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Energy Management Subcommittee

SCTE STANDARD

SCTE 203 2019

**Product Environmental Requirements for Cable
Telecommunications Facilities – Test Methods**

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1 Introduction

1.1 Purpose

The specification purpose is to define test methods to evaluate equipment compliance with criteria specified in ANSI/SCTE 186 2012.

1.2 Scope

This document is identical to SCTE 203 2014 except for informative components which may have been updated such as the title page, NOTICE text, headers and footers. No normative changes have been made to this document.

This document specifies physical, environmental, electrical, and sustainability test procedures to evaluate equipment compliance with requirements defined in ANSI/SCTE 186 2012.

1.3 Requirements Syntax

Throughout this document, specific words are used to define the requirements significance. These words are:

"shall"	This word means that the item is an absolute requirement of this specification.
"shall not"	This phrase means that the item is an absolute prohibition of this specification.
"should"	This word means that there may be valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"should not"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"may"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

1.4 Acronyms

Table 1-1: Acronyms

AC	Alternating Current
ASTM	American Society for Testing and Materials
ANSI	American National Standards Institute
ASD	Acceleration Spectral Density
ASHRAE	American Society of Heating, Refrigerating and Air-conditioning
ATIS	Alliance for Telecommunications Industry Solutions
CENELEC	European Committee for Electrotechnical Standardization
CFR	Code of Federal Regulations (US)
CO	Central Office
DC	Direct Current
DOCSIS™	Data Over Cable Service Interface Specification
eCFR	Electronic Code of Federal Regulations (US)
EC	European Community
ECMA	Ecma International® (formerly European Computer Manufacturers Association)
EFT	Electronic Fast Transient
EIA	Electronic Industries Alliance
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ETSI	European Telecommunications Standards Institute
EUT	Equipment Under Test
FRU	Field Replaceable Unit
IEC	International Electrotechnical Commission
ITU	International Telecommunication Union
NRTL	Nationally Recognized Testing Laboratory
OSHA	Occupational Safety and Health Administration (US Dept. of Labor)
OSP	Outside Plant
PacketCable™	A CableLabs® led initiative to develop interoperable interface specifications for delivering advanced, real-time multimedia services over two-way cable plant
RoHS	Restriction of Hazardous Substances
SPEC	Standard Performance Evaluation Corporation
TCG	Telecommunications Carrier Group
TIA	Telecommunications Industry Association
U	Unit, Short for Rack-Unit, Measure of vertical rack space, 1U=1.75" (44.45mm)
UPS	Uninterruptible Power Supply
WEEE	Waste Electrical and Electronic Equipment

2 Physical Requirements

2.1 Frame and Cabinet

Refer to *ANSI T1.336-2009* for test procedures.

2.2 Equipment Static Load (chassis static force test)

No mechanical damages or visible deformation, exposure to shock hazard or sharp edges shall occur when the equipment housing is subjected to a static force of 25lbf (111N) applied via a 1.2 inch diameter steel hemisphere for a period of one (1) minute. The equipment shall withstand the static load when applied to various locations on the top, bottom, right side, and left side of the equipment both when it is free standing and when it is housed or mounted using the vendor supplied mounting brackets.

2.3 Impact Force Resistance

The external metal enclosure of the device / product (intended for use in a controlled environment) shall be subjected to an impact generated by a free-falling smooth, solid steel sphere 2 inches (5.08cm) in diameter and weighing approximately 1.18 lbs (0.535Kg).

- The sphere is to fall freely from a height of 51 inches (129.54cm) at various locations on the outside of the enclosure.
- The tests shall not result in permanent distortion to the extent that wire to ground or chassis spacing is reduced below the following values:
For 0 to 50 Vrms peak: 1/16"
For >50 to 150 Vrms peak: 1/4"
For 150 to 600 Vrms peak: 1/2"
- The tests shall not result in any distortion that produces contact of the enclosure with un-insulated electrically active parts other than those connected in a low voltage circuit.
- The tests shall not result in the unit developing any opening(s) that expose electrically active un-insulated parts that create a risk of electrical shock or high energy current levels.

2.4 Microphonics Emissions

- The device / product shall withstand minimum impact energy of 0.7 Newton-meters (Nm) applied to the device / product at various chassis locations without harmful or detrimental effect to any functional service provided by the test specimen (i.e., bit errors, spurious emissions, macro-blocking, interruption, lock-up or any other signal flow impairment).
- Microphonics impacts should be made with a calibrated impact hammer such as the E D & D Models 5110 or F22.50 (or equivalent).
- Information on the models listed above may be reviewed at <http://www.productsafet.com>.
- Specification reference for the type of impact hammer to be used is IEC 68-2-63 / 1991 (or latest version).
- Impacts shall be imparted to each of the six operational planes of the device / product to be tested.
- Depending upon the size of the product each operational plane should be divided into one or more areas and multiple impacts should be imparted to each area.
- Appropriate notations shall be made as to the location where the microphonics impact force is applied when any and all signal flow impairments are seen.
- Documentation should include written notes, diagrams, pictures, etc.
- Measurements shall be made while any and all signal flow(s) is (are) monitored for discontinuities and / or interruptions

