SBC-TP-76200
NETWORK EQUIPMENT POWER, GROUNDING, ENVIRONMENTAL, AND PHYSICAL DESIGN REQUIREMENTS

To:	Telecommunications Equipment Suppliers
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Related Documents:	BSP 802-001-180MP, BSP 801-601-900MP, Telcordia GR-63-CORE, and GR-1089-CORE,
Cancelled Documents:	TP 76200, Issue date May 2002
Issuing Department:	Network Staff, Common Systems
Business Unit:	SBCSI, Inc.
Points of Contact:	For additional copies of this document contact: Phone number: (517) 788-6872 e-mail: apex.ntwk@ameritech.com
Author (s):	Bon Pipkin, General and Technical Sections 6 & 8 (925) 823-4325 Don Murray, Technical Sections 2 &3, (775) 333-8526 Brian Mullins, Technical Sections 10, 11 & 12, (775) 333-8553 Chuck Slavin, Technical Sections 4, 5 & 7, (775) 333-3948 Larry Wong, Technical Sections 6 & 9, (925) 823-4544 John Tablerion, Process, Appendix A, (708) 403-4450

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1 GENERAL

1.1 Requirements and Objectives

This section provides the requirements and objectives for the power, grounding, environmental, and physical design of telecommunications equipment intended for use in network facilities. The appendices included in this section discuss SBC's product evaluation process and identify the type of product information required from product suppliers for the product evaluation process.

1.2 Purpose

The purpose of this section is to provide product suppliers with a comprehensive reference of equipment requirements and objectives for the subjects covered. A product's compliance with the requirements and objectives of this section will not be the sole basis for the acceptance of the product, however noncompliance with one or more of the requirements or objectives of this section may be the basis for a product's denial of purchase.

1.3 Scope

Unless otherwise stated, the requirements contained herein apply to equipment systems and assemblies intended for installation in network equipment buildings, equipment areas within buildings, electronic equipment enclosures such as controlled environment vaults, outside mounted electronic equipment cabinets, and at customer locations.

Definitions

A. The term **product supplier** as used throughout this section refers to the equipment manufacturer or agent of the equipment manufacturer, whichever is appropriate for the product being considered.

B. The term **company representative** as used throughout this section refers to the SBC employee representing SBC

C. Requirements are those product features that **must** be provided by the equipment manufacturer. The words "shall" and "must" are used throughout this section to identify requirements.

D. Objectives are product features that are **desired** for the long term use or application. The word “should” is used throughout this section to identify objectives.

1.4 SBC TP 76200 Internet Web Site

Copies of this document and general information about SBC's environmental equipment standards my be found at https://ebiznet.sbc.com/sbcnebs/

1.5 Product Evaluation Process

SBC's Product Evaluation Process is documented in Appendix A.

NOTE: Unless the SBC Fast Track process is used (see Appendix A), for requirements that call for testing to verify conformance, test reports **must** be forwarded to SBC for review before the product will be approved for use.

1.6 Requirement Levels

Specific requirements for each level are identified in the corresponding Equipment Supplier Response (ESR) matrix forms located at the end of this Section. See Appendix A for processes required to document conformance to requirements.

A. LEVEL ONE (ESR-001). Level One refers to requirements that are a subset of Level Two requirements and are identified as the minimum acceptable requirements necessary to protect personnel and the network.

B. LEVEL TWO (ESR-002). Level Two refers to all TP 76200 requirements and addresses both equipment safety and reliability.

C. ANCILLARY (ESR-ANC) (Level 1 and Level 2). Ancillary requirements refer to a subset of Level Two requirements that apply to additions to or changes to equipment previously approved for use in SBC. If a change to an existing product, or sub-system of the product, results in the assignment of a new CLEI code, the product shall be evaluated for compliance to Ancillary requirements. See Appendix B for guidelines applicable to special considerations for testing of enhanced products.

1.7 Product Change Notices (PCNs)

PCNs must be evaluated for their effect on the equipment's TP 76200 compliance.

A. When it is determined by the manufacturer, using sound engineering judgement, that a hardware or software change does not impact the equipment's TP 76200 compliance, the manufacturer may submit a letter of attestation to this effect. See Appendix A, paragraphs and 15.6.

   NOTE: Except when it is obvious that the PCN will not affect the equipment's compliance, SBC recommends that a third party, independent laboratory evaluate whether testing is required to verify compliance.

B. When the manufacturer, a test lab or SBC determine that the PCN may affect the equipment's TP 76200 compliance, the modified equipment must be tested per TP 76200, Ancillary Requirements (ESR-ANC).

NOTE: Depending on engineering judgement, not all requirements may need to be tested.

1.8 Portable Test Equipment

At a minimum, portable test sets, including OSP test sets, will be reviewed to the following requirements prior to deployment:

- Electrical Safety Review: An electrical safety review is necessary when the output voltage of the equipment exceeds 140 volts DC or 50 volts rms AC.
- Radiated Emissions: A review is necessary when the equipment supplier cannot certify compliance to FCC Part 15. In the absence of FCC Part 15 compliance, the radiated emissions requirements and test methods of GR-1089, Section 3 shall apply.

Portable test sets that do not exceed 140 volts DC or 50 volts rms AC and are certified compliant to FCC Part 15, may be considered in compliance with the electrical safety and radiated emissions requirements and do not require review by the NEBS group.

1.9 Customer Premises Equipment

Network equipment intended for location in customer premises environments, including SBC non-central office areas (e.g., data rooms, NOCs, etc.), shall be listed by a Nationally Recognized Testing Laboratory and comply with applicable TP 76200 Level 1 and Level 2 requirements. If the equipment is intended ONLY for customer premises locations (NOT COs) listing will be accepted for fire resistance compliance and in some cases listing and FCC electromagnetic certification (e.g. FCC Part 15) may be accepted as verification of conformance to other TP 76200 Level 1 requirements.

1.10 Outside Plant Equipment

Equipment intended for use in uncontrolled environments in the outside plant (OSP) shall meet requirements from standards documents applicable to that application. These may include requirements from GR-487-CORE, Electronic Equipment Cabinets, OSP Airborne Contaminants requirements from GR-63-CORE and OSP temperature & humidity requirements from various documents such as GR-418-CORE. Information on test results of OSP airborne contaminants, temperature and humidity and other NEBS related OSP environmental standards should be including when forwarding documentation verifying compliance to TP 76200. For information on other SBC OSP equipment requirements, please contact:

Roy Tomko
25 E. Orange Street
Chagrin falls, Ohio 44146
(216) 765-7733

1.11 Equipment Testing Requirements

Unless otherwise stated in the requirement, when equipment is tested to verify conformance to a requirement, the applicable test protocol as set forth in this document or specific referenced source documents must be used.

1.12 Laboratory Accreditation Requirements

Starting January 1st, 2004, SBC will only accept test reports submitted from testing laboratories that are accredited by an accreditation agency (e.g., the American Association for Laboratory Accreditation, National Voluntary Laboratory Accreditation Program) that is, in turn, accredited by the National Cooperation for Laboratory Accreditation.

1.13 Additional SBC Requirements

The inclusion of the following functional requirements in this section are for notification purposes only. Refer to directions contained in the following paragraphs to obtain further information on these requirements. Verification of conformance to these requirements is not part of the evaluation process for this section.

Alarms

A. The SBC Alarm Standards Technical Manual, BSP 801-601-900MP, is the official repository of standard alarm information for all network elements (NE) deployed within the SBC Local Exchange Carriers' (SBC LEC) network of central offices and remote locations, exclusive of switching equipment. Specifically, the BSP document includes, but is not limited to, concepts and philosophies, interconnect methodologies and alarm details, as related to the alarm monitoring of transmission equipment, loop equipment, power equipment and building or environmental equipment.

B. Prior to the installation of any network equipment into an SBC LEC location, and, as part of the Approval For Use (AFU) process, all such equipment shall be reviewed by the Alarm Standards Committee to ensure that it meets the minimum alarm requirements set forth in the fore mentioned BSP. This BSP is available to equipment manufacturers at the SBC Extranet web site. Questions regarding access to this web site should be referred to the vendor's local SBC contacts.

C. All manufacturers submitting network equipment for review and consideration should pay specific attention to Sections A.03.0 and A.04.0 for minimum alarm and interconnection requirements and then follow the instructions contained in Sections B.01.0 and B.02.0 for submission procedures.

Synchronization

Equipment approved for use in the SBC network must be compliant to SBC Synchronization standards. These requirements are contained in the SBC document *SBC Basic Synchronization Requirements for Network Elements*. These requirements are similar to those established by Telcordia (e.g., GR-1244-CORE), but many of the conditional requirements and objectives in the GR are SBC requirements. Information on SBC synchronization requirements can be found on the SBC Common Systems Extranet web site or contact the company representative.

TP 76450MP: Common Systems Standards for the SBC Communications Network

Other SBC physical and functional requirements pertaining to new equipment placement in and connection to SBC facilities (e.g., dc power, cable routing and connections, etc.) are contained in TP 76450MP. This document may be obtained from the SBC internet web site at https://ebiznet.sbc.com/sbcnebs/.

1.14 Applicability of Other Publications

All or part of a product's requirements and objectives may be contained in other technical publications for some subjects. Unless otherwise stated in the text of this section all references to other publications are to their most current issue.

In response to questions received from product suppliers regarding the differences between the requirements contained in this section and the requirements contained in Telcordia GR-63-CORE, GR-1089-CORE, and SR-3580 the following information is provided.

Differences between TP 76200 Level 1 and SR-3580 Level 1 requirements:

- TP 76200 section 6 C, requirement 6.5 report on Heat Dissipation data is not an SR-3580 Level 1 requirement.
- TP 76200 section 9, Shock and Vibration, requirements 9.6 and 9.8 are not an SR-3580 Level 1 requirement
- TP 76200 section 10.4 – Protective Barriers are not GR-63-CORE requirements.
- TP 76200 section 10.5 – Fire Spread requirements reference ANSI/T1.319 not GR-63.

Differences between TP 76200 Level 2 and SR-3580 Level 3 requirements:

- TP 76200 section 6 C, requirement 6.05 Heat Dissipation differs from those in GR-63-CORE
- TP 76200 section 7, DC Power requirements are not in GR-1089-CORE
- TP 76200 section 8, Airborne Contaminants, fan filter requirements differ from GR-63-CORE
- TP 76200 section 10.4 – Protective Barriers are not GR-63-CORE requirements.
- TP 76200 section 10.5 – Fire Spread requirements reference ANSI/T1.319 not GR-63.

1.15 Revisions

The contents of this section are revised according to business objectives and the evolution of technology. The Reason for Reissue part of this section identifies the changes made to this document when it is revised.

