

ESP D5133NT Surge Suppressor vs. Competitive Models



Test Objective

Buyers Laboratory Inc. (BLI), Hackensack, NJ, was commissioned by Electronic Systems Protection, Inc. (ESP) to conduct a comparative performance test of the ESP D5133NT vs. competitive surge suppressive devices (APC P6M10, Panamax M4T-EX, Panamax MIP-15A-EX, Innovolt CV-TFB-2411 and SmartPower TBF15C-1121TN). The objective of the test was to compare the performance of the devices for protection against voltage transients (spikes/surges) when subjected to IEEE/UL1449 standard test methods; endurance to exposure from repeated high-voltage spikes/surges; resistance to electrical noise disturbances according to the MIL STD-220B testing protocol; and successful transmission of a Category 5E network signal through the surge suppressor to an output device.

Performance Summary

While a few competitive units performed comparably or slightly better in one or more of the individual tests, the ESP D5133NT demonstrated clearly superior performance overall. In addition to being the best of the tested devices for suppressing spikes/surges, with the least amount of let-through energy, it was among three devices that completed the surge endurance test without any problems. It also performed well in the electrical noise tests, providing a comparable performance to the SmartPower device and the Panamax MIP-15A-EX and proving to be better at reducing noise than the APC, the Innovolt and the Panamax M4T-EX units. The Innovolt device failed during the surge test, and the SmartPower and both Panamax devices failed the network communication test (the Panamax M4T-EX because it does not support CAT 5E cabling).

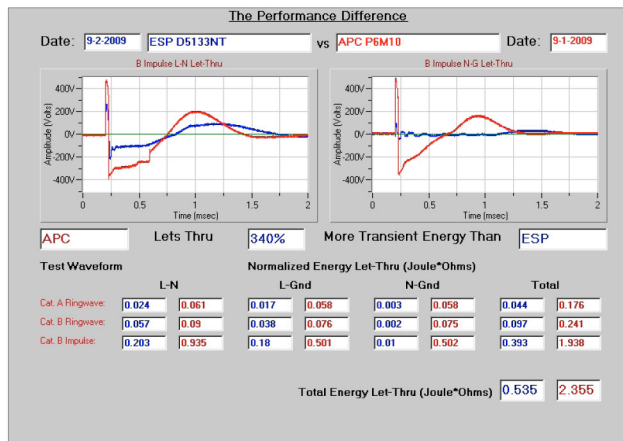
Performance

BLI tested let-through energy (a measure of the actual residual energy that would be “let through” to a device after a surge is passed through to the surge suppressor) in accordance with UL1449 and IEEE standard test procedures, in which the devices are subjected to a variety of surges/spikes up to 6000 volts/3000 amps.

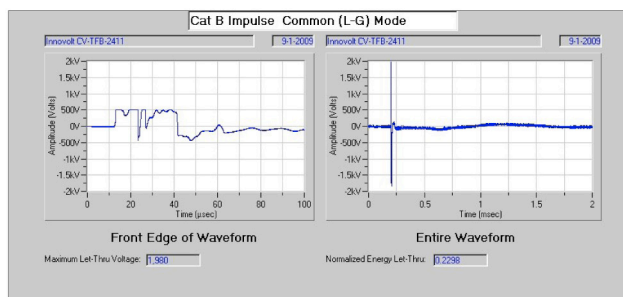
Of the six devices evaluated in this test, the ESP D5133NT gave the best performance, letting through the least amount of total transient energy, at .535 Joule*Ohms. The Innovolt CV-TFB-2411 failed during this test and was consequently inoperable. The other competitive surge suppressors let through from 160% to 340% more transient energy than the ESP, as can be seen in the table below, with the SmartPower unit delivering the next-best performance after the ESP.

ENERGY LET-THROUGH (JOULE*OHMS)

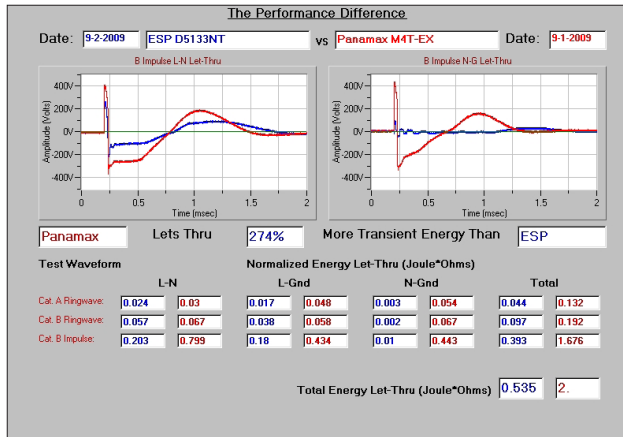
Surge Suppressor	Total Normalized Let-Through	% More Let-Through Than ESP
APC P6M10	2.355	340%
ESP D5133NT	0.535	N/A
Innovolt CV-TFB-2411	Failed test	Failed test
Panamax M4T-EX	2.000	274%
Panamax MIP-15A-EX	2.410	319%
SmartPower TBF15C-1121TN	1.392	160%



