY-000054. In each case, the customer must provide access for any required maintenance and testing.

In this configuration, the industry standard cable length is less than 1500 feet (i.e., 1310 feet), so that the DSX interface (or POT) always is located in a controlled office environment. The parties have access to all elements of the interface, ensuring that adequate safeguards against network harm and adequate access to equipment for prompt repair and replacement exist.

⁹See standards listed in note 7, *supra*. See also the Southwestern Bell Telephone Company ("SWBT") TP 76625, High Capacity Digital Service (1.544 M B/S and 44.736 M B/S) Requirements and Transmission Limits, Issue 1, June 1990 ("SWBT Standard"), attached hereto as Attachment A. For DS-1 services, in Section 2.1 of the SWBT Standard, SWBT requires compliance with the ANSI DS-1 Standard and with ANSI T1.107-1988, American National Standard for Telecommunications - Digital Hierarchy - Format Specifications, but it does not require compliance with Part 68. The SWBT Standard refers to the 1989 ANSI DS-1 Standard, but balloting on this newer version is incomplete and the 1987 version referenced herein still is in effect.

Under these circumstances, the DSX interconnection is benign with respect to the PSTN. Registration under Part 68 only is necessary in a hostile environment, such as where the cable interconnection is located outside or where voice processing occurs.

Even though digital terminals using a DSX interface are sold to network providers for internal use without CSUs, they cannot be sold to private users for interconnection to the PSTN or to 1.544 Mbps circuits unless they are CSU-protected. This anomaly is unjustified. A CSU, on average, triples the overall cost of a digital terminal from \$7,000.00 to \$21,000.00 without improving protection of the PSTN.⁹

Requirements under Part 68 must be limited to digital terminals which are located in an uncontrolled environment or which are used with a PBX or with other voice-processing CPE. The ANSI DS-1 Standard and other industry standards appropriately and comprehensively govern 1.544 Mbps digital terminals using a DSX interface in a controlled office environment. Given the exclusive reliance by network providers on these industry standards, mandating compliance with Part 68 before this equipment can be purchased and interconnected by private users is arbitrary and unnecessary.

C. ANS' Proposed Amendment for "Digital Terminal" Leaves Part 68 Intact.

To solve this problem, ANS herein proposes amending Section 68.3 by adding a definition for "digital terminal," as set forth in Attachment B. This definition limits the scope of 1.544 digital terminals subject to Part 68 registration:

Digital terminal: A digital device operating at a 1.544 Mbps or lower rate which contains voice channel equipment terminating in the public switched telephone network or which interconnects the public switched telephone network with a cable exceeding 1500 feet in length.

⁹For example, an average 1.544 Mbps digital terminal using a DSX connection costs approximately \$7,000.00 and a CSU, which would be unnecessary under this Petition, costs approximately an additional \$14,000.00.

A digital terminal meeting ANS' proposed definition would be subject to Part 68 registration requirements. This proposed definition leaves intact Part 68 requirements for digital terminals where protection is necessary. If adopted, this definition would ensure that digital terminals located in unprotected areas or used with CPE providing voice services continue to be subject to Part 68 registration requirements. This definition is consistent with the Subpart D specifications for environmental simulation (Section 68.302); leakage current and hazardous voltage (Sections 68.304 and 68.306); signal power (Section 68.308); longitudinal balance (Section 68.310); on-hook impedance (Section 68.312); and billing protection (Section 68.314). No changes to these specifications would be necessary.

Any digital terminal not meeting ANS' proposed definition would be exempt from Part 68 requirements. Protection of the PSTN and 1.544 Mbps private line services still is guaranteed, however, because these digital terminals must meet the ANSI DS-1 Standard or other industry standards¹⁰ before they can be interconnected. The definition for "digital terminal" proposed herein is totally consistent with all applicable domestic and international industry standards for Special Access service. Limiting Part 68 registration requirements to digital terminals used in an office-to-office environment or interconnected to CPE where PSTN terminating voice processing functions occur would permit equipment manufacturers to market DSX digital terminals to private users without the need for costly and unnecessary protective circuitry.