1.16 Reasons for Reissue

This document is being reissued due to changes in some requirements. Primary changes are as follows:

- Paragraph 1.7, Product Change Notice added
- Paragraph 1.8, Portable Test Equipment added
- Paragraph 1.11, Equipment Testing Requirements added
- Paragraph 1.12 Laboratory Accreditation Requirements added
- Paragraph 1.13 Additional SBC Requirements, Common Systems Standards for the SBC Communications Network, TP 76450 added
- Section 7, DC Power:
  - Elimination of requirement for testing Noise Returned from Telecommunications Load Equipment (requirement 7.04 (b) from TP 76200, May 2002). Be advised that this requirement is still contained in other documents (e.g., GR-499-CORE) that SBC cites as requirements.
  - Various changes to text and figures within this Section including added requirement to report List 2 power drain information.
  - Several requirements moved to TP76450
- Paragraph 10.4, Protective Barriers text change, notes future reference to ANSI/T1.307.
- Paragraph 10.5, Fire Spread text change, references ANSI/T1.319
- Various SBC TP 76200 Forms, altered to capture above changes

1.17 Effective Date of this Issue

The requirements and processes contained in this section will be effective immediately upon publication. Documentation submitted based on the previous issue of this section dated May 2002 will be accepted until 9/30/2003.

1.18 Comments

Comments or questions regarding the content of this section should be directed to:

Associate Director –
Common Systems Product Standards Group
2600 Camino Ramon, Room 4S450H
San Ramon, CA 94583

2 ELECTROMAGNETIC COMPATIBILITY

2.1 GR-1089-CORE

The electromagnetic compatibility and electrical safety requirements for equipment products are stated in Telcordia publication GR-1089-CORE, Issue 3, October 2002, Electromagnetic Compatibility and Electrical Safety Generic Criteria for Network Telecommunications Equipment. GR-1089-CORE places these requirements into a single document that covers the central office, outside plant (loop) and customer location environments.

2.2 Application of Requirements

The application guidelines provided in subpart F of this part are intended to guide the reader in the application of requirements and tests to various types of telecommunications equipment.

2.3 Equipment Type

The product supplier shall determine the Equipment Type and record the appropriate numerical equipment Type from Table 2-1 in the Y Column of form ESR-001 (Level 1), ESR-002 (Level 2, Item 2.3) or ESR-ANC (Ancillary Item 2.1).

2.4 Electro Magnetic Interference

The equipment shall meet the radiated emission requirements stated in section 3.2 of GR-1089-CORE.

2.5 Conducted Emissions

The equipment shall meet the conducted emission requirements stated in section 3.2 of GR-1089-CORE.

2.6 Immunity

The equipment shall meet the immunity requirements stated in section 3.3 of GR-1089-CORE.

2.7 Lightning and AC Power Faults

The equipment shall meet the applicable lightning and ac power fault requirements stated in sections 4 of GR-1089-CORE.

2.8 Steady State Power Induction

The equipment shall meet the steady state power induction requirements stated in section 5 of GR-1089-CORE.

2.9 Electrical Safety Criteria

The equipment shall meet the electrical safety requirements stated in section 7 of GR-1089-CORE.

2.10 DC Potential Difference

The equipment shall meet the dc potential difference requirements stated in section 6 of GR-1089-CORE.

2.11 Equipment Type Application Guidelines

Table 2-1 provides a guide for applying the aforementioned electromagnetic compatibility requirements. Application of the various criteria is a function of the type of equipment under consideration, its connection to the telecommunications network and the intended location of the equipment. For the purpose of determining the applicable criteria of GR-1089-CORE, network equipment has been grouped into four categories. It is necessary to determine which of the four categories best applies to the equipment under test. Table 2-1 may be consulted once the equipment has been appropriately categorized as follows:

- Type 1: Equipment directly connected to metallic tip and ring outside plant conductors and intended for placement in telephone company locations such as central offices, electronic equipment enclosures (EEEs), controlled environmental vaults (CEVs), and huts. Examples include voice and data switches, multiplexers and digital carrier systems.
- Type 2: Equipment not directly connected to metallic tip and ring outside plant conductors (includes equipment isolated from the outside plant by channel banks or office repeaters) and intended for placement in telephone company locations such as central offices, electronic equipment enclosures (EEEs), controlled environmental vaults (CEVs) and huts. Examples include optical fiber multiplexers, digital cross-connect systems (DCS's) and signal transfer points (STP's).
- Type 3: Equipment directly connected to metallic tip and ring outside plant conductors, including lines that leave the premises, and intended for placement on customer premises. An example is a digital carrier system remote terminal.
- Type 4: Equipment intended to be located on customer premises that does not directly connect to metallic tip and ring outside plant conductors, but may serve intra-building metallic tip and ring conductors only. Examples include digital carrier system remote terminals and optical fiber multiplexers.

Table 2-1 - Application of Electromagnetic Compatibility Requirements

GR-1089-CORE		**Equipment Type**			
Section	**Description**	**1**	**2**	**3**	**4**
3	EMI	X	X	X	X
4.6	Equipment with Telecommunications Ports				
4.6.5	Short-Circuit Test	X		X	
4.6.7	First-Level Lightning Surge Tests	X		X	
4.6.8	Second-Level Lightning Surge Tests	X		X	
4.6.9	Intra-Building Lightning Surge Tests		X		X
4.6.10	First-Level AC Power Fault Tests	X		X	
4.6.11	Current-Limiting Protector Tests for Non-Customer Premises Equipment	X			
4.6.12	Second-level AC Power Fault for Non-Customer Premises Equipment	X			
4.6.13	Second-Level AC Power Fault Tests for Series-Type Equipment for Non-Customer Premises Equipment	X			
4.6.14	Fusing Coordination Tests for Network Equipment to be Located On Customer Premises			X	
4.6.15	Second-Level AC Power Fault Tests for Network Equipment to be Located On Customer Premises			X	
4.6.16	Second-Level AC Power Fault Tests for Series-Type Network Equipment to be Located on Customer Premises			X	
4.6.17	Second-Level Intra-Building AC Power Fault Tests for Network Equipment to be Located On Customer Premises				X
4.7	Lightning Criteria for Equipment with AC Power Port	X	X	X	X
4.8	Equipment with Coaxial Ports				
4.8.3	Short Circuit Tests	X		X	
4.8.4.1	First-Level Lightning Surge and Power Fault Tests for Equipment without External Protectors	X		X	
4.8.4.2	Second-Level Lightning Surge and Power Fault Tests for Equipment without External Protectors	X		X	
4.8.5.1	First-Level Lightning Surge and Power Fault Tests for Equipment with External Protectors	X		X	
4.8.5.2	Second-Level Lightning Surge and Power Fault Tests for Equipment with External Protectors	X		X	
4.8.6	Additional Criteria for Equipment Intended for the Outside Plant	X		X	
5	Steady-State Power Induction	X		X	
6	DC Potential Test	X		X	
7	Electrical Safety	X	X	X	X
8	Corrosion	X		X	

3 ACOUSTIC NOISE

The equipment shall meet the acoustic noise requirements stated in section 4.6 of GR-63-CORE.

4 ELECTROSTATIC DISCHARGE (ESD) and ELECTRICAL FAST TRANSIENTS (EFT)

4.1 ESD Immunity Criteria

Equipment shall meet the ESD immunity criteria requirements for normal operation and be tested for installation and repair objectives according to section 2.1.2 (ESD Immunity Criteria) of Telcordia's GR-1089-CORE document. All tests shall be conducted as described in section 2.1.4 of GR-1089 and IEC Publication 61000-4-2.

4.2 Special Requirements and Maintenance Information

Any additional equipment-specific requirements in paragraph 2.1.2.4 of GR-1089-CORE shall be described in the report.

4.3 Electrical Fast Transient (EFT)

Equipment shall be tested in accordance with section 2.2 of Telcordia's GR-1089-CORE document with tests conducted as described in section 2.2.1.

5 GROUNDING

5.1 Bonding and Grounding Requirements

Structures, equipment and power systems submitted for evaluation shall meet applicable Bonding and Grounding requirements of section 9 of GR-1089-Core. . For Ancillary reviews, only the short circuit test data of section 9.10 is required.

6 THERMAL

6.1 Temperature and Humidity Requirements

A. Controlled Thermal Environments

The majority of network equipment is located in structures with a controlled environment and therefore must be tested to requirements in Section 5 of the GR-63. An environment that maintains the ambient air temperature as defined in GR-63 between 40°F and 85°F is considered a controlled thermal environment.

B. Uncontrolled Thermal Environments

Equipment intended for use in an uncontrolled thermal environment (e.g., OSP cabinets) must be tested for compliance to "hardened" temperature requirements. These requirements are contained in several Telcordia GRs. Compliance to the requirements and test procedures contained in applicable document(s) will be considered acceptable to meet this requirement. An environment where there are no controls to maintain the ambient air between 40°F and 85°F is considered an uncontrolled thermal environment.

NOTE: Requirements other than those contained in this document may apply to auxiliary hardware used in an uncontrolled environment including, cabinets, power supplies and batteries.

6.2 Altitude

The equipment shall meet the altitude requirements and objective stated in section 4.1.3 of Telcordia publication GR-63-CORE.

6.3 Heat Dissipation

A. The normal continuous duty heat dissipated (in Watts) by the equipment shall be stated on TP 76200 form ESP-001 or ESP-002 form for individual units and maximum configured systems, if applicable. Heat dissipation is usually considered the power draw by equipment minus work accomplished by equipment and the value can be calculated or measured by the manufacturer. Manufacturer shall refer to Telcordia GR-3028 Section 6. Equipment Specifications for determining heat dissipation data for products and information reported as required under equipment data reporting. TP 76200 Form ESP-001 or ESP-002 is to be used for reporting to SBC in place of form referred to in GR-3028 Appendix F.

B. Manufacturer shall state **Yes** if product is electric motor fan forced cooled or **No** if product is convection cooled or cooled by other than fan forced cooling design. Other cooling methods shall be explained with a statement included as attachment to form ESP-001/002.

C. Equipment cooling scheme in central offices typically has cooling air inlet in front face of equipment and heat exhaust to back or top of equipment, GR-3028 EC Cooling Class F1-R3. The equipment cooling class with bottom-front inlet air to rear-top exhaust shall be SBC's preferred configuration for all fan forced cooled products. Manufacturer shall state **Yes** if cooling air flow of your product adheres to this cooling scheme. Heat exhaust to side(s) or front of equipment either as primary or secondary paths requires answering this question with a **No**.

D. Face temperature of equipment shall never exceed 38 degrees C (100 degrees F) at an ambient room temperature of 26 degrees C (79 degrees F). Manufacturer shall state **Yes** if in compliance.

7 DC POWER

The following requirements are referenced from, but not limited to, the American National Standards Institute (ANSI) publication ANSI T1.315-2001.

NOTE: SBC has other DC Power requirements including but not limited to those referenced in Telcordia's GR-499-Core and GR-513-Core.

7.1 Noise Immunity

Noise immunity tests in this section are based on the requirements outlined in ANSI T1.315-2001, section 5.5.1.