2.5 Dissimilar Metals

Inspect and determine compliance by analysis using the following method:

- Galvanic Compatibility is defined as the differential in Anodic Index Voltage between the various metals at the junction. The maximum Anodic Index (V) differential limit for equipment shall not be greater than +/- 0.50 Volt. Galvanic compatibility

The compatibility of two different metals may be predicted by consideration of their "Anodic Index". This parameter is a measure of the electrochemical voltage that will be developed between the metal and gold. To find the relative voltage of a pair of metals it is only required to subtract their Anodic Indexes.[9]

For normal environments, such as storage in warehouses or non-temperature and humidity controlled environments, there should not be more than 0.25 V difference in the "Anodic Index". For controlled environments, in which temperature and humidity are controlled, 0.50 V can be tolerated. For harsh environments, such as outdoors, high humidity, and salt environments, there should be not more than 0.15 V difference in the "Anodic Index". For example; gold - silver would have a difference of 0.15V being acceptable [10]

Often when design requires that dissimilar metals come in contact, the galvanic compatibility is managed by finishes and plating. The finishing and plating selected facilitates the dissimilar materials being in contact and protect the base materials from corrosion.[10]

Table 2-1: Anodic Index Table

Anodic index[10]	
Metal	Index (V)
Most Cathodic	
Gold, solid and plated, Gold-platinum alloy	-0.00
Rhodium plated on silver-plated copper	-0.05
Silver, solid or plated; monel metal. High nickel-copper alloys	-0.15
Nickel, solid or plated, titanium and alloys, Monel	-0.30
Copper, solid or plated; low brasses or bronzes; silver solder; German silver high copper-nickel alloys; nickel-chromium alloys	-0.35
Brass and bronzes	-0.40
High brasses and bronzes	-0.45
18% chromium type corrosion-resistant steels	-0.50
Chromium plated; tin plated; 12% chromium type corrosion-resistant steels	-0.60
Tin-plate; tin-lead solder	-0.65
Lead, solid or plated; high lead alloys	-0.70
2000 series wrought aluminum	-0.75
Iron, wrought, gray or malleable, plain carbon and low alloy steels	-0.85
Aluminum, wrought alloys other than 2000 series aluminum, cast alloys of the silicon type	-0.90
Aluminum, cast alloys other than silicon type, cadmium, plated and chromate	-0.95

Hot-dip-zinc plate; galvanized steel	-1.20
Zinc, wrought; zinc-base die-casting alloys; zinc plated	-1.25
Magnesium & magnesium-base alloys, cast or wrought	-1.75
Beryllium	-1.85

2.6 Equipment labels and markings

Evaluate by inspection

1. Equipment vendor and product identification shall be visible when the unit is installed.
2. Labels for equipment user panels, connectors, controls, and power connections shall be visible when unit is installed and shall be located near their intended function.
3. Equipment certifications, compliances, approvals, and warning labels shall be visible when the unit is installed and shall be provided in the equipment user documentation.
4. Labels that display serial numbers, MAC addresses and similar information shall be visible when the equipment is installed and shall be implemented in light text on a dark background to assure legibility in non-optimum lighting.
5. Labels shall not peel, wear, crack, fade or blister under the environmental conditions in which the equipment will operate. Compliance may be evidenced by any of the following methods:
 - a. Using a permanent ink/typing ribbon meeting the requirements of ANSI/UL 969 or CAN/CSA No. 0.15
 - b. Use of a combination of materials and printing method accepted as a UL PGJ12 label system
 - c. Shelf level equipment labels shall not be placed on the top, bottom, or side, e.g., shelf level equipment labels shall be visible when the equipment is installed.
 - d. Equipment should provide an area to affix a MSO placed equipment barcode or equivalent label.
6. Laser light emitting ports shall be capped and include a yellow warning label warning of the presence of laser light emissions.

2.6.1 Packaging and Shipping Labels

Evaluate by inspection

1. Equipment package device bar code shall be placed such that it can be read and/or scanned without removing the equipment from its package or wrapping material.
2. Equipment shipping package shall have bar codes indicating its contents placed on the front upright surface.
3. Equipment packaging shall comply with Outer Shipping Container Bar Code Label Standard CEA556C and Product Package Bar Code Label Standard for Non-Retail Applications CEA624A.

2.6.2 ESD Labels and Documentation

Evaluate by inspection

1. Equipment shall be labeled in compliance with EIA-471-1996, Symbol and Label for Electrostatic Sensitive Devices.
2. The ESD label should be located on the equipment front. Alternative locations are acceptable if there is no room for a front of equipment label.
3. Equipment documentation shall specify any ESD sensitivity issues.
4. Instructions and procedures to prevent ESD problems shall be provided in the equipment user documentation