Industry standards effectively manage network interconnection of digital terminals using a DSX interface. These standards are comprehensive, consistent with each other, well documented, and readily available for all manufacturers. Under these circumstances, the potential for carriers to engage in discriminatory behavior by refusing to interconnect unregistered DSX terminals is virtually non-existent because they have been purchasing these terminals on

¹⁰See industry standards set forth in note 7, supra.

a fully competitive and open basis for 20 years.¹¹ More importantly, as detailed in Section IV, infra, interconnection of Part 68 registered digital terminals using a DSX interface would cause severe degradation to, or complete interruption of, network operations because the Commission's technical standards do not incorporate current industry standards and thus are dangerously at odds with what carriers require.¹²

D. ANS Seeks Temporary Relief to Market DSX Terminals.

ANS merely wishes to be allowed to market to private customers the same products (i.e., digital terminals exempt from Part 68 registration and from being protected by a CSU) that it sells to the companies comprising the PSTN. Until the Commission acts on this Petition, ANS needs Special Temporary Authority ("STA") and a temporary waiver to meet private user demand for these digital terminals.

ANS is losing sales to private customers because other digital terminal manufacturers do not include the price of, or declare the need for, a CSU in their bid. Customers are not notified by these other manufacturers that a CSU is required under Part 68 for the DSX digital terminal. The network carrier does not require a CSU because industry standards, instead of Part 68, are used. The bid thus is significantly lower than ANS could propose because its bid would comply with Part 68 and include the cost for, or acknowledge the need to purchase, protective circuitry.

To maintain a level playing field among equipment manufacturers, ANS, contemporaneously herewith, requests STA and a temporary waiver to market its DSX digital

¹¹ANS sells the DSX terminals nationwide. Relying on BOCs, LECs and other carriers to tariff these digital terminals is overly burdensome, impractical to implement, and thus unacceptable.

¹²For example, pulse rate limitations are prescribed in Section 68.308(h)(2) of the Commission's Rules which require digital equipment to be capable of meeting three (3) output templates. Digital terminals used for 1.544 Mbps service must meet the ANSI DS-1 Standard for use in the industry, but this standard is totally inconsistent with the Section 68.308(h)(2) requirements. Use of terminals manufactured to meet Part 68 pulse rate specifications, instead of industry standards, could have a catastrophic impact on network operation.

terminals to private users until the Commission adopts the rule changes proposed in the Petition (the "Request").¹⁹ In separately filed Form 730s, ANS demonstrates compliance with the appropriate, industry-accepted ANSI DS-1 Standard instead of with the inappropriate Subpart D technical specifications. In these Form 730s, ANS attests that its DSX terminals meet the ANSI DS-1 Standard and all other applicable Part 68 requirements, including product labeling and dissemination of consumer information.

III. ANS IS WELL-SUITED TO MAKE THE PROPOSALS CONTAINED HEREIN

ANS is a wholly-owned subsidiary of Alcatel Alsthom ("Alcatel"), one of the world's largest corporations (with annual sales in excess of \$30 billion) and the world's largest manufacturer and supplier of telecommunications equipment. In particular, Alcatel is the world's largest independent manufacturer and supplier of digital microwave radios and other telecommunications equipment.

ANS was formed in 1991 following Alcatel's acquisition of Rockwell International Corporation's Network Transmission Systems Division, which, in turn, was a successor to the Collins Radio Company, a pioneer in the development and production of microwave and other radio equipment. This organization, which started in Iowa with eight employees in 1933, now employs approximately 5000 people in the United States. It has manufacturing facilities in Richardson and in Longview, Texas; Raleigh, North Carolina; and Nogales, Mexico. These facilities contain over one million square feet of floor space devoted exclusively to the manufacture and test of digital lightwave and microwave radio transmission equipment. ANS has over \$500 million in annual sales.

¹⁹ANS seeks this temporary relief pursuant to Section 1.3 of the Commission's Rules. 47 C.F.R. Section 1.3 (1992).

ANS' expertise makes it well-suited to create, and advance before the Commission, the rules proposed herein. It is a world leader in manufacturing microwave and lightwave transmission systems. Its parent company also lends expertise as a leader in the provision of cables, networks for broadband and narrowband services, satellite earth stations, and myriad data communications equipment.

ANS' equipment is used for a wide range of services, including short, medium and long-haul voice, video and data transmissions. Its microwave customers include all the BOCs, most major independent telephone companies, cellular operators, power and other utility companies, oil companies, railroads, industrial companies, and state and local government agencies.