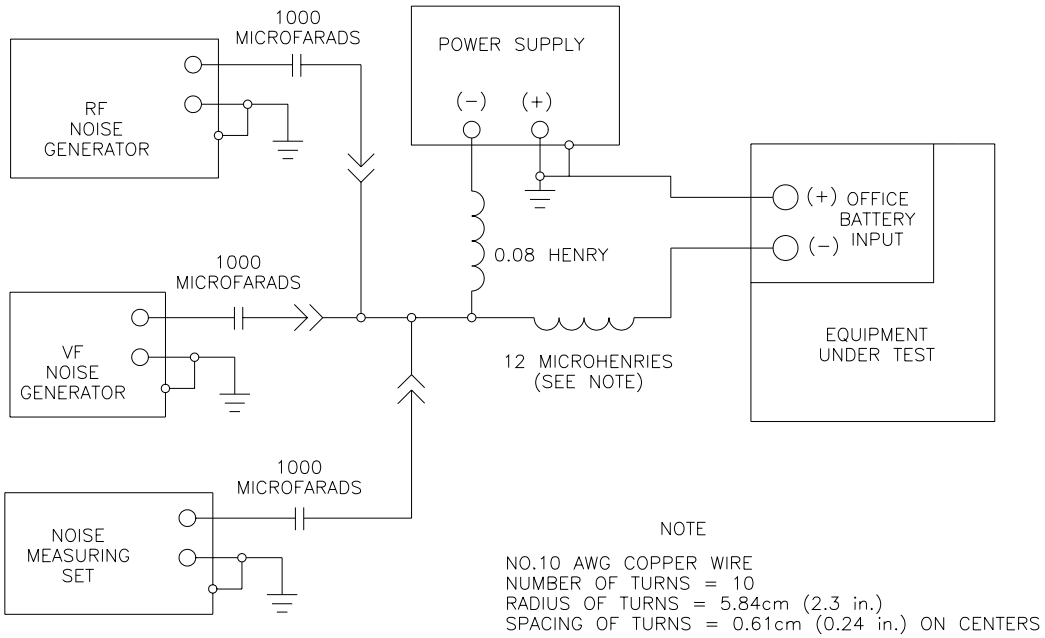
The equipment shall meet its operational requirements in the presence of the specified levels of electrical noise applied to the power-input terminals. The noise levels in Table 7-1 represent simulated noise from the dc power plant and include noise returned from the equipment under test. Wideband noise is defined as the Vrms in any 3 KHz frequency band from 10 KHz - 20 MHz. This test shall be performed on a plug-in, assembly, system or frame. A suggested test setup for performing this test is illustrated in Figure 7-1. The equipment supplier shall provide a report containing the test methods and results for the above requirement.

Table 7-1

Test Levels for Noise Immunity

Voiceband C Message dBrnC @ 600 ohms	Peak-To-Peak (mV)	Wideband (mV rms)
56	480	100

Figure 7-1
Noise Immunity Test Setup

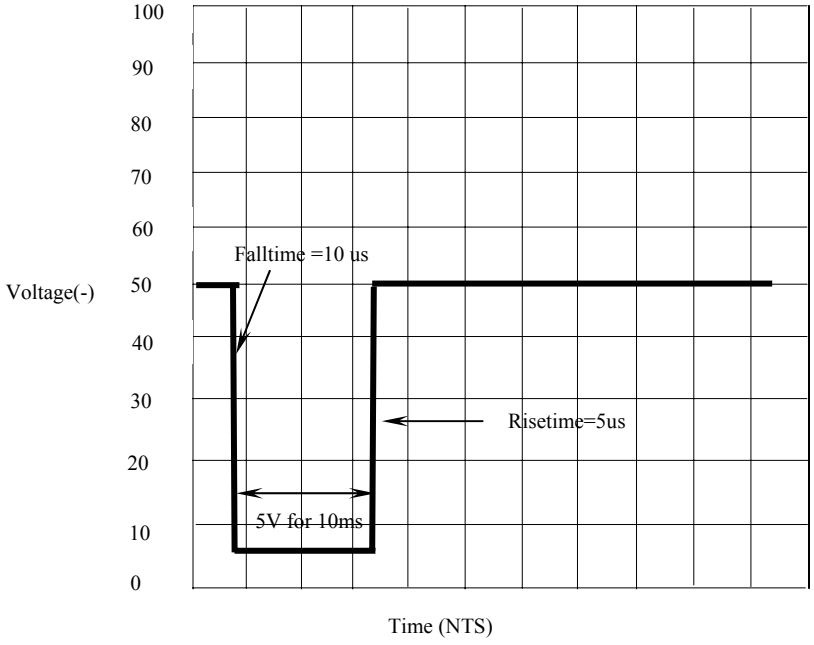


7.2 Transient Tests

The tests in this section are based on the under voltage transient requirements outlined in ANSI T1.315-2001, section 5.2 through 5.4

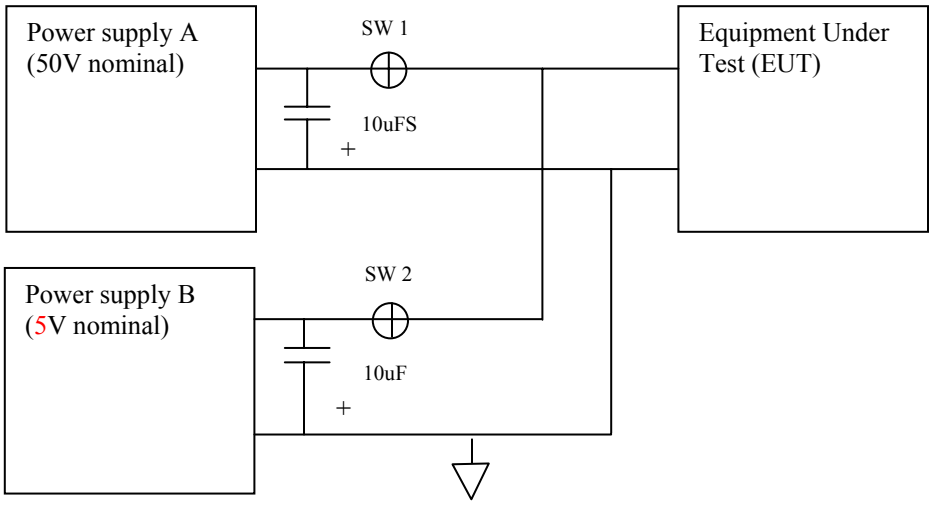
A. The equipment shall not suffer damage when the waveform defined in Figure 7-2 is applied at the power input terminals of the equipment under test. Following application of the test waveform and return to the nominal 50 volts, the equipment shall automatically return to its operational specifications without manual intervention. For equipment with redundant power supplies, one power supply shall be disabled for this test. The equipment supplier shall provide a report containing the test methods and results for the above requirement.

Figure 7-2
Under Voltage Transient Waveform



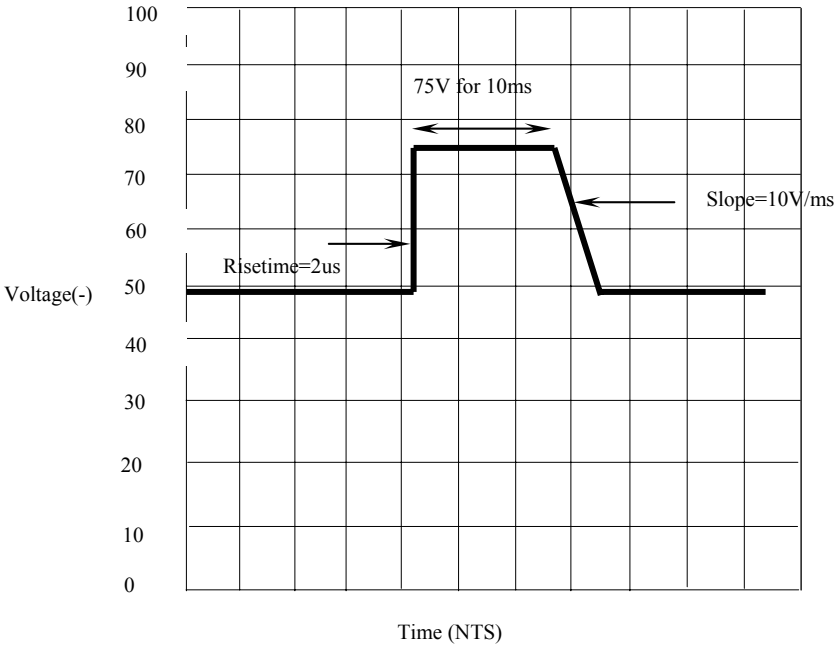
B. The undervoltage transient can be generated with the test set up shown in Figure 7-3, which is taken directly from ANSI T1.315-2001. The switches SW1 and SW2 are solid state with switching times of 1 microsecond or less. The rise time for this transient is not critical as long as it is less than the specified rise time. The control for the switches must prevent both switches from being on at the same time. SW1 must be able to supply the EUT with its required operational current and both switches should be capable of supplying a peak current of 100A. If power supply B cannot sink a large value of current it must be preloaded to insure the input capacity of the power supply can be discharged rapidly.

Figure 7-3
Undervoltage Transient Test Setup



C. The equipment shall meet its operational requirements during and following any single isolated over voltage transient applied between the power input terminals and having characteristics as shown in Figure 7-4. The duration of the over voltage transient shall be measured at an amplitude that begins and ends at a point midway between the 50V (nominal voltage) and 75V. The equipment supplier shall provide a report containing the test methods and results for the above requirement.

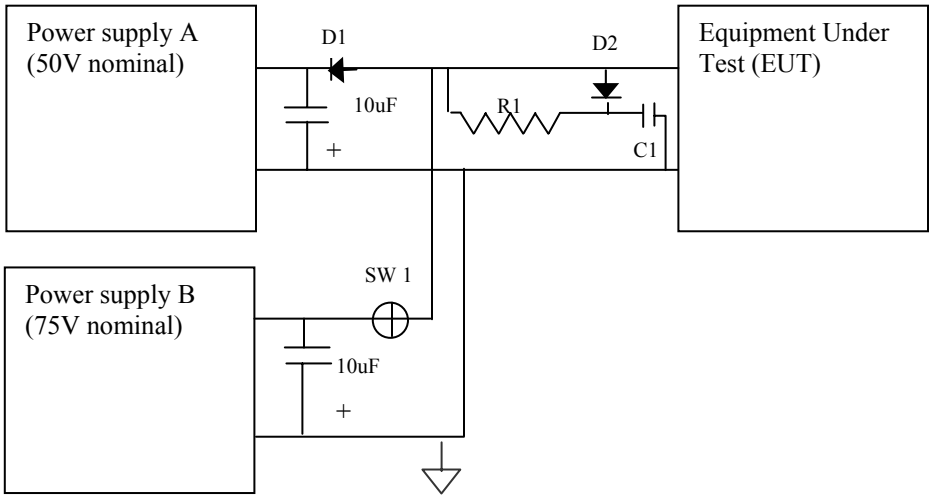
Figure 7-4
-27 VDC Overvoltage Transient Waveform



D. The over voltage transient can be generated with the test set up shown in Figure 7-5 which is taken directly from ANSI T1.315. The switch SW1 is solid state with a switching time of 1 microsecond or less. The rise time for this transient is not critical as long as it is less than the specified rise time. The diode D1 isolates power supply A from power supply B. Diode D2 allows a fast rise time while controlling the fall time by capacitor C1.

