



# **Verizon NEBS™ Compliance: FOC Audit Process**

**Verizon Technical Purchasing Requirements  
VZ.TPR.9454  
Issue 1, November 2008**





**CHANGE CONTROL RECORD:**

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## 1.0 PURPOSE

The purpose of this Verizon Technical Purchasing Requirement document is to provide a basic overview of the FOC audit process as it pertains to the auditing of ITLs and Verizon's suppliers' labs.

## 2.0 SCOPE

FOC ITL & FOC supplier lab audits

## 3.0 REFERENCES

<b>VZ.TPR.9401</b>	Checklist for Initial FOC ITL and Supplier Lab Audit
<b>VZ.TPR.9402</b>	Checklist for Follow-up FOC ITL and Supplier Lab Audit
<b>VZ.TPR.9415</b>	Declaration of Readiness by FOC ITL to Proceed with an Audit
<b>VZ.TPR.9453</b>	Quality Audit Process

## 4.0 ACRONYMS

<b>CAR</b>	Corrective Action Report
<b>FOC</b>	Fiber Optic Components
<b>ITL</b>	Independent Testing Laboratory
<b>NQA</b>	NEBS & Quality Assurance
<b>QAM</b>	Quality Assurance Manager
<b>RCA</b>	Root Cause Analysis
<b>TPR</b>	Technical Purchasing Requirement



## 5.0 **GENERAL REQUIREMENTS FOR FOC AUDITS**

Verizon NQA performs FOC audits of ITLs and its suppliers' labs primarily to ensure compliance to a particular product test plan based on an applicable GR and/or TPR. These audits typically include a quality review, which is not addressed in this document but is outlined in VZ.TPR.9453, Quality Audit Process.

### 5.1 **Pre-Audit Activities**

Prior to any audit, the lab being audited (hereafter the *auditee*) shall follow the procedure for setting up an audit as outlined in VZ.TPR.9415, Declaration of Readiness by FOC ITL to Proceed with an Audit. Once NQA has received the declaration of readiness and reviewed and approved the appropriate test plan(s), the audit may be scheduled.

A member of NQA staff will conduct the audit. For supplier lab audits, the supplier will contract with a Verizon-approved ITL. For all audits, the ITL will directly cover all travel-related expenses and billable hours of the NQA personnel. Billing of expenses by the ITL back to the supplier, when applicable, is handled solely between those two parties.

### 5.2 **Audit Plan**

NQA shall provide an audit plan to the auditee in advance of the on-site visit to alert the staff as to the direction and scope of the audit. The audit plan should include among others the following key topics:

- Opening and closing meeting schedules
- Brief introductions and outline of scope of analysis
- Quality system review, utilizing VZ.TPR.9401, Initial FOC ITL and Supplier Lab Audit or VZ.TPR.9402, Follow-up FOC ITL and Supplier Lab Audit, as appropriate.
- Management Requirements
- Quality System
- Document Control
- Non-conformances (internal)
- Contracts
- Previous Audits
- Technical Requirements
- Time/schedule Requirements for personnel
- Infrastructure
- Equipment
- Calibration



- Review of all test plans planned under the audit (such as the following example):
  - GR-xxx Test Plan – detailed review and capture of any needed changes to the GR-xxx generic test plan, customized with the lab’s specific documentation, processes, and laboratory test equipment utilized. Detailed review of equipment and demonstration of expertise of lab personnel for executing all optical parametric, environmental, mechanical and material tests and measurements, which include the following test suites (examples below are for illustrative purposes only):
    - Chemical testing
    - UV testing
    - Impact testing (Aerial and Buried)
    - Flex testing
    - Temperature cycling
    - ...etc.
- Other miscellaneous test plan reviews
- Summary of findings

### **5.3 Follow-Up Activities**

Upon completion of the on-site audit, the audit report will be written by NQA and will be issued within the agreed upon time frame and distributed to the appropriate recipients.

The conclusion remarks of the audit may indicate the need for corrective, preventive or improvement actions, as applicable. Such actions are usually decided and undertaken by the auditee within an agreed upon time frame and are not considered to be part of the audit. Each nonconformance shall be entered into a corrective action database for proper communication, disposition and management review. Acceptable disposition of a nonconformance includes root cause analysis, selection of corrective measure(s), implementation activities, and review/measurement of adequacy and effectiveness. Records of corrective action review shall be maintained and presented for review at follow-up audits.