ANS, with its Collins Radio and Rockwell International heritage, has more than 30 years experience as a leading U.S. supplier of turnkey telecommunications systems. This long and successful history at the forefront of radio technology includes the following:

- **Providing the radio communication equipment for the Admiral Byrd expedition to the South Pole;**
- **Developing the first Class B radio modulation;**
- **Developing the first autotuning radio transmitters for nearly instantaneous frequency channel changes;**
- **Developing the first high frequency rotating direction finder;**
- **Developing the first weather radar system for a commercial television station;**
- **Providing the high frequency transmitters for the State Department's Voice of America broadcasts;**
- **Developing the first radio sextant;**
- **Providing the high frequency communications equipment for the U.S. Air Force Strategic Air Command;**
- **Providing the communication/navigation system for the X-15 rocket plane;**
- **Providing the first two-way radio voice communication via artificial satellite (Project Echo);**

- Providing all radio communication equipment for manned orbital flights (Project Mercury and Project Gemini);
- Being, at one time, the largest independent producer of data modems (Kineplex);
- Being a pioneer in the field of Tropospheric microwave communication;
- Manufacturing the first all-solid-state microwave radio to use a fundamental frequency above 1 GHz;
- Obtaining the first FCC type acceptance for a common carrier microwave transmitter; and
- Introducing the first all digital microwave radio capable of 1344 channels on one polarization.

With this experience and expertise, it is understandable why ANS' predecessor's equipment was used on Project Apollo to transmit the voice of the first man on the moon.

IV. MANUFACTURERS OF TERMINALS CONNECTED TO 1.544 Mbps DIGITAL SERVICES WITH A DSX INTERFACE CANNOT MEET PART 68 REQUIREMENTS

A. Terminals Connected to 1.544 Mbps Digital Services Are Subject to Part 68.

In Part 68, the Commission establishes the technical and procedural standards for direct electrical connection of customer-provided telephone equipment, systems, and protective apparatus to the PSTN. These standards assure equipment manufacturers and consumers that "their equipment is connectible to the network" and they assure telephone companies that "such connection will not cause harm to the network."¹⁴ Terminal equipment directly connected to "1.544 Mbps digital services" is subject to Part 68 registration requirements.¹⁵

¹⁴See, e.g., EDS, 5 FCC Rcd 5578 (Com.Car.Bur. 1990).

¹⁵47 C.F.R. Section 68.2(a)(5) (1992). Inexplicably, "terminal equipment" and "digital terminal" never are defined in Part 68. A "1.544 Mbps digital service" is defined as a "full-time dedicated private line circuit used for the transmission of digital signals at a speed of 1.544 Mbps." 47 C.F.R. Section 68.3 (1992).

Grant of Part 68 registration is required before terminal equipment can be connected to the PSTN or to certain private line services.¹⁶ Such connection can be direct or through registered protective circuitry, such as a CSU.¹⁷

To obtain Part 68 registration, a FCC Form 730 must be filed with the following information:

- Identification, technical description and purpose of the equipment for which registration is sought.
- The means, if any, used to limit signal power into the interface.
- A description of all circuitry employed in assuring compliance with Part 68.
- A statement that the terminal device (or protective circuitry) complies with and will continue to comply with Part 68 conditions for registration (i.e., Subpart D), "accompanied by such test results, description of test procedures, analyses, evaluations, quality control standards and quality assurance standards as are necessary to demonstrate that such terminal equipment or protective circuitry complies with and will continue to comply with all the applicable rules and regulations in Subpart D"¹⁸

The conditions for registration set forth in Part 68, Subpart D,¹⁹ prescribe technical specifications or limitations (e.g., environmental simulation, leakage current, hazardous voltage,

¹⁶47 C.F.R. Sections 68.100 and 68.102 (1992). Grant of the Part 68 registration has certain related responsibilities. All models of the registered device must continue to meet applicable Part 68 specifications. 47 C.F.R. Section 68.218(a) (1986). A Part 68 grantee, or its agent, must provide the user of the registered equipment with instructions concerning installation, operation and repair. 47 C.F.R. Section 68.218(b) (1986). For registered devices used in connection with 1.544 Mbps digital services, users must be instructed to notify the telephone company prior to disconnection of such registered devices. 47 C.F.R. Section 68.218(b)(6) (1986). When the registration is revoked for any item of equipment, the Part 68 grantee is responsible to take all reasonable steps to ensure that purchasers and users of such equipment are notified of the revocation and are notified to discontinue use of the equipment. 47 C.F.R. Section 68.218(c) (1986). Connection of unregistered terminal equipment could result in civil or criminal sanctions. 47 U.S.C. Sections 501-504 and 510 (1993).