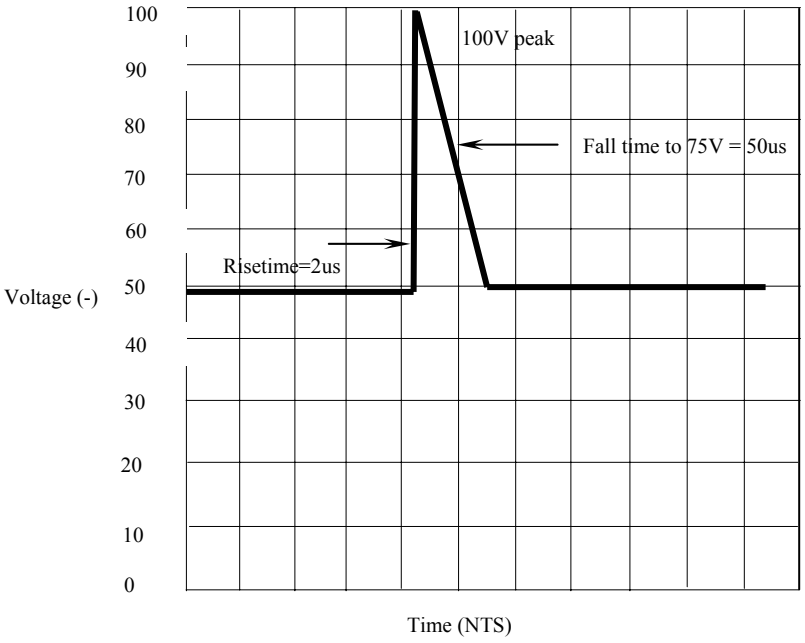
Resistor R1 charges capacitor C1 to 75 volts during the 10 milliseconds that SW1 is closed. D1 must be capable of supplying the EUT with its required operation current. The value of C1 must be chosen experimentally and will depend on the input power. The nominal value of C1 is 1.6uF per watt of input power. The slope of the decay will be approximately linear and will depend on the EUT input current versus voltage characteristics over the 50V to 75V range. The duration of the fall time should be approximately 2.5ms.

Figure 7-5
Over Voltage Transient Test Setup



E. The equipment shall meet its operational requirements during and following the simulated operation of a current protection device (e.g., fuse or circuit breaker). A transient resulting from the operation of a protection device is depicted in the waveform of Figure 7-6. The waveform is applied to the power input terminals of the equipment. The equipment supplier shall provide a report containing the testing methods and results for the above requirement.

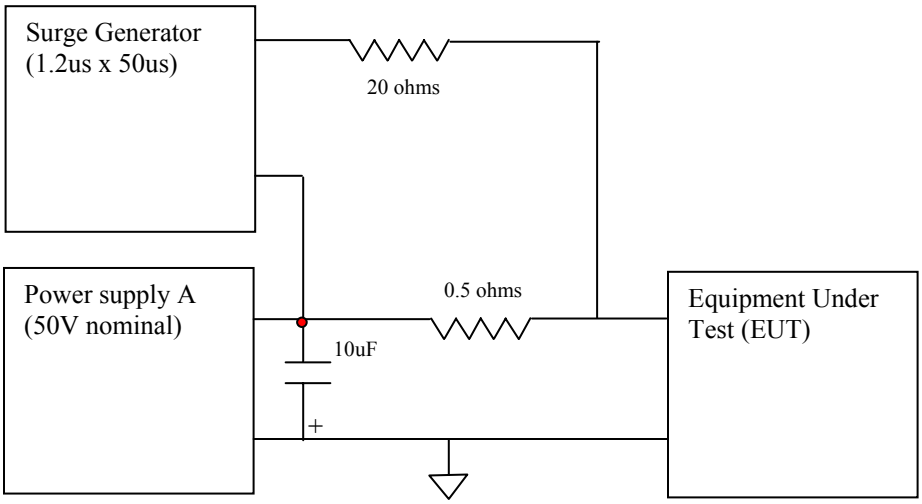
Figure 7-6
Over Current Protection Device Transient Waveform



F. The over current protection device transient can be generated with the test set up shown in Figure 7-7 which is taken directly from ANSI T1.315. The over current protection (impulse) transient is produced by a surge generator with a rise time of 1.2 microseconds, fall time of 50 microseconds and a 1000 ampere short circuit current at 2000 volts. With the test set up shown, a 2000 V surge will produce a 50 V surge across the 0.5 ohm resistor and the surge will produce up to 100 A into the EUT.

This test method is compatible with EUTs having input current up to 25 A by increasing the power supply voltage to compensate for the voltage drop across the resistor. A suitable inductor having a low dc resistance and a high dc current rating may be connected across the 0.5 ohm resistor to reduce the dc voltage drop. The inductor must not distort the impulse transient waveform.

Figure 7-7
Over Current Protection Transient Test Setup



7.3 Current Drains

A. The List 1 current drain, for a maximum configuration of cards and shelves, shall be provided in amperes on the appropriate ESP form. List 1 drain is the average busy-hour current at normal voltage and operating conditions.

B. The List 2 current drain, for a maximum configuration of cards and shelves, shall be provided in amperes on the appropriate ESP form. List 2 drain is the peak current during emergency operating limits of the EUT and with normal operating conditions (no short circuits or other malfunctions).

7.4 Minimum Operating Voltage

Specify the minimum voltage at which the equipment remains fully operational and verify the equipment will recover to a fully operational state after losing power. A suggested test method is outlined below:

A. With a maximum configurations of cards and shelves, apply 40V dc to the input terminals and verify normal operation of the equipment. Lower the input voltage by 1volt and hold for 30 seconds. Record the voltage, current drain and whether or not the equipment is operating normally.

B. Continue to lower the input voltage in 1-volt increments as above until abnormal operation of the equipment is observed. Record the voltage and current drain at which abnormal operations occurs.

C. Continue to lower the input voltage in 5-volt increments for 30 seconds at a time until reaching 0 volts. There must be no damage to equipment

D. Return the input voltage to 40 volts. The equipment must restart without manual intervention and return to normal operation within 30 minutes.

8 AIRBORNE CONTAMINANTS

8.1 Mixed Flowing Gas (MFG) Test –

The MFG test shall be performed per the 14 day test as detailed in Telcordia GR-63, Issue 2.

8.2 Controlled Environments

Equipment intended for installation in controlled environment spaces shall meet the Airborne Contaminants requirements for indoor equipment as stated in section 4.5 of Telcordia's GR-63-CORE, Issue 2 with the exception of changes noted in paragraph 8.3 below.

8.3 Uncontrolled Environments (OSP)

Equipment intended for in outdoor air (i.e., cabinets installed on pads or poles) with no filtration shall meet the Airborne Contaminants requirements for outdoor equipment as stated in section 4.5 of Telcordia's GR-63-CORE with the exception of changes noted in paragraph 8.3 below.

8.4 Fan Filter Requirements

Fan cooled equipment shall meet the requirements of Telcordia GR-63-CORE, section 4.5.4 with the following exceptions:

A. Equipment 1U in height or smaller does not require fan filters.

B. Fan filters shall have a minimum dust arrestance of at least 65%.

C. It is an objective that fan filters have a dust arrestance of 80%.

9 SHOCK AND VIBRATION

9.1 Handling and Transportation - Shock

Network equipment shall be designed with tolerance for shock of transportation and handling from manufacturer's facilities to job sites without sustaining physical damage or affecting functional performance. The manufacturer shall be in compliance to handling and transportation shock requirements specified in Telcordia document GR-63-CORE. Product test documentation may not be requested with the understanding that the equipment manufacturer is responsible to assure receipt of acceptable and functional products to the job sites.

9.2 Handling and Transportation - Vibration

Network equipment shall be designed with tolerance for transportation and handling from manufacturer's facilities to the job site without sustaining physical damage or affecting functional performance. The manufacturer shall state **Yes** if in compliance to handling and transportation vibration requirements specified in Telcordia document GR-63, **No** if not in compliance or if product has not been tested. SBC may not request test documentation with the understanding that the equipment manufacturer is responsible to assure receipt of an acceptable and functional product to the SBC job site.

9.3 Earthquake

Equipment buildings may be located in high earthquake risk areas. Network equipment considered for SBC Level 2 service (Level 3 Telcordia SR-3580) shall be designed for service in high seismic risk locations. Equipment shall demonstrate conformance to Telcordia GR-63-COREor ANSI T1-329 earthquake requirements by having equipment assembly tested on shake table and submitting documentation of successful test results. The manufacturer shall state **Yes** if in compliance to earthquake requirements specified in Telcordia document GR-63-CORE or ANSI T1-329, No if not in compliance or if product has not been tested. Manufacturer may state N/A for products that are intended for *low seismic risk applications only* and has written statement from SBC confirming the limited application. Equipment considered for Level 1 service does not require earthquake tests to be conducted, however, equipment shall be installed in framework suitable for resisting earthquake loads and framework secured appropriately to building.

9.4 Positive Latching

All network equipment shall have circuit pack latches or retainers to prevent pack and module walkout. Ejectors are not retainers and should not be used for that purpose.

9.5 Hard Drive Backup

Hard drive storage units used with network equipment shall be designed with tolerance for shock and vibration by physical isolation of drives, backup systems or self-recovery capabilities to assure service integrity.

9.6 Standard Frame

Network equipment shall be designed for mounting in telecommunications industry standard framework, relay racks. However, equipment deeper than 12 inches, heavier than 400 pounds or designed for special housings may require framework other than standard relay racks. For safety consideration, a loaded framework during transport or on site awaiting installation should temporarily be able to stand upright on it's own when not secured. If weight distribution of equipment in framework results in framework falling backward or forward, special deeper framework is to be provided. Overnight or longer storage of loaded framework shall always be secured in SBC equipment areas.

9.7 Self Support Frame

All network equipment assemblies 7'-0" tall and under shall be designed for freestanding installation in SBC equipment areas. Freestanding is defined as framework not secured overhead but have provisions for floor anchors of appropriate size and quantity to secure equipment from overturning under worst-case site conditions.

9.8 Office Vibrations

Network equipment shall be designed for operation under office vibration conditions specified in Telcordia document GR-63-CORE. The manufacturer shall state **Yes** if in compliance to office vibration requirements in Telcordia document GR-63-CORE, No if not in compliance or if product has not been tested. SBC may not request test documentation with the understanding that the equipment manufacturer is responsible to assure operational reliability for conditions that may exist in SBC equipment locations.

9.9 Floor Loading

Floor loading requirements specified in Telcordia document GR-63-CORE shall not be exceeded. The manufacturer shall consider the worst case configuration of heaviest arrangement within a single framework when analyzing floor load. The configuration may need to include weight within a frame contributed from equipment supplied by others. Manufacturer shall state **Yes** if product is in conformance to floor load limits.

10 FIRE RESISTANCE

10.1 Minimum Fire Resistance

This part provides the minimum fire resistance requirements for equipment products and apparatus intended for installation in the network equipment facilities. All equipment shall be tested or otherwise evaluated for compliance with the fire resistance criteria provided in this part.

10.2 General

Generally, products that have been determined to be acceptable for purchase from a fire resistance perspective do not have to be retested or evaluated unless subsequent changes to the product include one or more of the following characteristics:

- A substantial increase in the product's polymeric content (fuel load),
- A decrease in the fire resistance characteristic/rating of included components,
- An increase in the density of installed electrical components, or
- A physical change in the product's framework or enclosure construction.

