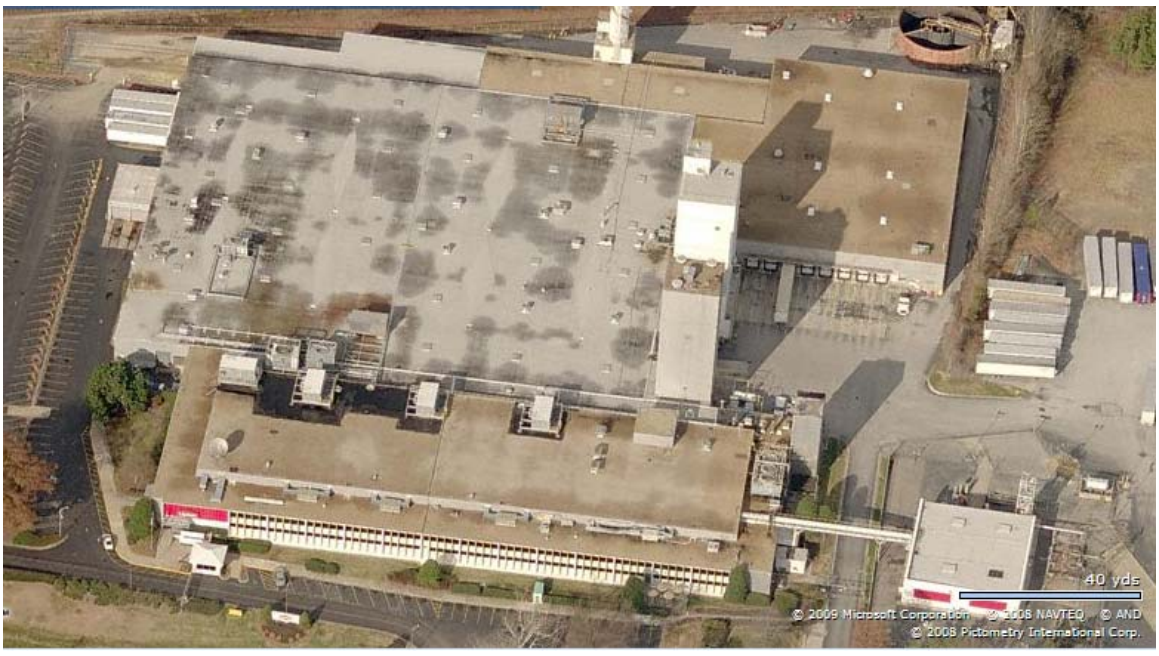
Evaluation of Lipton Facility for High Frequency Noise



01/28/2009

MET Electrical Testing Company, LLC
1457 Miller Store Road, Suite #105
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Evaluation of Lipton Facility for High Frequency Noise

Power Quality Survey Performed By:

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Account Manager By:

Tony Baratta
Senior Account Manager

Report Written By:

Ronald W. Glaser BSEE, CPQ

Table of Contents

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SECTION 1

Report Overview

Executive Summary

Lipton is one of the world's best-known and best-selling brands of both hot leaf and ready-to-drink tea. It is currently owned by Unilever and Lipton represents around 10 percent of the world market for tea (in retail value terms).

Over the course of a century, Lipton has become a dominant tea brand in many markets. The brand is well-represented in many countries across the globe, including the US, Russia, Saudi Arabia, France, Japan, Australia, and Sweden. Compared to other tea brands, Lipton has always had a strong focus on innovation, given its continuous launch of both leaf tea and ready to drink tea products. Its products target the mass market and are generally positioned in the middle of the price spectrum for tea. Due to its size, Lipton is also a dominant player in tea expertise in the world.

Innovation has not been restricted to just their well known branded products, but also reflected in how the factory produces its quality products. This innovation ranges from industry product quality control and manufacturing processes, but also includes advanced automated machinery that is controlled by PLC and computer electronic devices. In an effort to lower their factory carbon footprint, electronic ballast were also recently installed throughout the facility.