¹⁷47 C.F.R. Section 68.102 (1992).

¹⁸47 C.F.R. Section 68.200 (1993).

¹⁹47 C.F.R. Sections 68.300-68.318 (1993).

signal power, longitudinal balance, on-hook impedance and billing protection). An applicant for Part 68 registration must demonstrate, with specific documented test results, that its terminal equipment meets these Subpart D technical specifications or limitations.²⁰ A grant of the Form 730 application for equipment registration is made if the Commission "finds from an examination of such application and other matter which it may officially notice, that the equipment will comply with the rules and regulations in Subpart D . . . or that such grant will otherwise serve the public interest."²¹

Digital terminals are subject to these Part 68 requirements. As detailed in the descriptive materials included with the Form 730s ANS submitted with its Request, these terminals interface with 1.544 Mbps services via CSUs, or, if used exclusively within the network, directly into multiplexers or switching equipment.

B. Conditions for Registration Under Part 68, Subpart D, Are Inconsistent With Industry Requirements for 1.544 Mbps Digital Terminals Using a DSX Interface.

All technical conditions for registration prescribed in Part 68, Subpart D, are inconsistent with industry requirements for 1.544 Mbps digital terminals using a DSX interface. Even though these conditions could be met by equipment manufacturers, compliance would produce materially unacceptable results:

- Part 68 compliant digital terminals would not meet analogous industry standards, which would disqualify such equipment from being sold to AT&T, BOCs and other major customers.
- Part 68 compliant digital terminals would harm, rather than protect, the PSTN.

These Subpart D requirements include environmental simulation (Section 68.302); leakage current limitations (Section 68.304); hazardous voltage limitations (Section 68.306); signal power

²⁰47 C.F.R. Section 68.200 (1993).

²¹47 C.F.R. Section 68.206 (1991).

pulse rate limitations and encoded analog content specifications (Section 68.308); maximum longitudinal balance (Section 68.310); and billing protection (Section 68.314). While the pulse rate limitation specification is the most dangerous for 1.544 Mbps digital terminals using DSX interfaces, all the Subpart D specifications threaten network operations. Consequently, the Commission must amend Section 68.3 to include the definition in Attachment B for "digital terminal" that limits registration to equipment that could harm the network.

1. Pulse rate limitations -- In Section 68.308, the Commission establishes signal power limitations (i.e., attenuation requirements) for different interconnected terminal devices.²² These signal power limitations "shall be made using terminations as specified"²³

For terminal equipment connecting to a 1.544 Mbps digital service, specific limitations exist.²⁴ In particular, output pulse templates are set forth:

Output pulse templates. The registered terminal equipment shall be capable of optionally delivering three sizes of output pulses. The output pulse shall be selectable at the time of installation.²⁵

These specifications are inapplicable to terminal equipment interfacing with 1.544 Mbps digital services.

²²47 C.F.R. Section 68.308(a) (1986).

²³47 C.F.R. Section 68.308(a) (1986).

²⁴47 C.F.R. Section 68.308(h) (1986).

²⁵47 C.F.R. Section 68.308(h)(2)(ii) (1986). The three (3) selectable output pulses commonly are termed "options A, B, and C." Each option has specific signal power attenuation capabilities and is selected at the time of installation depending upon the level of attenuation needed to protect the network and avoid crosstalk. See BellSouth, 6 FCC Rcd 3336, 3337 (Com.Car.Bur. 1991). The signal voltage at the network interface must be within specified limits, which is achieved by implementing the appropriate output pulse option as a function of telephone carrier cable loss specified at the time of equipment installation. 47 C.F.R. Section 68.308(h)(2)(iii) (1986). The circuitry which performs the attenuation and which includes options A, B, and C is referred to as "LBO" and the actual attenuation commonly is termed "LBO functionality." BellSouth, 6 FCC Rcd at 3337.