10.3 Materials/Components

The materials and components used in the construction and interconnection of equipment shall comply with the most current issue of ANSI/T1-307. Generally, materials and components shall be constructed of polymeric materials having an oxygen index of 28% or greater and a fire resistance characteristic equivalent to or better than Under Writers Laboratories (UL) standard UL 94 V-1. Cable and wire shall generally be listed for their purpose.

10.4 Protective Barriers

Exposed nonmetallic equipment frame components such as protective covers, viewing panels, etc.:

A. Shall have a fire resistance characteristic equivalent to or better than UL-94 V-0 if the component's exposed surface area is $\leq$1 ft.^{2} (0.09 m^2), or

B. Shall have a fire resistance characteristic equivalent to or better than UL-94 5VA if the component's exposed surface area is greater than >1 ft.^{2} (0.09 m^2) and it's thickness is less than 0.18 inches (5 mm), and

C. Shall have a maximum flame spread rating of 150 if the component's exposed surface area is >10 ft.^{2} (0.9 m^2). Flame spread ratings shall be determined by product test methods that are equivalent to UL standard 723 *Test for Surface Burning Characteristics of Building Materials.*

It is anticipated that the products addressed in 10.04 will be covered in the next reissue of ANSI/T1.307. ANSI/T1.307 (paragraph 10.03) will then be the reference criteria for the products mentioned in 10.04.

10.5 Fire Spread

This part applies to equipment products intended for installation in indoor network equipment facilities, and may apply to equipment products intended for installation in outdoor enclosures and environments.

Equipment products shall comply with the appropriate fire spread performance criteria provided in ANSI/T1.319, 2002 or later.

Equipment suppliers shall use appropriate ESR forms to indicate whether the product(s) under consideration have been evaluated to the criteria of 10.05 and whether a copy of the test report and test video issued by the testing facility is included for review and retention. An expected test date shall be given for all products that have not yet been evaluated to the above criteria.

11 SPATIAL

11.1 General

This part provides the physical requirements for equipment units, and equipment systems intended for use in indoor network equipment areas. This part does not apply to power equipment or office distributing frames, and is not applicable to equipment intended solely for use in outdoor equipment enclosures, or controlled environment vaults.

11.2 General System

The word **system** as used in this part refers to multi-unit and multi-frame equipment configurations that collectively perform one or more telecommunications or data management functions. System equipment is normally furnished preinstalled in one or more equipment framework assemblies.

11.3 General Unit

The term equipment **unit** as used in this part refers to stand alone products that are generally field mounted on an as needed basis.

11.4 Network Switching Systems

Network switching systems refers to a contiguous group of equipment frames whose primary purpose is typically the management of local area calling traffic. Network switching systems shall be designed so that all equipment frames, intrasystem cabling, and intrasystem cable racking can be accommodated in an equipment area having a 9'-0" clear ceiling height. To accomplish this:

A. Equipment frames should not exceed 7'-0" in vertical height.
B. All intrasystem cable and cable racking arrangements within and between equipment lineups shall be contained within the area between the top of the equipment frames and the 9'-0" level.

C. The vertical space between the 9'-0" and 10'-0" levels shall be allocated to network interconnecting cable and its associated cable management apparatus. Intrasystem cable rack designs should include provisions for the support and management of office cabling that terminates in the switch as well as cabling that transverses the switch's equipment area.

- Suppliers shall use appropriate ESR form to indicate whether their switching equipment design complies with 11.4 through 11.4(c).

11.5 Other Equipment Systems

Frame level equipment systems intended for random location within a building:

A. Shall be mounted in frames or cabinets that are 7'-0" or less in vertical height and equal to or greater than the overall depth of installed equipment and all possible network interconnection cabling.
B. Shall include any required bolt-on framework apparatus required to comply with the equipment and cabling protection requirement of a), and
C. Should not exceed 2'-6" in overall width.
D. Should not exceed 15” in depth.
E. Should not require more than 2’ 6” of aisle space at the rear and 3’ 0” of aisle space at the front for equipment installation and maintenance purposes.

11.6 Other Equipment 7'0"

Multi-frame equipment systems should employ the use of a common equipment framework depth to facilitate movement of people and apparatus along equipment aisles. When it is necessary that frameworks of different depths be used, angled frame base transitional hardware shall be included with, or be optionally available for the shallower frames to avoid abrupt changes in equipment framework depths.

11.7 Equipment Units

Equipment units shall:

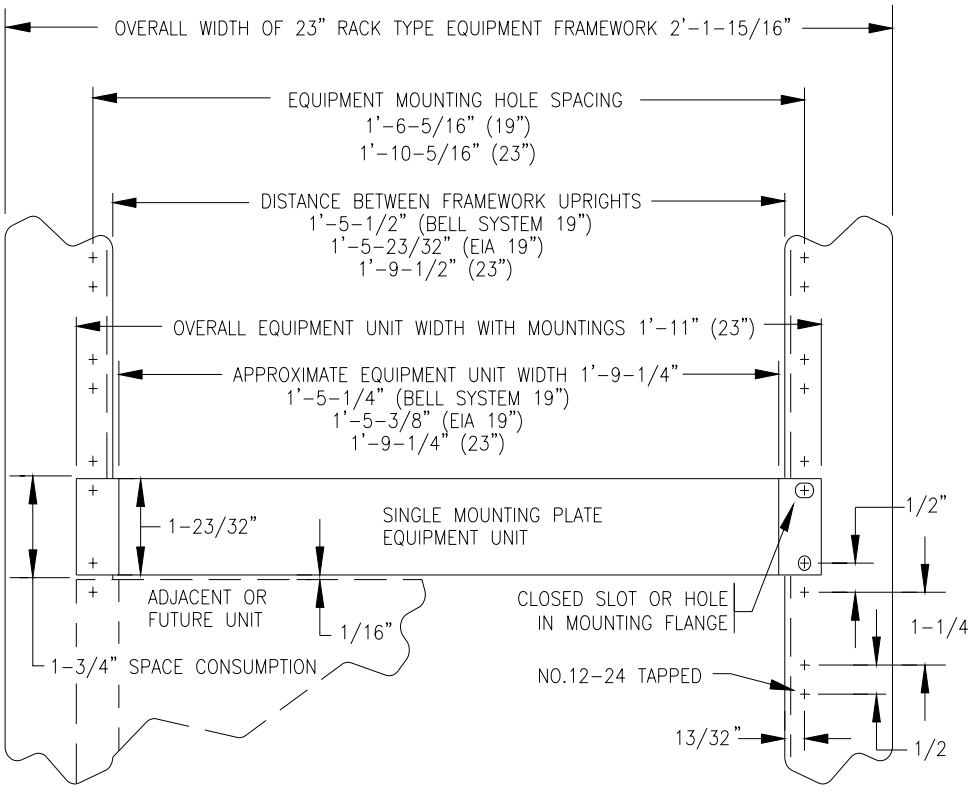
A. Be designed so they are installed from the front and cabled from the rear of equipment framework assemblies,

B. Incorporate the use of holes or closed slots for attachment to equipment framework mounting surfaces,

C. Accommodate mounting in equipment frameworks using the 1-3/4 x 23 inch mounting hole pattern shown in Figure 11-1, and

D. Should accommodate a 2 x 23-inch mounting hole pattern (mounting holes spaced 1 inch apart).

Figure 11 -1 - Commonly Referenced Equipment Spatial Considerations



12 PLANNING AND ENGINEERING DOCUMENTATION

12.1 User's Reference Material

The information described in this part should be a dedicated part or section of the user reference material (user's manual) describing the product's overall functionality, network application and integration requirements/recommendations.

- Suppliers shall use form ESR-002 to indicate whether the planning and engineering information described in the subsequent text of 15(A) and (B) has been documented, and is provided for review.

12.2 Space Planning

Space planning information enables a person to accurately determine where network equipment shall or should be located relative to other network elements, and the equipment's overall office floor space requirements. It includes an equipment overview describing the equipment's primary network function, its associated equipment if any, and all supportive reasoning affecting its location within a building or within an equipment frame (for shelf level products).

12.3 Space Planning Information

The following information should be included in equipment space planning information:

- Floor plan designation(s) of all equipment frames comprising the equipment system
- Overall dimensions of equipment frames
- Minimum front and rear aisle spacing requirements
- Equipment location restrictions
- Equipment weight
- Detailed description of equipment framework
- Number of frames required per equipment system functionality
- ac and dc power requirements
- Additional floor space requirements, if any
- Maximum heat dissipation per frame in watts per ft^2

12.4 Site Conditioning

Site conditioning information indicates via text and supportive illustrations how an equipment area shall/should be arranged to physically accommodate the equipment and its associated cabling. When relevant, site conditioning information shall include the recommended clear ceiling heights, square footage of floor space, sizes and locations of office cable racking, and any other physical and electrical apparatus necessary for the efficient installation, cabling and maintenance of the equipment.

13 PRODUCT INFORMATION FORM DESCRITPION

13.1 General

This section includes product information forms to help suppliers communicate product information in a way that will facilitate the product evaluation process. These product information forms may be reproduced as necessary. The product information forms shall be completed and provided for new products and for enhanced products for equipment already approved for use in SBC.

13.2 ESR Forms

The ESR *Equipment Supplier Response* forms are provided so equipment suppliers can effectively communicate product attributes relative to the requirements and objectives contained in this section. A separate ESR form is required for each "product" being evaluated. Suppliers may use a single ESR form for multi-unit products provided that any entries that are not applicable for all units being evaluated are specifically qualified in an ESR attachment.

The following describes how the ESR entries are defined and will be interpreted during the product evaluation process. A response is required to every item in the ESR form.

Column	Description
Item	This is the applicable paragraph number in this section.
Reference	This is the product attribute being addressed in "key-word(s)" form.
Y	An "X" here means the product complies and requested data is being furnished.
N	An "X" here means the product does not comply or the requested data is not being provided at this time. A "No data" response shall be accompanied by an expected date of when the information will be made available.
n/a	An "X" here means that, in the opinion of the supplier, the item is not applicable to the product. Provide an explanation why the requirement is “n/a” for this product.
Att.#	An entry here (alpha, numeric, or combination) identifies the ESR attachment containing the requested data or an explanation of the response entered.

Note: A simple identification system for attachments (e.g. A, B, C...) is preferred, but other schemes are acceptable. When a single attachment is used for more than one ESR item, each entry in the attachment shall be identified using the corresponding ESR item number.

13.3 ESP Forms

The engineering and space planning forms provide a detailed overview of the planning and engineering considerations associated with products being evaluated. *System Equipment* form ESP-001 applies to products comprised of multiple equipment units installed in a predefined configuration. Such products may be furnished preinstalled in an equipment framework assembly (frame level) or as shelf level products (individual units) for installation into existing equipment framework assemblies. *Equipment Unit* form ESP-002 applies to stand-alone shelf level products.

Suppliers shall complete an ESP-001 form for frame level products, each frame of multi-frame products, and for shelf level products that are optionally available preinstalled in an equipment framework assembly. The ESP-002 form shall be completed for individual shelf level products.