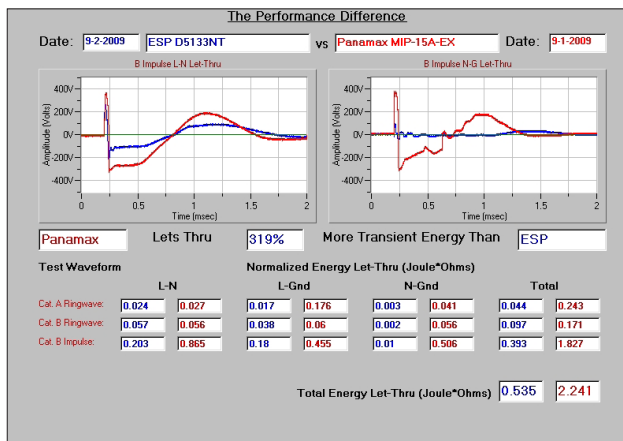
The APC P6M10 let through 340% more energy than the ESP device.



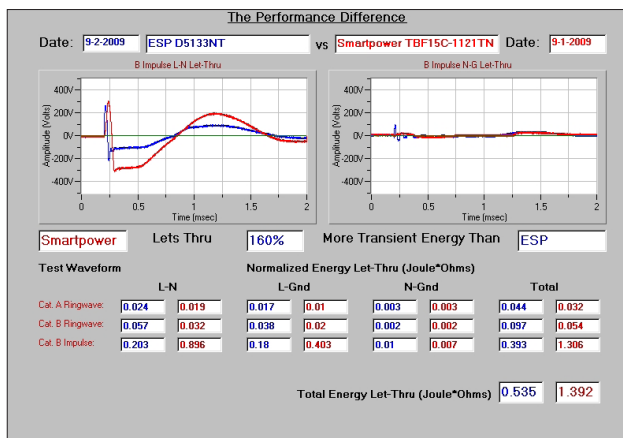
The Innovolt CV-TFB-2411 failed when subjected to this test.



The Panamax M4T-EX let through 274% more energy than the ESP device.



The Panamax MIP-15A-EX let through 319% more energy than the ESP device.



The SmartPower TBF15C-1121TN let through 160% more energy than the ESP device.

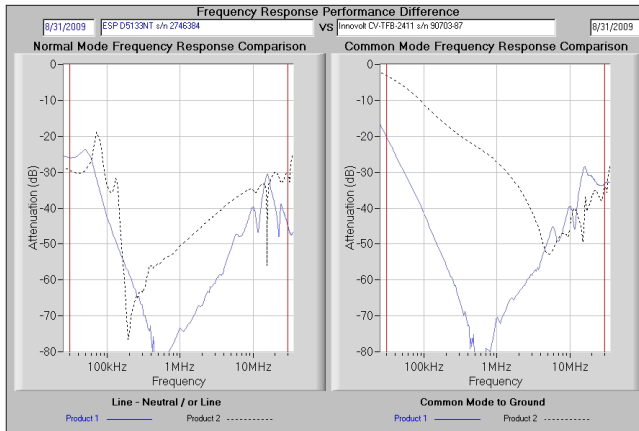
ENDURANCE

To test the endurance of the devices, BLI subjected the devices to repeated 6,000-volt/3,000-amp transient surges, one every 24 seconds over a period of approximately 20 minutes, for a total of 50 surges.