With the changes toward innovated manufacturing processes and electronic controlled machines at this facility, the increase in risk and facility maintenance is expected because of the increase amount of power pollution found on the power feeds and distribution panels. It is well documented in the industry that facility power pollution generated from both outside (power company, lightning surges), and inside (electronic ballast and switch mode power supplies) has a very negative effect on the expected life of all electrical and electronic devices connected to the facility power.

As the Frequency Spectrum test validated, The Lipton Suffolk facility also reflected significant amount of noise on its power, especially when the automated machines and motors were running in the facility. The installation of EP Power Filter / Protectors clearly made a positive effect on the amount of power pollution and the level of protection against future power quality events.

Scope of Evaluation

The scope of this evaluation was to discover the risk levels of power pollution on the Lipton Suffolk facility and develop a facility protection system to reduce the facility electrical/electronic risk to damage, thus potential to reduce facility budget. This system would also be expanded to protect facility Green initiatives implemented by the company like the use of electronic ballast (including future development and use of LED type lighting) and using variable speed drives throughout the facility.

This evaluation will be presented in two parts, Power condition BEFORE a protection system is deployed and AFTER a protection system is installed.

1. Using Power Quality meters, evaluate ambient frequency noise generated from outside and inside the facility in August 2008 BEFORE protection product is installed.
2. Again in January 2009 after the protection product is installed.

See attached Before and After data in Section 2 of this report

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Test Site Location:

Lipton

*www.**lipton**.com*

1046 W Washington St
Suffolk, VA 23434
(757) 539-3403

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SECTION 2
Frequency Analysis Data

2008 Data and Evaluation of a Filter Protection System to Reduce a Facility Electrical / Electronic failures

- **Analyze the Frequency Data on Site Before and After Filter/Protection equipment was installed**

Filter / Protection System

A Filter/Protection system for a facility is designed to focus on removing higher frequency that range from 3 kHz to 1 MHz but MUST also convert electrical noise to heat, are used specifically to reduce high frequency noise and transients generated inside and outside the facility created by power company, VFD, Ballast and other digital loads (computers, control cards). It has been demonstrated that reduction of these frequencies by removal of the unwanted noise from the building, improves efficiencies in transformers, motors, and hot spot's in the electrical wiring and increases the life of the motors and digital devices, significantly lowering the yearly facility maintenance budget. These filters have also demonstrated the ability to reduce the facility electrical kilowatt hour usage on motors, thus lowering the facility electrical budget.

Report of Findings

The findings in this report are compared to the guidelines suggested by the Standard Handbook For Engineers 13th Edition, IEEE STD. 519-1992 , Recommended Practices and Requirements For Harmonic Control In Electrical power Systems, IEEE STD. C62 Guides and Standards for Surge Protection, ANSI (American National Standards Institute), and the NEC (National Electrical Code).

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Report Parameters

Based on the existing conditions at the point of monitoring and the aforementioned standards and guidelines, the quantitative limits are pre-programmed into the RPM (Reliable Power Meter). All recorded data is subsequently analyzed in comparison to these values.

Test Equipment

Item	Qty	Model #	Description
1	1	PK4533	System includes PS4500 with three (3) FX3000 Flexible Current Probes, DXV Voltage Leads, CAS3 Hard-Shell Carrying Case, 120 or 240 Volt Charging Unit, USB communication, Secure.
2	1	FAO	Frequency Analysis Option Power-line spectrum analysis from 3kHz to 100kHz, detecting 0.1mVrms to 1Vrms

Data Analysis

While EP Filter / Protectors were placed on all key panels at this facility, a before and after test was conducted to allow a base line of the power condition at this facility reflecting status of power condition before and after the filters were installed. A Frequency Analysis was conducted on a sampling of different type of panels and different type of loads that a good sampling of the type of power that is provided to the load at the Lipton Facility. The noise strength was measured in dB. Every reduction of 3dB is a reduction of ½ of the power in the noise. Every reduction of 10 dB is a reduction of the noise power by 10.