First, the requirements set forth for Template option A do not correspond with industry standards.²⁶

	<u>ANSI</u>	<u>FCC</u>
Pulse width	460-627 nsecs.	279-369 nsecs.
Pulse height	2.4-3.6 volts	2.4-3.3 volts

The wide discrepancy between these pulse width and height values is significant. Digital terminals meeting the ANSI DS-1 Standard will not meet the Commission Part 68 specification; digital terminals meeting the Commission specification do not meeting industry standards and cannot be sold to network carriers. Indeed, there is substantial likelihood that a digital terminal operating within the Part 68 pulse rate specification totally would disable operation on the associated channel.

If the Part 68 pulse rate specification is used, due to 1.544 Mbps circuit design, the clock recovery function could not differentiate rise and fall time because the pulse slope is radically different than what is expected. This discrepancy prevents data recovery and thus totally forecloses the ability to communicate. Given the fact that all DS-1 channels interface with the network switch, any inability to communicate would cause a cascading effect, resulting in significant degradation to or complete cessation of network operations.

²⁶Compare ANSI DS-1 Standard at Paragraph 2.2.2, Fig. 1 with 47 C.F.R. Section 68.308(h), Table III.

Unlike the Commission, ANSI does not specify the other two templates, options B or C.²⁷ Instead, under the ANSI DS-1 Standard, values are extrapolated to meet its specifications.²⁸ Options B or C are unnecessary because of the flexibility inherent in the single ANSI standard template. Network carriers, including SWBT and the other BOCs, require compliance with ANSI and other industry standards instead of with Part 68.

The Commission requires digital terminals to be capable of meeting all three templates. This requirement cannot be satisfied by digital terminals meeting the ANSI DS-1 Standard. Meeting the two extra templates specified in Part 68 only would make matters worse. Standard data recovery circuits expect a voltage level higher than options B and C. If the lower option B and C voltage levels are used, data never would be recovered and communication would be disabled.

2. Environmental simulation; leakage current and hazardous voltage limitations -- In Section 68.302, the Commission prescribes safeguards against certain environmental mechanical and electrical stresses, such as temperature and humidity, shock and metallic voltage surge.²⁹ In Sections 68.304 and 68.306, the Commission establishes leakage current and hazardous voltage limitations to protect against network harm for terminals which could be adversely affected by certain voltage sources.³⁰ These specifications are unnecessary for 1.544 Mbps

²⁷Similarly, another principal industry standard, ITU Recommendation, Table 4 and Figure 10, only specifies a single template. This ITU Recommendation is consistent with the ANSI DS-1 Standard but not with Part 68.

²⁸The Part 68 options A, B and C are based upon T1 span line parameters, not upon the digital DSX interface used for 1.544 Mbps services. By contrast, the interfaces covered by the ANSI DS-1 Standard assume a pre-defined cable length of 655 feet. If the actual cable length differs from this default value, the ANSI DS-1 Standard permits the carrier to extrapolate the appropriate value using LBO to attenuate the signal accordingly.

²⁹47 C.F.R. Section 68.302 (1992).

³⁰47 C.F.R. Sections 68.304 (1993) and 68.306 (1986).

digital terminals using DSX connections because such terminals are not located in areas subject to environmental stresses or in network configurations vulnerable to uncontrolled voltage sources. Moreover, these potential threats to network operations are managed by the industry standards that the DSX digital terminals must meet.

3. Encoded analog content -- The encoded analog content specifications in Section 68.308(h)(2)(v) are inapplicable to terminals connected to 1.544 Mbps digital services with a DSX interface. Under this rule, if

registered terminal equipment connected to 1.544 Mbps digital service contains an analog-to-digital converter, or generates signals directly in digital form which are intended for eventual conversion into voice band analog signals, the encoded analog contents of the subrate channels within the 1.544 Mbps signal must be limited.³¹

This specification presupposes PCM channel banks in terminal equipment. However, terminal equipment used with 1.544 Mbps digital Special Access services do not assume specific video or data rates. Thus, these current digital Special Access services do not use the format prescribed in Section 68.308(h)(2)(v), making it inapplicable and unnecessary. Instead of requiring compliance with the encoded analog content specification in Section 68.308(h)(2)(v), 1.544 Mbps digital terminals using DSX connections should be required to meet the ANSI DS-1 Standard or other industry standards because they properly describe the data format currently used by network equipment.

