Verizon NEBS™ Compliance: Checklist for TMST ITL and Supplier Lab Audit

Verizon Technical Purchasing Requirements

VZ.TPR.9602

Issue 1, January 2010

CHANGE CONTROL RECORD:

Version	Date	Action*	Reason for Revision
1	*1/22/2010*	New	New document.

* **New, Add, Delete, Change, Reissue**

PREPARED BY:

Name, Title, Organization	Date
Stephen Wright DMTS-NEBS Compliance and Quality Assurance Corporate Network & Technology Systems Integration and Testing 320 St. Paul Place, Floor 14 Baltimore, MD 21202 Phone: 410-736-5946; Fax: 410-736-5144 E-mail: Stephen.w.wright@verizon.com	1/22/2010

APPROVED BY:

Name, Title, Organization	Date
Ludwig C. Graff Director, NEBS Compliance and Quality Assurance Corporate Network & Technology Systems Integration and Testing 320 St. Paul Place, Floor 14 Baltimore, MD 21202 Phone: 410-736-5904; Fax: 410-736-5144 E-mail: ludwig.c.graff@verizon.com	1/22/2010

Table of Contents

1.0 PURPOSE

The purpose of this Verizon Technical Purchasing Requirement (VZ.TPR) document is to develop an audit checklist to be used by Verizon auditors during the certification of Independent Testing Laboratories and equipment manufacturers seeking approval to Verizon's Thermal Modeling Simulation and Test Certification (TMST) program requirements. Auditing will be administered by the NEBS Compliance & Quality Assurance organization under its existing NEBS Testing Certification Program.

2.0 SCOPE

The Checklist of tests and requirements contained herein shall be used by equipment manufacturers and Verizon certified Independent Test Laboratories as the minimum set of requirements and tests for the thermal management portion of telecommunications equipment NEBS testing.

TMST Certification is based on an analysis of (1) simulation software and (2) verification testing.

This audit scope checklist does not include standard items analyzed under a Quality Management Program analysis. Such items will be separately addressed.

3.0 REFERENCES

VZ.TPR.9208	Thermal management Requirements for Improved Energy Efficiency of Telecommunications Equipment
GR-63-CORE	NEBS™ Requirements: Physical Protection Issue 3, March 2006
GR-78-CORE	Generic Physical Design Requirements for Telecommunications Products and Equipment Issue 1, September 1997
GR-357-CORE	Generic Requirements for Assuring the Reliability of Components Used in Telecommunications Equipment Issue 1, March 2001
GR-487-CORE	Generic Requirements for Electronic Equipment Cabinets, Issue 2, March 2000
GR-1089-CORE	Electromagnetic Compatibility and Electrical Safety, Generic Criteria for Network Telecommunications Equipment Issue 5, August 2009
GR-1209-CORE	Generic Requirements for Passive Optical Components Issue 3, March 2001
GR-1221-CORE	Generic Reliability Assurance Requirements for Passive Optical Components Issue 2, January 1999.

VZ.TPR.9205	Energy Efficiency Requirements for Telecommunications Equipment
VZ.TPR.9306	NEBS Requirements for the Physical Design and Manufacture of Telecommunication Products and Equipment
ISO 9001-2008	Quality Management System- Requirements
ISO 17025-2005	General Requirements for the Competence of Testing and Calibration Laboratories

4.0 ACRONYMS

CFD	Computational Fluid Dynamics
ITL	Independence Testing Laboratory
PBA	Printed Board Assembly
MCAD/ECAD	Mechanical and Engineering 3D CAD Software
TMST	Thermal Modeling Simulation and Test

5.0 CHECKLIST FOR TMST ITL OR SUPPLIER LAB AUDIT

Ref. #	TMST Program Stage	Conforms? Y/N/NA	Analyst's Comments
General Project Background			
1.	Name of Thermal Modeling Laboratory		
2.	Location of Thermal Modeling Laboratory		
3.	Name of Validation Test Laboratory		
4.	Location of Validation Test Laboratory		
5.	Is Product to be evaluated: - A Printed Board Assembly (PBA)? - A Shelf populated with PBAs - An Enclosure populated with Shelves - Other (specify)		
6.	Is the design of the product to be evaluated: - Complete? - Optimized - The version to be delivered to Verizon		