13.4 FRM Form

Form FRM-001 *Fire Resistance of Materials* shall be completed by the product supplier's representative having explicit knowledge of the subject addressed. The FRM form may be used for multi-unit products provided each individual unit comprising the product is specifically referenced in the space provided.

14 PRODUCT INFORMATION FORMS:

NOTE: See following pages

14.1 Form ESP-001

EQUIPMENT ENGINEERING & SPACE PLANNING DATA

Equipment Systems (1)

Manufacturer:_____ Product Name:_____ Date:_____

Equip. Functional Description and Nomenclature: _____

Floor Plan Designation: _____ Number of Frames Per System: _____

Names of Associated Frames: _____

PHYSICAL DATA (2)

Overall Dimensions Including Framework: Height: _____ Width (3): _____ Depth: _____

Equipment Weight: Shipping - _____ lbs. Installed - _____ lbs.

ENGINEERING DATA (2)

Framework Type/Description: _____

Manufacturer's Identifying Catalog/Part Number: _____

Minimum Aisle Spacing Requirements: Front: _____ Rear: _____

Additional Space Requirements Between This Frame And An:

Adjacent Like Frame: _____ End Guard: _____ Other Frames Or Structure: _____

Equipment Locating Restrictions: None ____ Yes (Explain):

120 V ac Required: Yes: ___ No: ___ Circuit Breaker Size per feeder: _____

Number of feeders: ____ -48 V DC Required: Yes: ___ No: ___

Feeder 1 (Load A): List 1 drain: ___ (@nominal V) Feeder 2 (Load B): List 1 drain: ___ (@nominal V)

Feeder 1 (Load A): List 2 drain: ___ (@nominal V) Feeder 2 (Load B): List 2 drain: ___ (@nominal V)

DC-C___ or DC-I ___ configuration per section 9.8.3 of GR-1089-Core

EXTERNAL CABLING DATA (4)

Equipment Cabling Plan Reference/Drawing Number: _____

Fiber Optic Conductors (0.125 dia. each):	Sq. inches _____
Fiber Optic Cable (0.75 dia. per 96 pair):	Sq. inches _____
Coaxial Cable (0.25 dia. each)	Sq. inches _____
Shielded Cable (0.70 dia. per 30 pair)	Sq. inches _____
Other Cable/Wiring Except Power (0.60 dia. per 50 pair)	Sq. inches _____

Do Special Cable Or Cabling Requirements Apply: No ___ Yes ___ (Describe):

(1) One form required per each frame of multi-frame system equipment.
(2) All dimensions to be expressed in FEET and INCHES.
(3) Width includes normal 1/16 inch space between adjacent frames.
(4) Use the values given in parenthesis when determining external cabling data for cables not furnished by you. Multiply the values by the known or expected number of cables required to provide the equipment's ultimate functionality.

ESP-001

HEAT DISSIPATION DATA SHEET

Manufacturer:_____ Product: _____ Date:_____

List each active component in system:		**No. Units to be Used in System[1]**		**Heat Dissipation per Unit/Traffic %[2]**		**Heat Diss Watts: B x D**
Description/Card Number	**Part Number**	**A: Max Poss:**	**B: SBC Est:**	**C: Max %Traffic**	**D: SBC Est:**	
					Total Watts for System:	

Air exhaust design: Does equipment exhaust heated air in back? Yes___ No ___ If No, attach description of air exhaust design.

1. **Max Poss:** The maximum number of units of this component that can be used in the system as designed
   SBC Est: The maximum number of units of this component per SBC planned deployment
2. **Max %:** Heat dissipation for a unit in W, when operating at maximum capacity
   SBC Est: Heat dissipation for a unit in W, when operating at maximum capacity expected for SBC deployment
3. **Heat Diss Watts, SBC Est:** Maximum number of units estimated for SBC deployment times heat dissipation per unit

14.2 ESP-002

ENGINEERING & SPACE PLANNING EQUIPMENT DATA

Shelf Level Equipment Units (1)

Manufacturer:_____ Product Name:_____ Date:_____

Unit Functional Description: _____

Product ID: _____ Nomenclature (Acronym): _____

Names of Associated Units Per Function: _____

EQUIPMENT DATA

Overall Dimensions (inches): Height:____ Depth (2):_____ Width: 19" ____ 23" ____

Unit Weight: Shipping - _____ lbs. Installed - _____ lbs.

Minimum Aisle Spacing Requirements (feet & inches): Front: _____ Rear: _____

Requires 120 V ac: Yes ___ No ___Circuit Breaker Size per feeder: ____

Number of feeders: ___ -48 V DC : Yes: ___ No: ___

Feeder 1 (Load A): List 1 drain: ___ (@nominal V) Feeder 2 (Load B): List 1 drain: ___ (@nominal V)

Feeder 1 (Load A): List 2 drain: ___ (@nominal V) Feeder 2 (Load B): List 2 drain: ___ (@nominal V)

DC-C___ or DC-I ___ configuration per section 9.8.3 of GR-1089-Core
Heat Baffles Required: Yes ___ No ___ If Yes, Supplied With Unit: Yes ___ No ___

UNIT TO FRAMEWORK MOUNTING DATA

Supported Mounting Flange Hole Patterns: 1 3/4 x 19" ___ 1 3/4 x 23" ___ 2 x 23" ___

Unit Mounts to Front of Framework Uprights: Yes ___ No ___

List Unit Locating Restrictions/Considerations if Any: _____

_____

Distance Unit Extends From Framework Mounting Surface: _____ (in.)

EXTERNAL CABLING DATA (3)

Unit Cabling Plan Reference/Drawing Number: _____

Unit Is Cabled From The Rear: Yes ___ No ___ Front and Rear: _____

Fiber Optic Conductors (0.125 dia. each): Sq. inches _____

Fiber Optic Cable (0.75 dia. per 96 pair): Sq. inches _____

Coaxial Cable (0.25 dia. each) Sq. inches _____

Shielded Cable (0.70 dia. per 30 pair) Sq. inches _____

Other Cable Except Power (0.60 dia. per 50 pair) Sq. inches _____

Required Alarm Leads And Designations: _____

Do Special Cable Or Cabling Requirements Apply: No ___ Yes ___ (Describe):

(1) One form required per each unit of a multi-unit product/system.
(2) Overall depth includes cable and its supporting apparatus.
(3) Use the values given in parenthesis when determining external cabling data for cables not furnished by you. Multiply the values by the known or expected number of cables required to provide the equipment's ultimate functionality.

ESP-002

HEAT DISSIPATION DATA SHEET

Manufacturer:_____ Product: _____ Date:_____

List each active component in system:		**No. Units to be Used in System[1]**		**Heat Dissipation per Unit/Traffic %[2]**		**Heat Diss Watts: B x D**
Description/Card Number	**Part Number**	**A: Max Poss:**	**B: SBC Est:**	**C: Max %Traffic**	**D: SBC Est:**	
					Total Watts for System:	

Air exhaust design: Does equipment exhaust heated air in back? Yes___ No ___ If No, attach description of air exhaust design.

3. **Max Poss:** The maximum number of units of this component that can be used in the system as designed
   SBC Est: The maximum number of units of this component per SBC planned deployment
4. **Max %:** Heat dissipation for a unit in W, when operating at maximum capacity
   SBC Est: Heat dissipation for a unit in W, when operating at maximum capacity expected for SBC deployment
3. **Heat Diss Watts, SBC Est:** Maximum number of units estimated for SBC deployment times heat dissipation per unit

14.3 Form FRM-001

LETTER OF COMPLIANCE ATTESTING TO FIRE RESISTANCE OF MATERIALS

Manufacturer:_____ Product Name:_____ Date:_____

This statement of compliance applies to the following product(s) which are being considered for purchase:

The below individual having reasonable control over the fire resistance characteristics of materials and components used in the construction and manufacture of the above product(s) assures that:

1. ___ All materials and components, except those listed below, meet the fire resistance requirements contained in the current issue of ANSI T1.307 *Fire Resistance Criteria - Part 1: Ignitability Requirements for Equipment Assemblies, and Fire Spread Requirements for Interconnection Wire and Cable Distribution Assemblies*.

2. ___ Exposed non-metallic apparatus having a surface area $\leq$1 ft.^{2} (0.09 m^2) have a fire resistance characteristic equivalent to or better than UL-94 V-0.

3. ___ Exposed non-metallic apparatus having a surface area >1 ft.^{2} (0.09 m^2) and a thickness less than 0.18 inches (5 mm) have a fire resistance characteristic equivalent to or better than UL-94 5VA.

4. ___ Exposed non-metallic apparatus having a surface area $>$10 ft.^{2} (0.9 m^2) have a fire resistance characteristic equivalent to or better than UL-94 5VA and a flame spread rating of 150 as determined by test methods equivalent to UL standard 723 *Test For Surface Burning Characteristics Of Building Materials* or the radiant panel te

t in UL standard 94.

5. ___ Items 2, 3 and 4 are not applicable to the product(s).

The below non-metallic components (other than LEDs, small cable ties and terminal lug insulators) do not or may not comply with Items 1 through 4 above. The combined weight of the listed components is _____ grams.

_____ _____
Signature Printed name

_____
Title

14.4 Form ESR-001

Level One
Equipment Supplier Response
TP 76200 Requirements

Manufacturer:_____ Product Name:_____ Date:_____

2. Electromagnetic Computability & Electrical Safety, GR-1089 Requirements: : Note The requirement numbers below are the GR1089 Absolute Requirement Numbers. See GR1089, Paragraph 1.4.1											
R #	**Description**	**Y**	**N**	**n/a**	**Att.#**	**R #**	**Description**	**Y**	**N**	**n/a**	**Att.#**
N/A	Equipment Type										
8	Radiated Emissions					41	EUT not meet require.				
9	Radiated Emissions Obj.					54	Class A1 Voltage				
10	Radiated Emissions					55	Class A2 Voltage				
11	Radiated Emissions					56	Class A3 Voltage				
12	Conducted Emissions					57	Class A3 segregtd				
128	Common Mode Emiss.					58	Class A3 Labled				
14	Unintentional Cond Em					59	Class AB restricted				
20	Manuf. CO switching.					60	Class AB inacces.				
34	Current Limiting Prot.					61	Rubber gloves ...				
22	Listing AC Power					62	Eqpt pwrd by gen.				
23	Listing Inverters					63	Class B de-enrgzd				
24	Listng Cust Prem Equip					64	Interruped/tripped v.				
25	EUT damage					65	Voltage interrupted				
29	EUT Safety Hazard					66	Int./Trpped include				
33	EUT Safety Hazard					67	Peak Voltage				
34	External Curr. Limit. Pr					68	Sources Com. Wire				
36	EUT Safety Hazard					69	Current - 100cm				
37	Series Type Network					70	Current - 1cm				
137	EUT Safety Hazard					71	Current measured				
39	EUT on Cust. Prem					115	Continuous Source Volt				
40	EUT Safety Hazard					125	EUT Safety Hazard				

Other TP 76200 Requirements:											
Item	**Description**	**Y**	**N**	**n/a**	**Att.#**	**Item**	**Description**	**Y**	**N**	**n/a**	**Att.#**
5. Grounding						**9. Shock and Vibration**					
5.0	GR-1089, Section 9					9.4	Positive Latching				
						9.6	Standard Frames				
6. Thermal											
C. Heat Dissipation											
6.3 A	Heat Dissip. Data*					**10. Fire Resistance**					
6.3 B	Fan forced					10.3	Material Compon.				
6.3 C	Flow front to back					10.4	Panels/Barriers				
6.3 D	Face Temperature					10.5	Fire Spread				
						Fire Test Video Included					
						Completed FRM-001 Form					

* Use appropriate ESP form to report this information.