4. Maximum longitudinal balance requirements -- In Section 68.310, the Commission imposes certain longitudinal balance requirements.³² The maximum balance requirements for registered terminal equipment connected to digital services "shall be equalled or exceeded for the range of frequencies applicable for the equipment under test and under all reasonable

³¹47 C.F.R. Section 68.308(h)(2)(v) (1986).

³²47 C.F.R. Section 68.310 (1986).

conditions of the application of the earth ground to the equipment."³³ All such terminal equipment shall have a specified longitudinal balance which, for 1.544 Mbps "shall be 100 ohms plus or minus one percent."³⁴

These Part 68 longitudinal balance requirements are unnecessary for 1.544 Mbps digital terminals using the DSX interface. Compliance with these requirements only adds cost to such equipment without serving any useful purpose because most digital terminals are located in a controlled central office environment. In this office environment, cable length never exceeds 1310 feet, which is the minimum length that the industry has decided should be subject to interference protection by imposing longitudinal balance specifications. Thus, 1.544 Mbps digital terminals connected to a DSX interface should be exempt from meeting any maximum longitudinal balance requirements.

5. Billing protection requirements -- The Commission prescribes various call duration requirements on terminal equipment connected to the PSTN, tie trunks, or private lines accessing the PSTN.³⁵ Specifically, registered terminal equipment for connection to 1.544 Mbps digital services

shall not deliver digital signals to the telephone network with encoded analog content energy in the 2450 to 2750 Hertz band unless at least an equal amount of encoded analog energy is present in the 800 to 2450 Hertz band.³⁶

Furthermore, in Section 68.314(f)(2), the Commission sets forth on-hook signal requirements for registered terminal equipment connected to 1.544 Mbps digital services:

³³47 C.F.R. Section 68.310(l) (1984).

³⁴47 C.F.R. Section 68.310(l) (1984). The longitudinal termination for those measurements shall be 500 ohms in all cases. Id.

³⁵47 C.F.R. Section 68.314(a) (1990).

³⁶47 C.F.R. Section 68.314(d) (1990).

The power derived by a zero level decoder, in the on-hook state, by reverse battery equipment shall not exceed -55 dB with respect to one milliwatt, unless the equipment is arranged to inhibit incoming signals.³⁷

These signaling requirements also are unnecessary. They assume a particular voice service. A 1.544 Mbps transmission facility can carry many forms of data service not covered by or applicable to these signaling requirements. Thus, terminal equipment connected to 1.544 Mbps digital services with a DSX interface also should be exempt from meeting signal interference requirements. The customer, not the Commission, should determine whether these requirements should be imposed.

**V. CONSISTENT WITH WELL-ACCEPTED COMMISSION PRACTICE,
INDUSTRY STANDARDS SHOULD BE RELIED UPON INSTEAD OF PART 68**

Reliance on industry standards instead of specific Commission rules is well-established. For example, in Part 68, Electronics Industries Association ("EIA") Standard RS-464, Section 4.4.1, dated December 1979, is incorporated into the rule prescribing operating requirements for Automatic Identified Outward Dialing.³⁸

Similarly, two recent Commission decisions reflect this policy favoring reliance on industry standards in its rules. First, Part 15 has been amended to incorporate international RF emission requirements so that manufacturers do not need to meet two separate standards.³⁹ Second, under Section 15.31(a), ANSI C63.4 has been incorporated into the Commission's Rules for measurement procedures to demonstrate compliance.⁴⁰

³⁷47 C.F.R. Section 68.314(f)(2) (1990).

³⁸47 C.F.R. Section 68.314(e) (1990).

³⁹Revision of Part 15, Report and Order, ET Dkt. No. 92-152 (FCC 93-421, released Sept. 17, 1993).

⁴⁰Revision of Part 15, 7 FCC Rcd 3128 (1992). See also Part 94 of the Commission's Rules, which references fixed microwave interference protection standards adopted by industry groups (i.e., IEEE, TIA, ANSI, NSMA) and the Second Report and Order, GEN Docket No. 90-314 (FCC

CONCLUSION

Requiring 1.544 Mbps digital terminals using a DSX interface to meet Part 68, Subpart D, specifications for registration disserves the public interest. Terminals using a DSX interface must meet stringent industry standards and do not need to be forced to meet Part 68 specifications. Fixing an "unbroken" system, by substituting Part 68 for these standards, could have a disastrous effect on network operations and on the digital transmission industry.