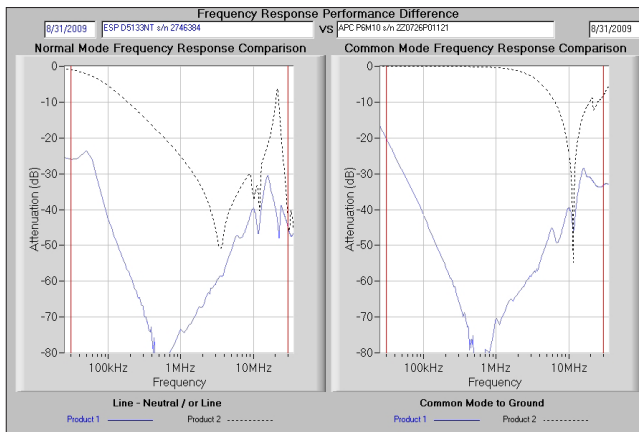
Three of the surge suppressors—the ESP and both Panamax models—completed this test without any problems, effectively suppressing 50 6,000-volt surges over a period of 20 minutes. This test could not be performed on the Innovolt device due to its failure in the surge test. A thermal fuse on the SmartPower TBF15C-1121TN failed after being subjected to only 10 surges; however, the unit appeared to remain functional.

MIL-STD-220B NOISE TEST

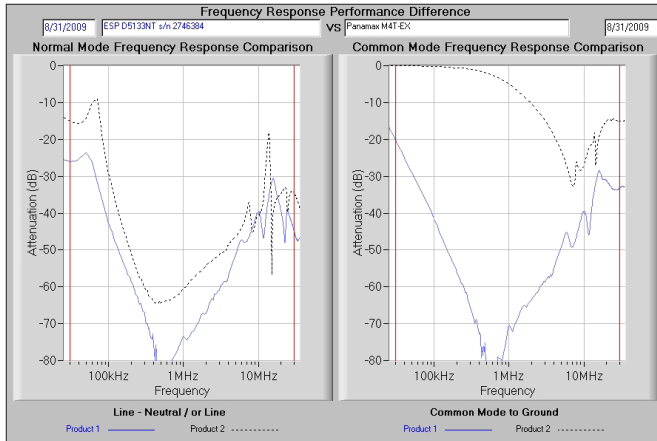
In the MIL-STD-220B noise test, the surge suppressors were subjected to electrical noise at varying frequencies to assess their ability to attenuate EMI/RFI noise. The test was conducted in both Common mode (Line/Neutral to Ground) and Normal mode (Line to Neutral). The results are depicted on the graphs; the ESP device is represented by the solid blue line, while the competitive device is represented by a black dotted line; a lower reading at a particular frequency indicates better noise reduction/attenuation. In Common mode, the ESP device reduced noise to the lowest measurement level (-80), which is considerably better than the lows achieved by the APC model (-55), the Innovolt (-50) and the Panamax M4T-EX (-33) and comparable to that achieved by the Panamax MIP-5A-EX and the SmartPower device.



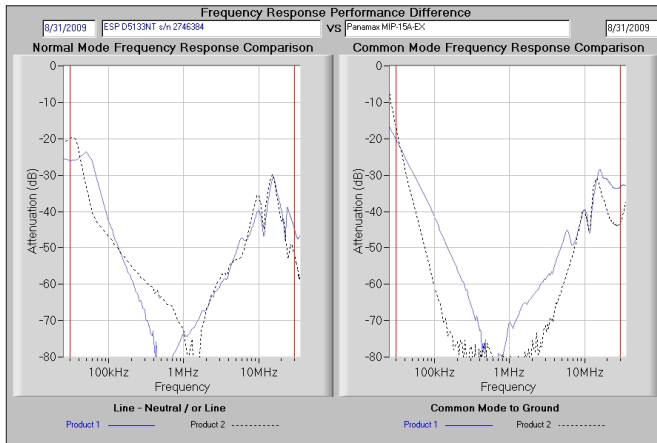
The ESP device reduced noise to lower overall levels than the Innovolt device in both Common and Normal modes.



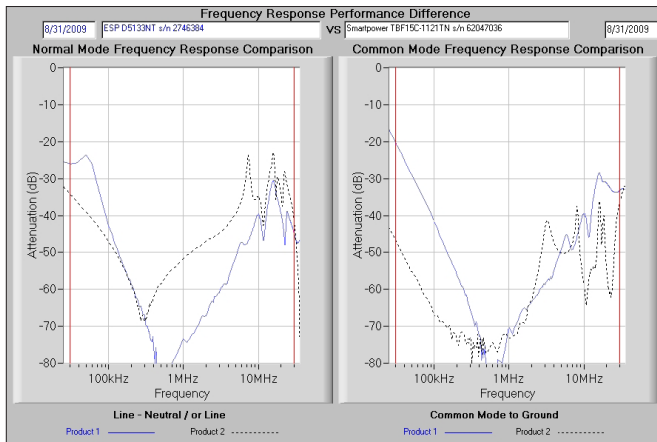
The ESP device reduced noise to lower overall levels than the APC device in both Common and Normal modes.



