



**Verizon NEBS™ Compliance: Test  
Requirements for MDU Drop Cables**  
Verizon Technical Purchasing Requirements  
VZ.TPR.9424  
**Issue 1, April 2008**





**CHANGE CONTROL RECORD:**

<b>Version</b>	<b>Date</b>	<b>Action*</b>	<b>Reason for Revision</b>
1	04/04/2008	New	New Document
* New, Add, Delete, Change, Reissue			



**PREPARED BY:**

Name, Title, Organization	Date
<b>Vijay Jain M.Tech., M.A.Sc., PMP</b> FOC-ITL Program Manager NEBS & Quality Assurance Verizon Technology Organization 320 St. Paul Place, Floor 14 Baltimore, MD 21202 Phone: 410-736-7947; Fax: 410-736-5144 E-mail: <a href="mailto:Vijay.x.jain@verizon.com">Vijay.x.jain@verizon.com</a>	04/04/2008

**APPROVED BY:**

Name, Title, Organization	Date
<b>Ludwig C. Graff</b> Director, NEBS Compliance and Quality Assurance Verizon Technology Organization Systems Integration and Testing 320 St. Paul Place, Floor 14 Baltimore, MD 21202 Phone: 410-736-5904; Fax: 410-736-5144 E-mail: <a href="mailto:Ludwig.c.graff@verizon.com">Ludwig.c.graff@verizon.com</a>	04/04/2008



## Table of Contents

<b>1.0</b>	<b>PURPOSE</b> .....	<b>5</b>
<b>2.0</b>	<b>SCOPE</b> .....	<b>5</b>
<b>3.0</b>	<b>REFERENCES</b> .....	<b>5</b>
<b>4.0</b>	<b>ACRONYMS</b> .....	<b>5</b>
<b>5.0</b>	<b>TEST REQUIREMENTS FOR MDU DROP CABLES</b> .....	<b>5</b>



## 1.0 PURPOSE

The purpose of this Verizon Technical Purchasing Requirement document is to provide test requirements to evaluate MDU Drop Cables.

## 2.0 SCOPE

Optical Cables

## 3.0 REFERENCES

<b>GR-20-CORE, Issue 2, July 1998</b>	Generic Requirements for Optical Fiber and Optical Fiber Cables
<b>GR-409-CORE, Issue 1, June 1994</b>	Generic Requirements for Premises Fiber Optic Cable
<b>VZ.TPR.9430</b>	Optical Fiber and Optical Fiber Cable

## 4.0 ACRONYMS

<b>A</b>	After
<b>B</b>	Before
<b>D</b>	During
<b>FOC</b>	Fiber Optic Components
<b>IL</b>	Insertion Loss
<b>ITL</b>	Independent Test Laboratory
<b>MDU</b>	Multi-Dwelling Unit
<b>nm</b>	Nano Meter
<b>Pin</b>	Input Power
<b>RL</b>	Return Loss

## 5.0 TEST REQUIREMENTS FOR MDU DROP CABLES

Verizon is considering using drop cables for MDU application. The following are test requirements for qualifying the MDU drop cables. All of the tests must be conducted at an ITL. It is assumed that fiber used in these cables is already qualified and Verizon approved.