Panel C2B –

DP C2B Phase A to B before filters showed a very strong high frequency noise presence on the power distribution lines as high as -28 db. After the EP Power filter/ protection system was installed, the panel noise voltage dropped down to -68 db which is basically earth noise. This filter reduction was down by a factor of 40 from the original signal strength. All other phases saw similar performance of the filters.

Panel DP 2A –

Panel D2A Phase A to B before filters showed noise levels on voltage line basically around the -35 dB marker. After filter was installed, this base line dropped down to earth noise level between -60 and -70 dB. This is basically a

reduction of the noise on the system power by a factor of 35. All other phases saw similar performance of the filters.

Panel RP B2A1 –

RP B2 Phase A to Phase B was extremely noisy with peaks of the base line as high as -12 dB. After EP Filter Protector was installed the baseline clearly flattened out with the base line of the voltage (black in color) now at -35 dB. This is a reduction of -23 dB or a power factor reduction of 20.5.

Conclusion

After review of the gathered information regarding noise level on the power panels at the time of this survey, it is believed that the EP 2000, and EP 2500 Filter Protectors clearly had a positive effect on the overall facility electrical system. Based on the data seen, no other filters are recommended at this time and should be sufficient to allow monitoring of the facility maintenance budget for the year of 2009. Based on the data gathered at other similar manufacturing facilities like Lipton, Lipton can expect a reduction to their facility maintenance due to electrical damage caused from power quality events and power line noise.

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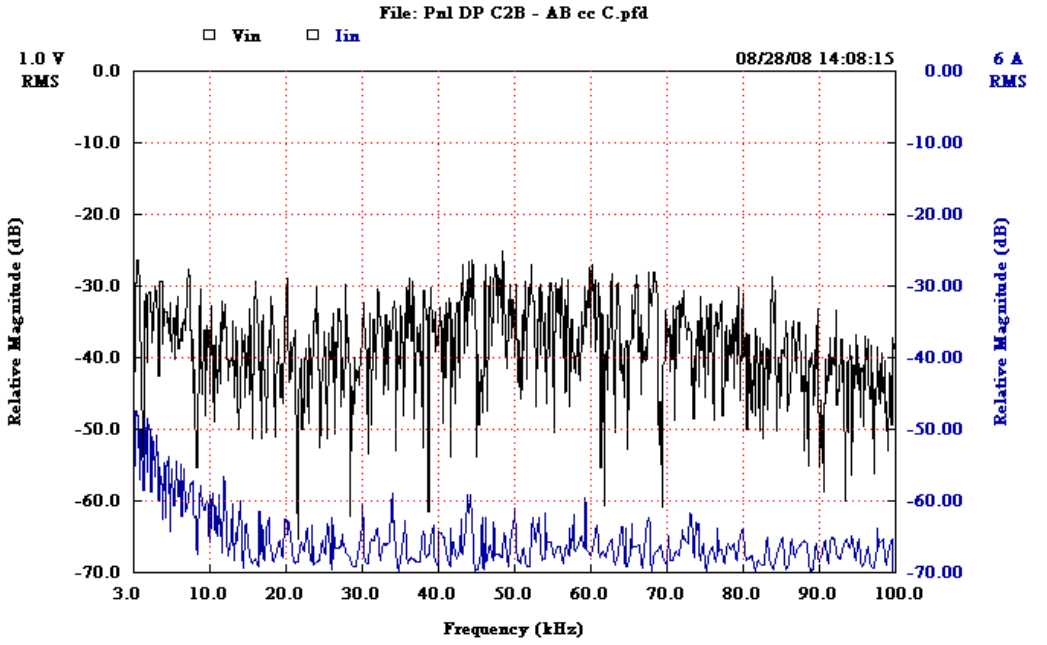