The ESP device reduced noise to lower levels than the Panamax M4T-EX device, especially in Common mode, where the difference is drastic.



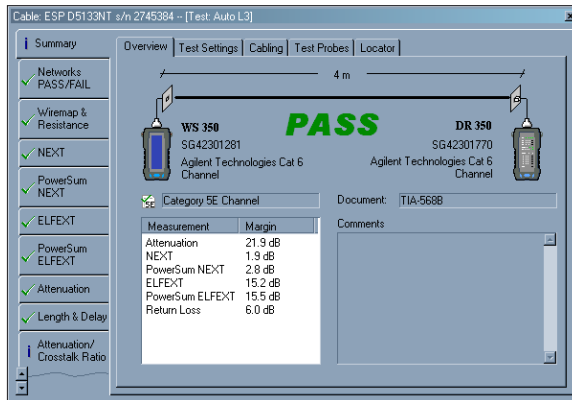
The performance of the ESP device was comparable to that of the Panamax MIP-15A-EX in both modes.



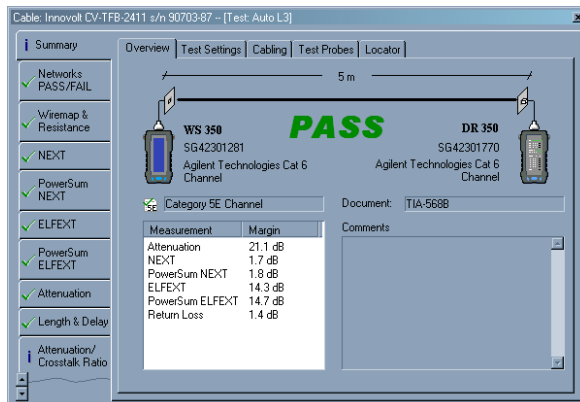
The ESP device's noise reduction capabilities were comparable overall to those of the SmartPower device.

NETWORK COMMUNICATION

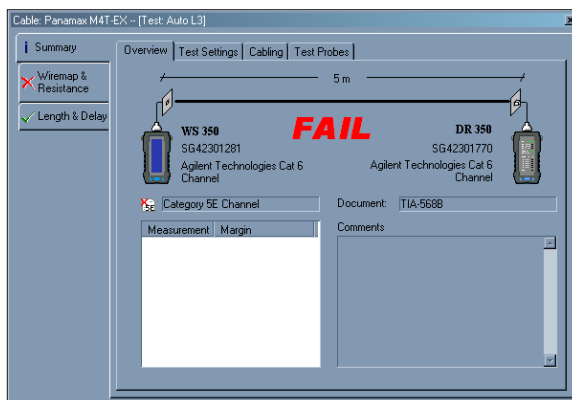
In a test of the surge suppressive devices' ability to carry a Category 5E network signal using an Agilent 5065-4944 wire scope, the ESP D5133NT and the Innovolt CV-TFB-2411 passed the test. The SmartPower TBF15C-1121TN and both Panamax surge suppressors failed the test—the M4T-EX because it does not support CAT5E cabling. The APC device does not support network functionality and was not subjected to this test.



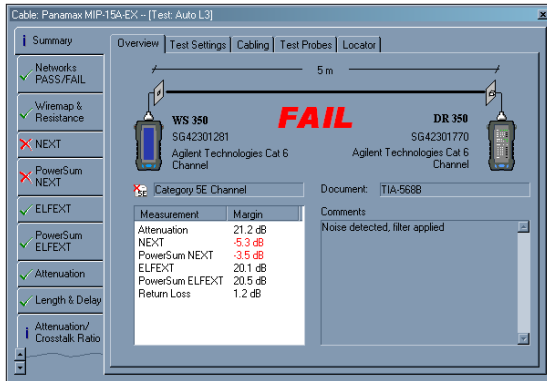
The ESP D5133NT passed the network communication test.



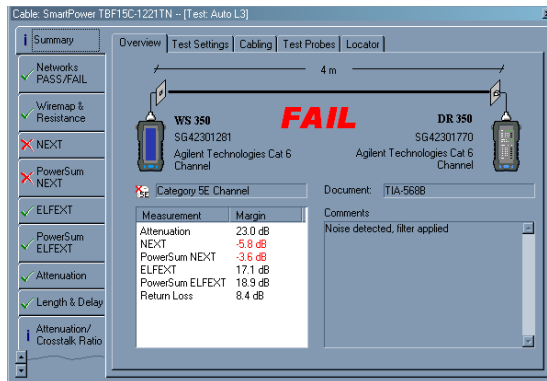
The Innovolt CV-TFB-2411 passed the network communication test.