Ref. #	TMST Program Stage	Conforms? Y/N/NA	Analyst's Comments
7.	Is the Validation Test Laboratory certified to: - ISO 9001: 20008 - ISO 17025: 2005 - Other (specify)		
8.	Will the CFD simulation be done by: - The ITL - The equipment manufacturer		
Computer Platform, Operating System and Thermal Simulation Software Used by ITL			
9.	What computer Platform is used by the lab? - PC - MAC - Other (specify)		
10.	What operating system is used by the lab? - Windows NT - Windows 2000 - Windows XT - Other (specify)		
11.	What CFD simulation software is used? - COOLIT[1] - Flotherm[2] - Icepak [3] Other (specify)		
12.	What version of the CFD simulation software is used?		
13.	Does the CFD software used provide: - Use predefined library of objects - Contain various object shapes - Allow optimization and parameterization - Require new input files for un-changed geometry - Allow geometry import from MCAD/ECAD - Permit user-defined macros		
Input of Boundary Conditions			
14.	Does CFD software make provision for - User input of inlet temperature - Inlet/exhaust air velocity - Inlet/exhaust static pressure - Fan performance curves		

[1] COOLIT is a registered trademark of DAAT Research
[2] FloTherm is a registered trademark of Flomerics/Mentor Graphics
[3] Icepak is a registered trademark of Fluent/AnSys

Ref. #	TMST Program Stage	Conforms? Y/N/NA	Analyst's Comments
Physical Model Building			
15.	How is the physical model imported to the CFD Software? - Direct import from the CAD solid modeling - Re-model in CFD - Other (specify)		
16.	Is the imported CAD model simplified for the CFD modeling?		
17.	How are the material thermal properties for the model created? - CFD software libraries - Other (specify)		
18.	How are the input boundary conditions specified - CFD default values - User specified values - Other (specify)		
19.	How are the ambient temperatures specified for the CFD Model? - TPR values for CO or OSP applications - CFD software libraries - Other (specify)		
20.	How are air movers modeled? - Fixed flow - Linear fan - Non linear fan - Other (specify)		
21.	How is the data for the air movers gathered? - Test data - Vendor data sheet - CFD software libraries - Other (specify)		
Mesh Generation			
22.	How is the model grid created? - Automatically created by the software - Specified by the user - Other (specify)		
23.	- Is mesh generation based on - Structured Cartesian - Un-structured body conforming		
24.	Does mesh generation - Allow fine and coarse size generation - Permit user control of mesh parameters - Allow user input of mesh deployment		

Ref. #	TMST Program Stage	Conforms? Y/N/NA	Analyst's Comments
Solving and Reporting			
25.	Does solver allow for: - Coarse initial inputs with low accuracy - Improved accuracy for fine tuned inputs		
26.	Do outputs from the simulation include: - PBA temperature profile - PBA airflow velocity profile - Component and PB surface temperature - PBA temperature and airflow tables - Enclosure air temperature profile - Enclosure airflow velocity profile - Minimum airflow to conform to TPR - Other (specify)		
27.	What is the accuracy of : - The CFD temperature predictions - The airflow velocity predictions - The airflow pressure predictions		
Validation of Temperature and Airflow Velocity by the ITL			
28.	What equipment is used to validate: - Component ambient temperature - Component outer or case temperature - PB laminate surface temperature - PB and enclosure airflow velocity - Fan power draw and acoustic noise - Enclosure airflow pressure - Enclosure surface temperature - Enclosure ambient temperature - EUT power consumption		
29.	Is the temperature validation equipment - A contacting type - A non-contacting type		
30.	Is the accuracy of the measuring equipment better than that of the CFD software predictions?		

END OF CHECKLIST