A simple solution exists. Rather than "shoehorn" 1.544 Mbps digital terminals using a DSX interface into Part 68, the Commission should amend its rules and add the definition in Attachment B so that these digital terminals are exempt from registration. In addition, to ensure prompt availability of terminal equipment for a private user interface with 1.544 Mbps circuits, the Commission must grant the Request.

Industry standards set forth in the ANSI DS-1 Standard and in other standards provide the appropriate specifications for compliance with network requirements by digital terminals using 1.544 Mbps DSX connections. These industry specifications, which serve the exact same purpose that the Subpart D specifications serve for digital terminals using 1.544 Mbps T1 connections, eliminate the need for Part 68 registration of digital terminals using the DSX interface. Imposing Subpart D specifications on digital terminals using a DSX interface would harm the network significantly.

ANS' proposed definition for "digital terminal" accommodates industry needs while preserving the goals of Part 68. The Subpart D specifications protect the PSTN by managing where the terminating signal is processed and where cables are located outside a controlled

93-451, released Oct. 22, 1993), wherein the Commission approves similar standards for governing PCS-microwave interference.

environment. Both these conditions exist with a metallic T1 span line connection and thus Part 68, Subpart D, remains appropriate for digital terminals using such an interface.

Neither condition exists at a DSX interface. Instead, at a DSX interface, the digital signal merely is connected to another transport terminal, which then transmits the signal to CPE for final processing. This end user CPE should be Part 68 compliant if it terminates in the PSTN, but the Special Access service transport terminal does not need to be Part 68 compliant because there is no resident final voice channel processing, the Subpart D specifications are inapplicable, and the industry manages the interconnection.

Nor does ANS' proposal diminish the requirement that carriers must interconnect all registered terminal equipment. Any digital terminal meeting ANS' proposed definition still would be protected by the Part 68 interconnection requirement. However, such protection for digital terminals using a DSX interface is unnecessary in today's highly competitive market environment. Carriers have developed standards specifically for interconnection of the DSX terminals. There is no evidence that carriers restrict interconnection of DSX terminals meeting their standards. Furthermore, carriers do not have the incentive or the ability to restrict such interconnection by private users which do not use a CSU.

The Commission must modernize Part 68 and harmonize it with prevailing national and international industry standards. Specifically, Part 68, Subpart D, technical specifications must be limited to digital terminals using T1 span line, office-to-office interfaces. Industry standards should govern digital terminals using DSX interfaces in a controlled office environment and registration should not be required as a condition to sale or use.⁴¹

⁴¹The Commission recently proposed amending Part 68 to accommodate terminal equipment interconnected to ISDN services. Notice of Proposed Rulemaking, 9 FCC Rcd 1068, CC Docket No. 93-268 (1993). Therein, at para. 2, the Commission recognizes the significant impact that its registration program has on "promot[ing] rapid exploitation" of new technologies and it recognizes that establishing uniform, industry-based standards facilitates achievement of these

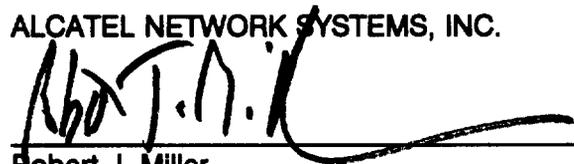
ANS' approach is the most comprehensive industry solution. It meets the public interest goals of Part 68 by ensuring flexible connectivity to and protection of the PSTN.

Strong industry support for this proposal is expected. Informal discussions with ANSI, the Telecommunications Industry Association, AT&T, Bellcore, BOCs, and various private users indicate that there will be a consensus favoring both adoption of the rule proposed herein and issuance of the STA and temporary waiver ANS seeks in the Request. Grant of this Petition and the Request will further the goals of Part 68 and thus will serve the public interest.

ANS' approach permits private users to incorporate exactly the same types of interfaces deployed for years by the various interconnecting common carriers. Taking this approach ensures a seamless transition for the digital transmission industry and continued protection of the PSTN.

Respectfully submitted,

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goals.

TP 76625
HIGH CAPACITY DIGITAL SERVICE
(1.544 M B/S AND 44.736 M B/S)
REQUIREMENTS AND TRANSMISSION LIMITS



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