The Panamax M4T-EX failed the network communication test.



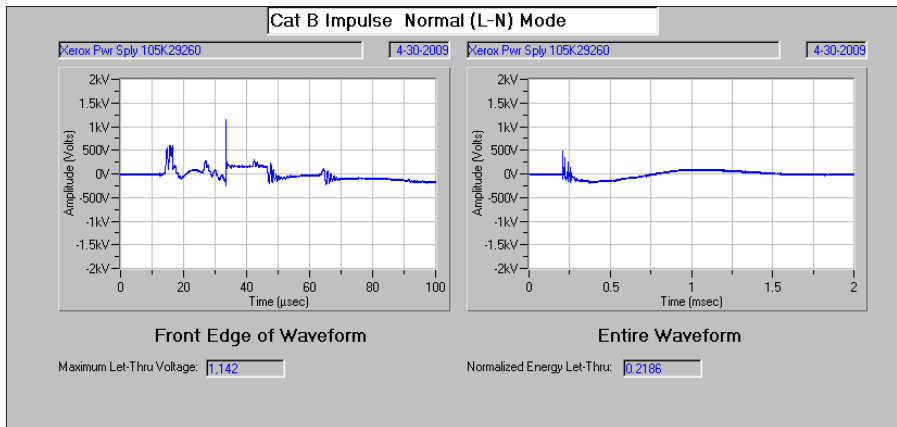
The Panamax MIP-15A-EX failed the network communication test.



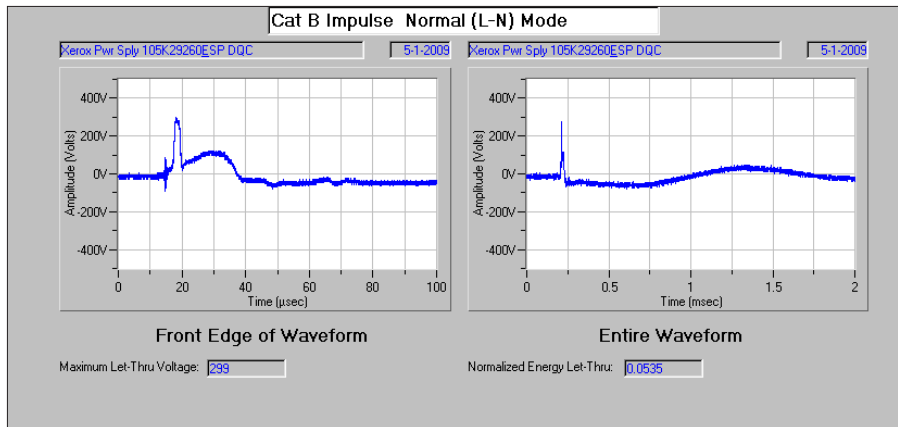
The SmartPower TBF15C-1221TN failed the network communication test.

VOLTAGE LET-THROUGH TO XEROX COPIER POWER SUPPLY WITH AND WITHOUT ESP D5133NT

To measure the difference in voltage let-through for a copier protected by an ESP D5133NT to one not protected by the device, BLI subjected a Xerox 105K2960 copier power supply to a power surge. As indicated by the images below, the ESP device reduced maximum voltage let-through from 1,142 volts to 299 volts.



Without the ESP D5133NT, the Xerox power supply was exposed to a maximum of 1,142 volts.



When protected by the ESP D5133NT, the power supply was exposed to a maximum of only 299 volts.

Test Methodology Overview

Devices tested: APC P6M10, ESP D5133NT, Innovolt CV-TFB-2411, Panamax M4T-EX, Panamax MIP-15A-EX and SmartPower TBF15C-1121TN

The devices, which were purchased by BLI, were tested by BLI technicians at Electronic Systems Protection, Inc.'s (ESP) offices in Zebulon, NC using ESP's equipment. Documentation that the instruments were calibrated and operating within tolerance was provided to BLI. (See below.)

Test Equipment: HP 3577A network analyzer, Velonex V-3040-R voltage and current surge generator, Velonex V-2980-R surge coupler/isolation network, Agilent 5065-4944 wire scope and Agilent 5065-4945 dual remote.