MDU Drop Cable Testing					
Description	Reference Specification	Test Condition	Compact Drop	Rugged Drop	Indoor/Outdoor Rugged Drop
<b>Cable Construction</b>					
Cable Core	GR-409, Section 6.1.1.		x	x	x
Number of Fibers per Cable	GR-409, Section 6.1.2.		x	x	x
Number of Fibers per Unit	GR-409, Section 6.1.3.		x	x	x
Sheath Removal	GR-409, Section 6.1.4.		x	x	x
<b>Cable Marking, Packaging, and Shipping</b>					
Cable Marking	GR-409, Section 6.2.1.		x	x	x
Cable Re-marking	GR-409, Section 6.2.2.		x	x	x
Identification Marking	GR-409, Section 6.2.3.		x	x	x
Cable Length and Length Markings	GR-409, Section 6.2.4.		x	x	x
Fiber and Unit Identification	GR-409, Section 6.2.5.		x	x	x
Packaging	GR-409, Section 6.2.6.		x	x	x
Shipping	GR-409, Section 6.2.7.		x	x	x
<b>Mechanical Requirements</b>					
Tensile Strength of Cable	GR-409, Section 6.3.6.	Rated tensile load specified by cable design	220 N	440 N	440 N
Low and High Temperature Cable Bend	GR-409, Section 6.3.3.	Use Riser test criteria for Rugged cable designs and General Purpose Interconnect criteria for Compact cable designs	x	x	x
Impact Resistance	GR-409, Section 6.3.4.		x	x	x
Compressive Strength	GR-409, Section 6.3.5.		x	x	x
Cable Twist	GR-409, Section 6.3.7.		x	x	x
Cable Cyclic Flexing	GR-409, Section 6.3.8.		x	x	x
Cable Materials	GR-409, Section 6.4		x	x	x
<b>Jacket Requirements</b>					
Outside Jacket Material	GR-409, Section 6.5.1.		x	x	x



MDU Drop Cable Testing					
Description	Reference Specification	Test Condition	Compact Drop	Rugged Drop	Indoor/Outdoor Rugged Drop
Cable Jacket Yield Strength and Ultimate Elongation	GR-409, Section 6.5.2.		x	x	x
Cable Outer Jacket Shrinkage	GR-409, Section 6.5.3.		x	x	x
Cable Jacket Thickness	GR-409, Section 6.4.4.		x	x	x
<b>Environmental Requirements</b>					
Temperature Cycling	GR-409, Section 6.6.1.	Use Interconnect/Outside Plant test criteria	x		
Cable Aging	GR-409, Section 6.6.2.		x		
Color Performance	GR-409, Section 6.6.3.		x		
Temperature Cycling	GR-20, Section 6.6.3.			x	x
Cable Aging	GR-20, Section 6.6.4.			x	x
Color Performance	GR-20, Section 6.6.6.			x	x
<b>Flammability Listing of Premises Cables</b>					
Plenum Cable	GR-409, Section 6.7.1.		x	x	x
Riser Cable	GR-409, Section 6.7.2.		x	x	x
General Purpose Cable	GR-409, Section 6.7.3.		x	x	x
Water Penetration	GR-20, Section 6.6.7.				x
Ionic Water Penetration	VZ.TPR.9430				x
<b>MDU Application Tests</b>					
Corner Bend with radius < 1 mm	n/a	Apply 2 kg load to cable to secure cable against fixture. Attenuation at 1550 nm should be ≤ 0.05 dB.	x	x	x
Corner Bend with radius < 1 mm	n/a	Apply load equal to the long term rated tensile load of the cable. Attenuation at	x	x	x



MDU Drop Cable Testing					
Description	Reference Specification	Test Condition	Compact Drop	Rugged Drop	Indoor/Outdoor Rugged Drop
		1550 nm should be $\leq 0.1$ dB.			
Mandrel wrap	n/a	5 wraps around a mandrel equal to the rated minimum bend radius of the cable. Attenuation at 1550 nm should be $\leq 0.1$ dB/turn.	x	x	x
T25 Staple	n/a	Secure 1 m of cable with 20 staples onto un-aged construction grade wood so that each staple is in full contact with the top of the cable. Attenuation at 1550 nm should be $\leq 0.1$ dB. Perform test three times with three different operators for a total of 60 staples.		x	x
MDU Simulation	n/a	The attenuation at 1550 nm should be $\leq 0.4$ dB after the following conditions are applied:		x	x
		-Ten 90° corner bends unloaded			
		-One 90° corner bend w/ 2 kg load			



MDU Drop Cable Testing					
Description	Reference Specification	Test Condition	Compact Drop	Rugged Drop	Indoor/Outdoor Rugged Drop
		-One 90° corner bend w/ 14kg -Two 10 mm mandrel wraps -Thirty T25 staples			
MDU Simulation	GR-20, Section 6.5.9	Perform temperature cycling and aging of the MDU simulation to the cable's rated temperature extremes.		x	x