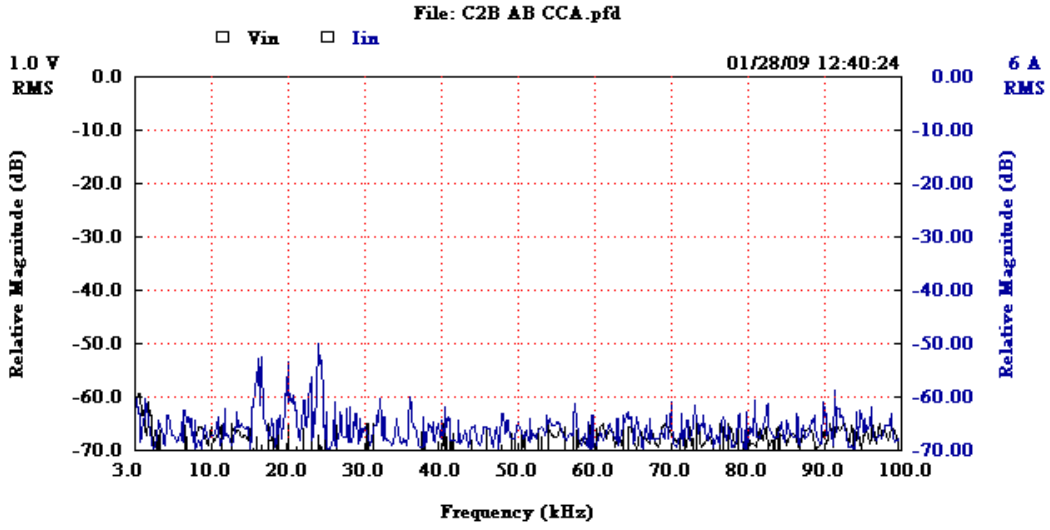

DP C2B Phase AB before filters showed a very strong high frequency noise presence on the power distribution lines as high as -28 db. After the filters were installed, the voltage dropped down to a -68 db baseline, which is basically earth noise. This filter reduction was a drop in the noise by a power factor of 40.

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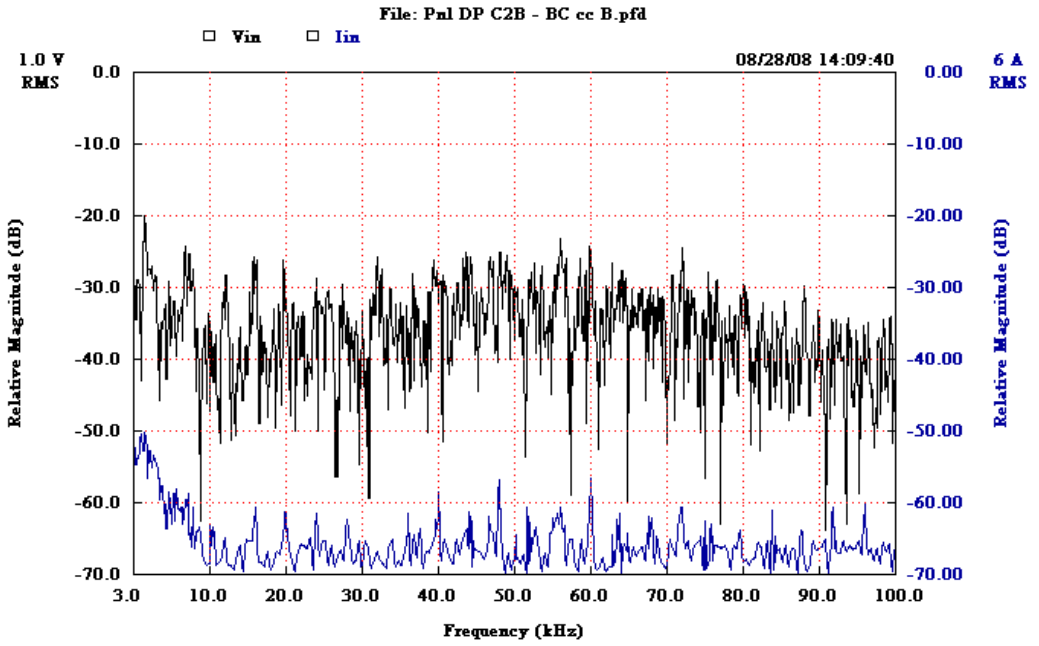