**APPENDIX A      CHECKLIST FOR FOC AUDITS**

<b>Initial Audit</b>	<b>Topics (ITL &amp; Vendor)</b>	<b>Compliant (Y/N)</b>	<b>Comment</b>
	<b>Management Requirements</b>		
I	Who is the single point of contact for the NQA ITL PFOC program?		
I	Is the test lab independent from the production dept?		
I	Provide an organizational chart		
I	Describe the roles and responsibilities of the Quality Assurance Mgr.		
I	Describe the roles and responsibilities of the Technical Mgr.		
I	Is there an appeals process in place? Used when results are contested.		
	<b>Quality System</b>		
I	Who is the Quality Assurance Manager?		
I	Does the QAM have access to senior mgmt to resolve conflicts?		
I	Is there a documented quality manual?		
I	What accreditations does the lab hold?		
I	Does the QAM state that Verizon requires all the test data be stored for 10 years?		
	<b>Document Control</b>		
I	Are policies and work instructions documented?		
I	Are policies and work instructions communicated?		
I	Are policies and work instructions implemented?		
I	Are policies and work instructions uniquely identified?		
I	Are policies and work instructions controlled?		
I	Are policies and work instructions accessible to employees?		
I	Are test plans controlled?		





<b>Initial Audit</b>	<b>Topics (ITL &amp; Vendor)</b>	<b>Compliant (Y/N)</b>	<b>Comment</b>
I	Are reference standards controlled?		
I	Is there a policy and procedure that states "latest references shall be used"		
I	Are data collection sheets controlled?		
I	Are there any safeguards in the data collection system to prevent data tempering?		
	<b>Non-Conformances</b>		
I	Is there a Non-Conformance policy?		
I	Is there a Root Cause Action (RCA) registry?		
I	Is the RCA system automated or mechanized?		
I	Is there a Total Recall policy?		
I	Does the policy state that NQA must be informed?		
I	Is the RCA system monitored and reviewed by mgmt?		
	<b>Contracts</b>		
I	Is there a documented process for contract review		
I	Does the process address lab capabilities?		
I	Does the process address test appropriateness?		
I	Does the process address sub-contracted work?		
I	Does the process address contract deviations?		
I	Does the process address deliverables?		
	<b>Audits</b>		
I	Are regularly scheduled internal audits conducted?		
I	Provide proof of this?		
I	Obtain Records of CAR's and corrective actions		



<b>Initial Audit</b>	<b>Topics (ITL &amp; Vendor)</b>	<b>Compliant (Y/N)</b>	<b>Comment</b>
I	Does the lab conduct quality audits of sub-contractor's facilities?		
I	Provide proof of a sub-contractor audit?		
I	Supplier audit minimum of every three years: assembly and test verified		
I	Is product under evaluation made in more than one location?		
I	Which GR is being addressed by this audit?		
I	Location of this audit		
I	Is the lab ISO-17025 accredited? Provide copy of the certificate.		
I	What other accreditations lab has? Provide copy of the certificates.		
	<b>Technical Requirements</b>		
I	Who are the Technical mgrs.?		
I	Is there a separate Program mgr.?		
I	Do you have access to reference standards documents?		
I	Is Gel Block used? Are Mandrills and /or terminators used?		
I	Are CLETOP cleaners used? Is > 99% alcohol used?		
I	Verify always latest reference standards are used?		
	<b>Personnel</b>		
I	Do you have job descriptions for each employee?		
I	Do you match the qualification of each employee with the job?		
I	How does the mgmt evaluate an employee's competence?		
I	Are training records for each employee on file? In Binders, with certificates		
I	How many employees are qualified to work on the ITL program?		
I	How many employees are qualified to work as a witness on the ITL-TCWP program? Provide training records.		



Initial Audit	Topics (ITL & Vendor)	Compliant (Y/N)	Comment
I	In-House Courses - trainer qualifications; formal curriculum, trainer is trained		
	<b>Infrastructure</b>		
I	Do other organizations control ownership of the lab's real estate?		
I	Is the lab secure?		
I	Describe the facility construction		
I	What measures are utilized to minimize data contamination?		
	<b>Equipment</b>		
I	Is maintenance and test equipment calibrated?		
I	Is maintenance and test equipment secured?		
I	Is maintenance and test equipment used by trained operators?		
I	Is maintenance and test safeguarded during handling?		
I	Is maintenance and test safeguarded during storage?		
I	Is maintenance and test safeguarded during transport?		
I	Does a preventive maintenance program exist for no-cal test equipment?		
I	Is custom (shop) specialty rigs/test gear made with precision/durability?		
I	Is there any test equipment/tests that must be used/performed offsite?		
I	Are there any rented equipment used for testing?		
	<b>Calibration</b>		
I	Is calibration in sourced, self sourced or outsourced?		
I	Is calibration traceable to NIST or equivalent?		
I	Are reference standards used to conduct intermediary checks?		
I	Are non-standard methods used to calibrate instruments?		