14.5 Form ESR-002

Level Two
Equipment Supplier Response
TP 76200 Requirements

Manufacturer:_____ Product Name:_____ Date:_____

Item	Reference	Y	N	n/a	Att.#
2 Electromagnetic Compatibility/Electrical Safety					
2.3	Equipment Type				
2.4	Rad. Emission				
2.5	Cond. Emission				
2.5	Emission Measure				
2.6	Immunity				
2.6	Immunity Measure				
2.7	Lightning/AC Pwr.				
2.7	Fault Testing				
2.8	Steady State Pwr.				
2.9	Electrical Safety				
2.10	DC Potential				
3 Acoustic Noise					
3.1	Meet GR-63				
4 Electrostatic Discharge & Fast Transient					
4.1	GR-1089, Sec 2.1.2				
4.2	GR-1089, Sec 2.1.2.4				
4.3	GR-1089, Sec 2.2				
5 Grounding					
5.1	GR-1089, Section 9				
6 Thermal					
A. Temperature and Humidity					
6.1	Meet/test to GR-63				
6.1b	OSP Test				
B. Altitude					
6.2	Meet GR-63				
C. Heat Dissipation					
6.3	Heat Dissip. Data*				
6.3b	Forced Air Cooled				
6.3c	Flow Front to Back				
6.3d	Face Temperature				

Item	Reference	Y	N	n/a	Att.#
7 DC Power					
7.1	Noise Immunity				
7.2A	Under voltage transient				
7.2C	Over voltage transient				
7.2E	Impulse transient				
7.3	Current Drain*				
7.4	Min. Operating V.				
8 Airborne Contaminants					
8.1	Meet GR-63 Indoor				
8.2	Meet GR-63 OSP				
9 Shock and Vibration					
9.1	Transport				
9.2	Vibration				
9.3	Earthquake				
9.4	Positive Latching				
9.5	Hard Drive Backup				
9.6	Standard Frames				
9.7	Self Support Frame				
9.8	Office Vibration				
9.9	Floor Loading				
10 Fire Resistance					
10.3	Materials & Comp.				
10.4	Protective Barriers				
10.5	Fire Spread				
Fire Test Video Included:					
Completed FRM-001 Form					
11 Spatial					
11.4	Switching Systms				
11.5	Other Systems				
11.6	Other Eqpt. 7'-0"				
11.7	Equipment Unit				
12 Engineering Documentation					
12.3	Space Planning				
12.4	Site Conditioning				

* Use appropriate ESP form to report this information.

14.6 Form ESR-ANC

Ancillary Equipment
Equipment Supplier Response
TP 76200 Requirements

Manufacturer:_____ Product Name:_____ Date:_____

Item	Reference	Y	N	n/a	Att.#
2. Electromagnetic Compatibility/Electrical Safety					
2.3	Equipment Type				
2.4	Rad. Emission				
2.5	Cond. Emission				
2.5	Emission Measure				
2.6	Immunity				
2.6	Immunity Measure				
2.7	Lightning/AC Pwr.				
2.7	Fault Testing				
2.8	Steady State Pwr.				
2.9	Electrical Safety				
4. Electrostatic Discharge					
4.1	GR-1089, Sec 2.1.2				
4.2	GR-1089, Sec 2.1.2.4				
4.3	GR-1089, Sec 2.2				
5. Grounding					
5.1	DC Short Circuit				
5.1	AC Short Circuit				
6. Thermal					
A. Temperature and Humidity					
6.1	Meet/test to GR-63				
6.1b	OSP Testing				
14.6.1.1.1 C. Heat Dissipation					
6.3	Heat Dissip. Data*				
6.6	Forced Air Cooled				
6.7	Flow Front to Back				
6.8	Face Temperature				

Item	Reference	Y	N	n/a	Att.#
7. DC Power					
7.1	Noise Immunity				
7.2A	Under voltage transient				
7.2C	Over voltage transient				
7.2E	Impulse transient				
7.3	Current Drain*				
8. Airborne Contaminants					
8.1	Meet GR-63 Indoor				
8.2	Meet GR-63 OSP				
9. Shock and Vibration					
9.2	Vibration				
9.3	Earthquake				
9.8	Office Vibration				
10. Fire Resistance					
10.3	Materials & Comp.				
10.4	Protective Barriers				
10.5	Fire Spread				
Fire Test Video Included:					
Completed FRM-001 Form					

NOTE:

Some tests may not be required if circuit packs can be demonstrated to be similar to original circuit packs in construction. See Appendix B.

* Use appropriate ESP form to report this information.

15 APPENDIX A

TP 76200 PRODUCT EVALUATION PROCESS

15.1 Purpose

The purpose of this appendix is to assist product suppliers with preparing and furnishing equipment documentation to the company representative for product evaluation purposes.

15.2 Types of Evaluations

The company representative requesting information may determine that only specific requirements apply to the product to be evaluated. Unless otherwise stated, all requirements apply to equipment systems and equipment units that will be installed in network equipment buildings and equipment areas within buildings, electronic equipment enclosures such as controlled environment vaults, outside mounted electronic equipment cabinets, and at customer locations.

An evaluation reviews a product against all applicable requirements based on the equipment and its intended use in the network**.** Documentation supporting compliance is required for a complete product evaluation. Documentation includes test reports verifying compliance for each applicable requirement. Below are the three types of complete evaluations. The requirements for each type are contained in their corresponding ESR forms:

A. LEVEL ONE (ESR-001). Level One is an evaluation against the minimum acceptable set of requirements necessary to protect personnel and the Network. Conformance to Level One requirements must be verified before equipment may be placed in a network equipment environment. Level One requirements are generally applicable to Physical Collocation, portable test and monitoring equipment, and equipment trials.

B. LEVEL TWO (ESR-002). Level Two is an evaluation against all requirements and addresses long term safety and reliability of the equipment. Conformance to Level Two requirements is required for general network approval and deployment.

C. ANCILLARY (ESR-ANC). Ancillary is an evaluation against a minimum set of requirements applicable to products previously approved by SBC that have undergone one or more changes.

D. PORTABLE TEST SET. At a minimum, portable test sets will be reviewed to the following requirements prior to deployment: Electrical Safety Review: An electrical safety review is necessary when the output voltage of the equipment exceeds 140 volts DC or 50 volts rms AC. Radiated Emissions: A review is necessary when the equipment supplier cannot certify compliance to FCC Part 15. In the absence of FCC Part 15 compliance, the radiated emissions requirements and test methods of GR-1089, Section 3 shall apply. Portable test sets that do not exceed 140 volts DC or 50 volts rms AC and are certified compliant to FCC Part 15, may be considered in compliance with the electrical safety and radiated emissions requirements and do not require review by the NEBS group.

E. PRODUCT CHANGE NOTICE (PCN). PCNs must be evaluated for their effect on the equipment's TP 76200 compliance.

- When it is determined by the manufacturer, using sound engineering judgement, that a hardware or software change does not impact the equipment's TP 76200 compliance, the manufacturer may submit a letter of attestation to this effect using the form in paragraph 15.6. When the PCN is judged to affect compliance to some requirements, but not all, use form ESR-002 to identify each. For requirements for which compliance is determined not to be affected, mark the "Y" column, for requirements that require testing mark the "N" column and annotate with a brief test plan and status. SBC will review the documentation submitted and determine if more documentation and/or testing are required.

  NOTE: Except for requirements where it is obvious that the PCN will not affect the equipment's compliance, SBC recommends that a third party, independent laboratory evaluate whether testing is necessary to verify compliance.

- When it is determined by the manufacturer, a test lab or SBC that the PCN may affect the equipment's TP 76200 compliance, the modified equipment must be tested per TP 76200. Documents verifying compliance to TP 76200 Ancillary Requirements (ESR-ANC) must be submitted for SBC evaluation as detailed in the Product Evaluation Documentation section of this appendix.

PRODUCT EVALUATION DOCUMENTATION

Documentation verifying that the product has been tested and conforms to applicable TP 76200 requirements must be submitted to the company representative. There are two acceptable processes for supplying documentation verifying conformance:

15.3 Test Report Documentation Package

Product information shall be assimilated in an organized fashion and provided to the company representative. A cover memo identifying included documentation should be included as a matter of convenience to facilitate the evaluation process. If available, informative product awareness brochures should also be provided but are not required.

A. Test Report Details

Relative to product test reports, SBC accepts test reports from any testing facility adequately equipped and capable of performing the required tests in a professional manner. At a minimum, test reports shall contain the following information:

- Test report number
- Description of Equipment Under Test (EUT), including specific test configuration
- Location and date of test
- Description of test equipment
- Calibration dates of test equipment
- Protocol of test with stated pass/fail criteria
- Test result data
- Assessment of whether equipment passed or failed the test
- Detailed notes on any anomalies during test procedure
- Detailed notes on any modifications made to the equipment in order to pass the test and detailed plans to incorporate the modifications into the final product.

Note: If the documentation is being submitted electronically or via CD disk, the file name or file folder shall clearly identify the file's contents (e.g. GR-63 test data). Reference the file name in the "Doc" cell for applicable requirements.

B. TP 76200 Forms

Each documentation package shall include an appropriate Equipment Supplier Response form (ESR) that corresponds to the type of evaluation being requested or anticipated.

For each type and level of evaluation the following forms shall be submitted:

- Preliminary: A completed ESR-002 and the relevant ESP-001 or ESP-002 form shall be submitted for review. An informative product brochure describing the physical and electrical characteristics of the equipment may be used in lieu of ESP forms. An indication of planned testing should be indicated for any product tests not yet performed.
- Level One: Completed forms ESR-001, ESP-001 or ESP-002, FRM-001, and applicable test report documentation shall be submitted for review.
- Level Two: Completed forms ESR-002, ESP-001 or ESP-002, FRM-001, and all test report documentation shall be submitted for review. An indication of planned testing shall be indicated for any product tests not yet performed.
- Ancillary: Completed forms ESR-ANC, FRM-001, applicable test report documentation, and/or a description of product revisions shall be submitted for review.

NOTE: Product will not be approved for use without receipt of correct completed forms.

C. SBC Documentation Package Evaluation Process

- The SBC Common Systems Product Evaluation group will review the product Documentation Package. If the product cannot be evaluated as compliant to all applicable requirements, an Initial Letter will be sent to the company representative specifying the areas that are not evaluated in conformance and what further action is required of the product supplier.

