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MECHANICAL ENGINEERING DIVISION

September 4, 2019

TEST DATA SUMMARY

SwRI Project No: 18.18276.05

Customer Name: Panasonic System Communications Company
Two Riverfront Plaza
Newark, NJ 07102
Attn: Pala Vachirabanjong

Equipment Tested: Panasonic TOUGHBOOK 55 Laptop

Test Date(s): July 19 through August 8, 2019

Test Reference: MIL-STD-810H, "Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests," 31 January 2019.
IEC 60529, "Degrees of protection provided by enclosures (IP Code)," Ed. 2.2, August 2013.
ASTM D4169-16, "Standard Practice for Performance Testing of Shipping Containers and Systems."

The Panasonic TOUGHBOOK 55 was tested at Southwest Research Institute for compliance to client specified requirements of the referenced standards. The test item was evaluated for performance-affecting physical damage, and for its ability to successfully re-boot the operating system following a non-operating test exposure, and to continue to play an audio/video file during operating test environments. Results of the testing performed are summarized in Table 1 below.

This summary is provided for review while the final report is in progress, and is not intended to be a stand-alone document. A full report including detailed configuration information, test procedures and results will be issued as Southwest Research Institute (SwRI) Test Report 18.18276.05.100.FR1, Issue 1.

This summary shall not be reproduced, except in full, without written approval of Southwest Research Institute. The results of this summary apply only to the specific samples tested. If the manufacturer extends the test results to apply to other samples of the same model, or from the same lot or batch, the manufacturer should ensure the additional samples are manufactured using identical electrical and mechanical components and assembly procedures.

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Table 1: Summary of Test Results - Panasonic TOUGHBOOK 55

TEST DESCRIPTION	TEST PROCEDURE	GENERAL PARAMETERS	RESULTS
Altitude: Storage / Air Transport	Method 500.6, Procedure I	Non-Operating (40,000 ft)	Pass
Altitude: Operation / Air Carriage	Method 500.6, Procedure II	Operating (40,000 ft)	Pass
High Temperature: Storage	Method 501.7, Procedure I	160°F Non-Operating, 7 days	Pass
High Temperature: Operation	Method 501.7, Procedure II (Constant)	140°F Operating	Pass
High Temperature: Tactical - Standby to Operational	Method 501.7, Procedure III	(+160°F) High storage Non-Operating to (+140°F) High Operating (test for operation)	Pass
Low Temperature: Storage	Method 502.7, Procedure I	-60°F, Non-Operating	Pass
Low Temperature: Operation	Method 502.7, Procedure II,	-20°F, Operating	Pass
Temperature Shock	Method 503.7, Procedure I	From +160°F to -60°F, three cycles	Pass
Humidity	Method 507.6, Procedure II (Aggravated)	Temperature cycles from 86°F to 140°F; 95%RH	Pass
Sand and Dust: Dust	Method 510.7, Procedure I	Blowing Dust: Operating temperature at 140°F	Pass
Sand and Dust: Sand	Method 510.7, Procedure II	Blowing Sand: Operating temperature 140°F	Pass
Vibration: General Vibration - Operating	Method 514.8, Procedure I	Category 4, Typical mission / field transportation scenario (Figure 514.7C-2), 2hrs/axis	Pass
		Category 4, Ground vehicles - Ground mobile, Composite wheeled vehicles, (Fig 514.7C-4), 2hrs/axis	Pass
Vibration: General Vibration - Non-Operating	Method 514.8, Procedure I	Category 24, General minimal integrity, Non-operating	Pass
Vibration loose cargo procedure II	Method 514.8 Procedure II	Category 5, 2.54cm (1 inch) diameter orbital path at 5Hz	Pass
Shock: Functional	Method 516.8, Procedure I	40g, 11ms, Operating; 3/direction/axis	Pass
Shock - Materials to be Packaged Transportation	Method 516.8, Procedure II	On-road and Off-road shocks from 5.1g, 11ms to 15.2g, 5ms (Table 516.8-VII)	Pass
Shock: Transit-Drop 36-inch	Method 516.8, Procedure IV	26 drops at 36in height on to 2in plywood, Non-Operating. All drops on the same unit.	Pass
Shock: Crash Hazard	Method 516.8, Procedure V	Ground and Flight Equipment	Pass
Shock Bench Handling	Method 516.8, Procedure VI	4" rotational edge drops onto all faces; 4x onto top and bottom, 1x onto other faces.	Pass
Freeze/ Thaw	Method 524.1, Procedure III,	Rapid Temperature Change; Test effects include condensation and fog	Pass
Random Vibration	ASTM D4169-16	Truck Profile, Medium Level	Pass
IP5X	IEC 60529	Dust Protected	Pass
IPX3	IEC 60529	Water Protected – Spraying	Pass



Figure 1: Panasonic TOUGHBOOK 55 Unit Under Test, Top View



Figure 2: Panasonic TOUGHBOOK 55 Unit Under Test, Bottom View



Figure 3: Panasonic TOUGHBOOK 55 Unit Under Test