<b>Initial Audit</b>	<b>Topics (ITL &amp; Vendor)</b>	<b>Compliant (Y/N)</b>	<b>Comment</b>
I	Is "as found" data provided after calibration?		
I	Provide an example of a calibration certification		
I	Is equipment that does not require calibration identified with a no-cal sticker		
I	Are copies of calibration certificates in lab area?		
I	What method is used to calibrate a system (e.g., setups with switches) that uses several test equipment		
I	What method is used to calibrate the rented equipment?		
	<b>Deliverables</b>		
I	How is test data transferred between the test lab and the ITL?		
I	Are ITL data sheets used by the test lab during data collection?		
I	Are there data collection packages for each GR - Used at supplier's lab?		
I	Is Test Plan Verizon approved for both in-house testing and at supplier's lab?		
I	Is test plan complete - all tests commented on? Is correlation ok with GR?		
I	Does test plan include all the FOC memos?		
I	What method is used to ensure latest FOC memos are used when and where applicable?		
I	Does test plan include requirement for supplying calibration data for the systems?		
I	Does test report follow test plan? Is all equipment used listed?		



**APPENDIX B      SAMPLE AUDIT REPORT**

**Verizon ITL - Fiber Optic Component (FOC) Test Lab Assessment Report**

1. **Date of Test Facility Assessment:** August 18-19, 2008.
2. **Project Number/s:** SIT.2008.01111, SIT.2008.01112, SIT.2008.01113
3. **Requesting ITL & Location:** XYZ Labs located at One Lab Drive, Baltimore, MD 21202.
4. **Product Manufacturer:** Not a product manufacturer
5. **Product Name & Release Level:** No product – Scope Expansion audit for FOC testing to the requirements of:
  - Verizon/ISO 17025, Quality Management and Technical Competence Systems.
  - GR-3123-CORE, Generic Requirements for Indoor Fiber Distribution Hubs (FDHs), Issue 1, March 2006/ VZ.TPR.9420
  - GR-409-CORE, Generic Requirements for Premises Fiber Optic Cable, Issue 1, May 1994/ VZ.TPR.9437
6. **Type of Evaluation:** Technical Analysis to verify if FOC testing to GR-409/TPR.9437 and GR-3123/TPR.9420 at XYZ Lab’s facility in Baltimore, MD is acceptable as part of the Verizon Independent Testing Laboratory Fiber Optic Component (ITL-FOC) Program.
7. **Verizon FOC Evaluator:** Vijay Jain, (Program Manager, Verizon Corporate Network & Technology).
8. **ITL-FOC Assessment Participants:**

<b>XYZ Labs and Verizon Participants</b>		
<b>Name</b>	<b>E-mail</b>	<b>Phone #</b>
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J. Smith – Sr. Mgmt Rep		

9. **Lab Participants:** See table above
8. **Evaluation Scope:** The purpose of this analysis was to follow up on findings from the May, 2008 audit and to determine whether XYZ Lab’s facility in Baltimore, MD can effectively perform testing per GR-409/VZ.TPR.9437 and GR-3123/VZ.TPR.9420.



**9. Evaluation Summary:** During August 18 – 19, 2008 an FOC Test Capability Analysis was conducted at XYZ Lab’s Baltimore, MD facility by the Verizon audit team identified above. Based on the results of this analysis, XYZ is **compliant** for GR-409/VZ.TPR.9437 and GR-3123/VZ.TPR.9420 FOC testing at facility.

A detailed listing of XYZ Lab’s demonstrated FOC test capability mapping with the existing approved GRs is provided in Appendix A-1, A-2 and A-3 of this report. All the open action items are listed in section 10 of this report.

**10. Action Items Affecting Certification:**

The following is a listing of notes and open action items identified during the audit.

Item #	Reference	Description of Finding / Action Item	Severity	CAR # / follow up action	Status Open/Closed
<b>Quality Findings</b>					
1.	Items 4 & 8 VZ Report SIT.2008.01 234	<ul style="list-style-type: none"> <li>There were multiple instances in the test plans where TPRs were not correctly referred.</li> <li>Test plans reviewed were GR-3123/TPR 9420 &amp; GR-409/TPR9437.</li> <li>TPR 9445 not referred, though it was part of TPR 9431, and could seriously impact the outcome of a factory audit.</li> </ul>	Major	TBD	Open
2.	ISO:17025: Section 5.5 Equipment, Item 10 VZ Report SIT.2008.01234	Repeatability and accuracy data is not included in all the test plans.	Major	TBD	Open
3.	ISO:17025: Section 5.5 Equipment	Cleaning procedure needs to be defined and included in the test plans for cleaning multi-fiber connectors using US Connect procedure.	Major	TBD	Open