- Upon receipt of the Initial Letter, the product supplier may forward supplemental data to or contact the company representative, the SBC Product Evaluation Group Coordinator or a specific SME regarding non-compliance resolution. Contact information for the Group Coordinator and SMEs is contained in the Initial Letter. Documentation, either electronic or hard copy, forwarded to SBC containing supplemental data in response to an Initial Letter should identify the contents of documentation and reference the Product Log number assigned to the product, the SME who requested the data and the non-compliance requirement the data is addressing.

- The SME(s) who requested the documentation will evaluate supplemental data forwarded to SBC by the product supplier. If the supplemental data is sufficient to allow all open areas to be evaluated as in conformance to applicable requirements, a Final Letter will be sent to the company representative notifying them that the product conforms to requirements. If there are still open items after supplemental data has been reviewed, a Product Evaluation Status letter will be sent to the company representative giving the status of the product and what further action the product supplier needs to take.

15.4 SBC Product Evaluation Fast Track Process

SBC has established a fast track process it will use for certain business opportunities to streamline equipment evaluations and shorten time-to-market intervals. The process consists of SBC accepting TP 76200 compliance Letters of Attestation and minimal product information from equipment suppliers in lieu of the Test Report Documentation Package described above.

Note: The equipment must have been tested and found in conformance to **ALL** applicable requirements to use the Fast Track Process. **The Fast Track Process will not be accepted if any requirement is not met or is conditionally met.**

A. TP 76200 Fast Track General guidelines:

1) The process is an optionally agreed upon business arrangement between and an equipment supplier.

2) A supplier must have successfully participated in the Test Report Documentation Package process at least once to be eligible for the fast track process.

3) SBC reserves the right to review any and all test documentation cited in the Letter of Attestation during the time the equipment is an integral component of SBC's network.

4) Test documentation cited in the Letter of Attestation must be made available to SBC within 20 business days upon receipt of a written request.
5) SBC may take any or all of the following actions for products approved for use via a Letter of Attestation that are subsequently found not to conform to applicable TP 76200 requirements:
   - Suspend further purchase of the product.
   - Require previously purchased products be brought into compliance.
   - Suspend the supplier's further use of the Fast Track process.
   - Hold the supplier liable for any damages directly resulting from the product's failure to conform to applicable requirements.

B. SBC Product Evaluation Fast Track Process Procedure for Product Suppliers

1) Verify with the company representative that the Fast Track process is appropriate for the product/project.
2) Complete all applicable tests required by TP 76200.
3) Review and verify the product's conformance to **ALL** applicable requirements.
4) Complete the Letter of Attestation that is applicable for the Type of Evaluation (i.e., Level 1, Level 2 or Ancillary). A template for the letter is contained in Attachment 1. All of the information requested in the applicable template must be completed. The Letter of Attestation must be signed at director level or above and notarized.
5) Complete either form ESP-001 or ESP-002, whichever is applicable for the product.
6) Forward an original copy of the Letter of Attestation and the completed ESP form to the company representative.

15.5 Letter of Attestation

LETTER OF ATTESTATION

Equipment Compliance to SBC Technical Publication TP 76200, (choose one: Level 1, Level 2 or Ancillary) Requirements

(Company name) hereby asserts, to the best of its knowledge, and pursuant to the information contained in the test reports identified herein, that the equipment listed below has been tested and found compliant to **ALL** applicable SBC LEC Technical Publication TP 76200 (choose one: Level 1, Level 2 or Ancillary) requirements.

Equipment vendor name:

Equipment model:

Name of test Facility/internal organization performing tests:

Date of test report(s):

Test report number(s):

Is equipment intended for use in Outside Plant (OSP) uncontrolled environment? Yes ☐ No ☐
If yes, the equipment must have been tested and found compliant to OSP airborne contaminants requirements and OSP "hardened" temperature requirements.

Is equipment intended for use at Customer Premises? Yes ☐ No ☐
If yes, the equipment must be listed for that purpose by a Nationally Recognized Testing Laboratory (NRTL).

(Company name) agrees that statements made in this letter may be audited by SBC via a review of compliance confirmation data (the reports listed above), and that this data will be made available to SBC within 20 business days of request. If the above equipment is determined to not meet SBC requirements as attested to, __(company name)__ acknowledges and agrees that, at its expense, it will remedy any such non-compliance in accordance with the terms of the contract under which the equipment was evaluated/purchased and/or licensed. .

(Company name) has caused this Letter of Attestation to be executed by its duly authorized representative as of the date written below.
(Company name)

By: _____

Title: _____

Date: _____

NOTE: This affidavit must be signed in front of a notary and notarized

Contact information to request test reports: Name: _____

Phone number: _____

15.6 Product Change Notice Statement

LETTER OF ATTESTATION - PCN

Equipment Compliance to SBC Technical Publication TP 76200 Requirements

(Company name) hereby asserts, to the best of its knowledge, and pursuant conclusions drawn from sound engineering judgement, that the PCN described below has been evaluated as having no significant impact to the compliance of the equipment listed below to **ALL** applicable SBC LEC Technical Publication TP 76200 requirements, except as noted below.

Equipment vendor name:

Equipment model PCN is for:

PCN Number:

Description of PCN:

TP 76200 requirements NOT COVERED by this document (

Describe the engineering justification for concluding the PCN will not effect TP 76200 compliance:

(Company name) has caused this Letter of Attestation to be executed by its duly authorized representative as of the date written below.

By: _____

Title : _____

Date: _____

Phone number: _____

16 APPENDIX B

TP 76200 PRODUCT CHANGE TEST GUIDELINES

16.1 Purpose

The purpose of this appendix is to provide product suppliers a guide to help determine what tests may not need to be performed on a product enhancement to verify conformance to TP 76200 Ancillary requirements.

16.2 General

Some product enhancements are so minor that a complete retest of the product may not be necessary. Typically, when a product supplier requests a re-test waiver to run tests on product enhancements, data comparing the new product to the existing product is submitted to the company representative for evaluation by SBC. Depending on the product under review, this data may include pictures, fire load data, descriptions of electrical components, etc. Each SBC product evaluation subject matter expert (SME) then reviews this data and responds with an assessment of what tests are required**. This Appendix is a guideline only. It is the product suppliers' responsibility to satisfactorily document that the new product conforms to applicable requirements**. This Appendix only applies to product enhancements to equipment previously evaluated as in conformance to applicable TP 76200 requirements and approved for use in SBC.

Software upgrades/changes shall be evaluated if it has involves:
- Additional or revised hardware
- Activation of previously unused hardware
- An increase in the amount of power supplied to the hardware

16.3 Retest Guidelines by TP 76200 Sections

A. Section 2, Electromagnetic Compatibility

Electromagnetic Interference – Emission & Immunity (TP 76200 Req. 2.04 – 2.09)

- Equipment suppliers should reassess or retest their equipment's Emissions and Immunity performance in accordance with GR-1089 CORE, Section 3.4.7. . As part of their reassessment, equipment supplier shall consider the effects of software changes on the Emissions and Immunity performance of their equipment.

Lightning, AC Power Faults, Steady State Power Induction, Electrical Safety & DC Potential Difference (TP 76200 Req. 2.10 – 2.20).

- Equipment supplier's should reassess or retest their equipment's performance for Lightning, AC Power Faults, Steady State Power Induction, Electrical Safety & DC Potential Difference whenever materials, components, circuit layout or accessibility is changed. . Equipment should be reassessed or retested when changes in software activate hardware not previously active or effect the equipment's ability to the EMC requirements of TP 76200 (Req. 2.10 - 2. The equipment's reassessment or retesting may include all of the technical requirements in these sections of TP 76200. However, the reassessment or retesting is usually limited to only those technical requirements effected by the change in the equipment.

B. Section 3, Acoustic Noise (TP 76200 Req. 3.01 – 3.03)

- Equipment suppliers should reassess or retest their equipment's Acoustic Noise performance when a change is made to the equipment's fan design, fan control system or a change in the number of fans within the equipment.

C. Section 4, ESD

- Subsystems should be tested whenever changes are introduced that may alter ESD susceptibility. Such changes may include a modified printed wiring board, new components additional components , changes to the power supply, additional telecommunications ports, changes in chassis design, software activation of existing hardware or increased clock speed.

D. Section 5, Grounding

- The only Grounding requirements for Ancillary equipment are the short circuit tests. Embedded ac or dc power supplies should be tested whenever changes are introduced that could alter these. Such changes may include a modified printed wiring board, new components or additional components , changes to the power supply, additional telecommunications ports, changes in chassis design, software activation of existing hardware or increased clock speed.

E. Section 6, Thermal

Temperature and Humidity

If the new product is significantly different from existing compliant products (e.g., different sub components, wiring, spacing, etc.) the previous test data may not be applicable to the new product. In order to be allowed to forego temperature and humidity testing on a new product, the product supplier needs to demonstrate to SBC that the new product is physically almost identical to the existing compliant product. This may be done via photographs, written descriptions, statements, etc. An example of an enhanced product that would not require retesting would be if the only physical change was a different memory chip.

Heat Dissipation

Heat dissipation should be recalculated whenever a change is introduced that changes the power usage of the unit.

F. Section 7, DC Power

The product supplier may perform an analysis, using good engineering judgement based on similarities to the existing product, predicting the probable conformance of the new product to Ancillary DC Power requirements. This analysis should consider similarities and differences of electric components, wiring, and power levels. The analysis shall be submitted to the company representative for review and approval by SBC.

G. Section 8, Airborne Contaminants

In reference to Airborne Contaminants testing, Telcordia GR-1274-CORE, states that "The qualification test shall be passed once for each new family of printed wiring assemblies." Based on Telcordia's assessment, new assemblies for enhanced products need not be tested for airborne contaminants if they meet the criteria for the same design family of printed boards, defined as follows:

- *A design family consists of printed wiring boards from the same manufacturer; using the same design rules for minimum line spacing and maximum electric field, and using components that require the same bias voltages. Within the same design family, boards shall have the same finish, i.e. they shall all be bare or all be coated with the same covercoat.*

If the product supplier does not test some or all of the printed wiring boards in an enhanced product, they shall supply a statement affirming that the board(s) not tested meet the definition for being in the same design family of a product previously approved for use in SBC. Documentation verifying the conformance of the tested card must be submitted for review.

H. Section 9, Shock and Vibration

Equipment should be tested whenever changes are introduced that could alter the physical integrity of the unit.

I. Section 10, Fire Resistance:

Reasons for Reassessment

Products that have been determined to be acceptable for purchase from a fire resistance perspective do not have to be re-evaluated or retested unless subsequent changes to the product include one or more of the following:

1) A change in the manufacturer's unique product identifier.
2) A modification to an equipment assembly's enclosure that increases ambient air circulation.
3) The addition of integral or separately mounted cooling fan(s) or a manufacture's requirement or recommendation that fans be used with the equipment.
4) The substitution of metallic apparatus with combustible material.
5) A change in an equipment assembly's electrical protection circuitry that increases the ampere rating of an overload protection device or affects the operational characteristics of a cooling fan.
6) The addition of printed circuit board(s) to one or more existing printed circuit board.
7) The addition of vertically oriented printed circuit boards to the extent that overall circuit board surface area within the unit is increased by 300 cm^2 (46.5 $in.^2$).