Item #	Reference	Description of Finding / Action Item	Severity	CAR # / follow up action	Status Open/Closed
<b>Issues related to GR-409 (TPR-9437)</b>					
4.	Section 3.1.2, 4.2.3, & 4.2.4	Multimode fiber is not identified as outsourced test in the executive summary and list of outsourced tests Test are also not identified in the test procedures as outsourced tests	Minor	TBD	Open
5.	Section 6.6.1	Optical test setup for conducting environmental tests that require in-situ testing was not setup for testing multiple fiber cables. No repeatability and accuracy data was available.	Major	TBD	Open
<b>Issues related to GR-3123 (TPR-9420)</b>					
6.	Test plan	Section 3.3- Labels: Requirements from GR-499, and associated methods to determine compliance, must be included in the test plan	Minor	TBD	Open
7.	Section 5.7, Craft Interaction	This test needs to be updated per new TPR-9446. A verification of the new test will be needed prior to conducting this test	Minor	TBD	Open

**11. Follow-up Action Items and Notes:** The list of all the open action items, identified during the audit, is listed in the table of section-12 above.

**12. Other Items Addressed:** Status update on ABC's five test programs

**13. Audit Conclusion/Comments:** XYZ Lab was well prepared for the GR-409/VZ.TPR.9437 and GR-3123/VZ.TPR.9420 Verizon ITL-FOC analysis. Test lab facilities required for testing were correctly configured, and were well maintained. The lab environment was acceptably well controlled to maintain the conditions necessary for this type of testing.

Several issues were found during this audit were left unresolved. However, XYZ has committed to address all these issues within 45 days. Verizon's FOC team will review these items during next planned audit. Based on the results of this analysis, XYZ's facility in Baltimore, MD has demonstrated both the capacity and capability for FOC testing and is authorized under Verizon ITL-FOC Program to perform testing to GR-409/VZ.TPR.9437 and GR-3123/VZ.TPR.9420.



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**Sample Audit Report Appendix A-1**

**August 18, 2008 Scope Expansion Audit of VZ.TPR.9420 (GR-3123) Test Program Capabilities Demonstrated at XYZ Labs, Baltimore, MD**

Test Ref. #	Test Name	GR/DS Ref.	Required Capabilities	Demonstrated Capabilities	Conforms? Y/N/NA
<b>GR-3123 Section 3.0: General Requirements</b>					
<b>GR-3123 Section 3.2: Markings, Packaging, and Shipping</b>					
1.	General Requirements	3123: 3.0			Y
2.	Markings, Packaging, and Shipping	3123: 3.2			Y
<b>GR-3123 Section 4.0: Functional Design Criteria</b>					
<b>GR-3123 Section 4.1: Materials</b>					
3.	Functional Design Criteria	3123: 4.			Y
4.	.....etc.				





**Sample Audit Report Appendix A-2**

**August 18, 2008 Scope Expansion Audit of VZ.TPR.9437 (GR-409) Test Program Capabilities  
Demonstrated at XYZ Labs, Baltimore, MD**

Test Ref. #	Test Name	GR/DS Ref.	Ref. Spec	Required Capability	Demonstrated Capability	Conforms? Y/N/NA
<b>GR-409 Section 4: Requirements and Test Procedures for Optical Fiber</b>						
<b>GR-409 Section 4.1: Requirements for Single-mode Fiber</b>						
1.	Requirements and Test Procedures for Optical Fiber	409: 4.0				Y
2.	Requirements for Single-Mode Fiber	409: 4.1	R4-1	Requirements from GR-20, Section 4, with the exceptions, additions, and modifications described in the rest of Section 4.1 of this document.	Per GR-20 Approval	Per GR-20 Approval
3.	...etc.					

**Sample Audit Report Appendix A-3**

**Personnel Authorized to Conduct Verizon FOC Testing to GR-409, and GR-3123  
at XYZ Labs, Baltimore, MD**

Standard	Name of GR Test Demonstrated During Analysis	First Name of XYZ Lab Test Person(s) Primary/Support	# of Years Experience with FOC type testing	FOC Authorized? (Y/N)
GR-3123	<i>All Tests Except the Ones Identified as Outsourced in Appendix -1 of this report</i>	...etc.		Yes unless identified as outsourced in Appendix A-1
GR-409	<i>All Tests Except the Ones Identified as Outsourced in Appendix -2 of this report</i>	...etc.		Yes unless identified as outsourced in Appendix A-2