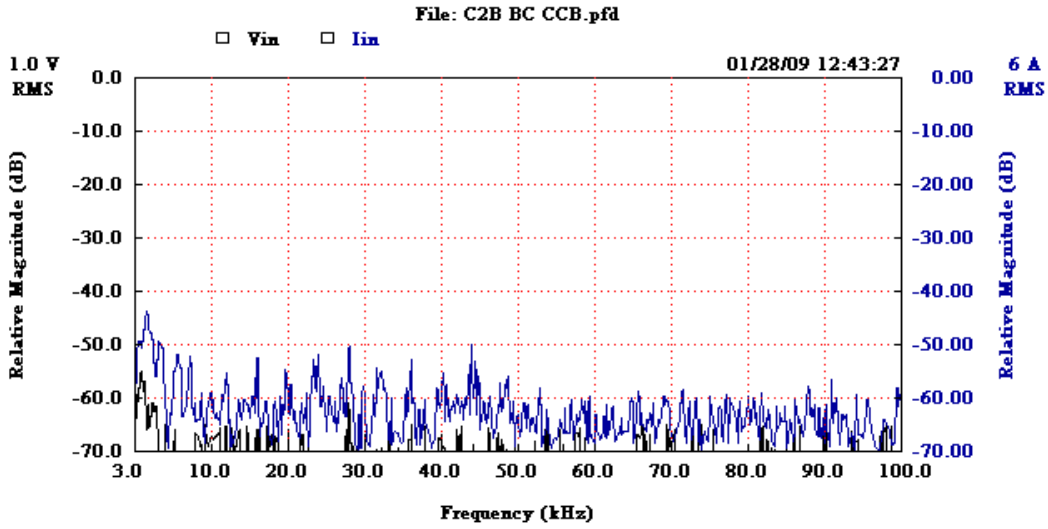

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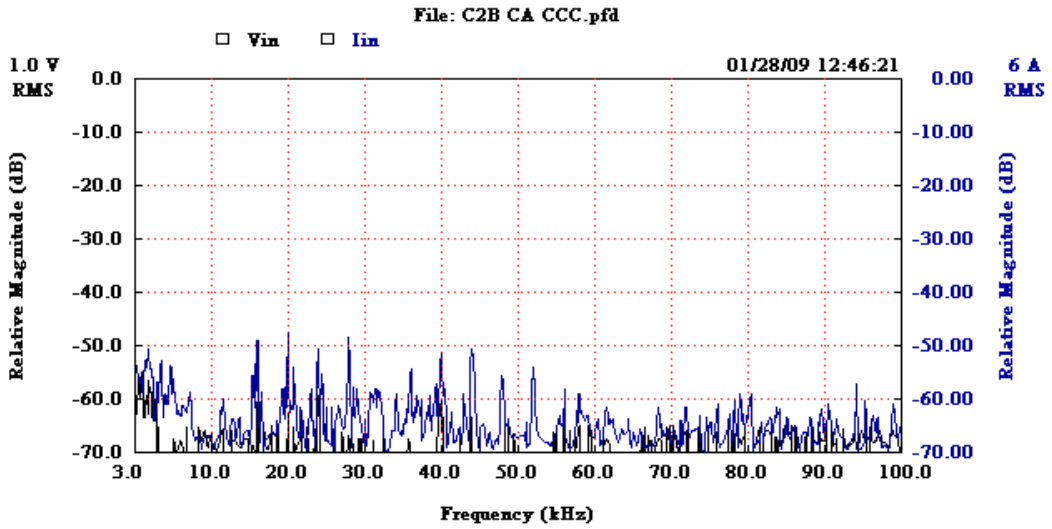
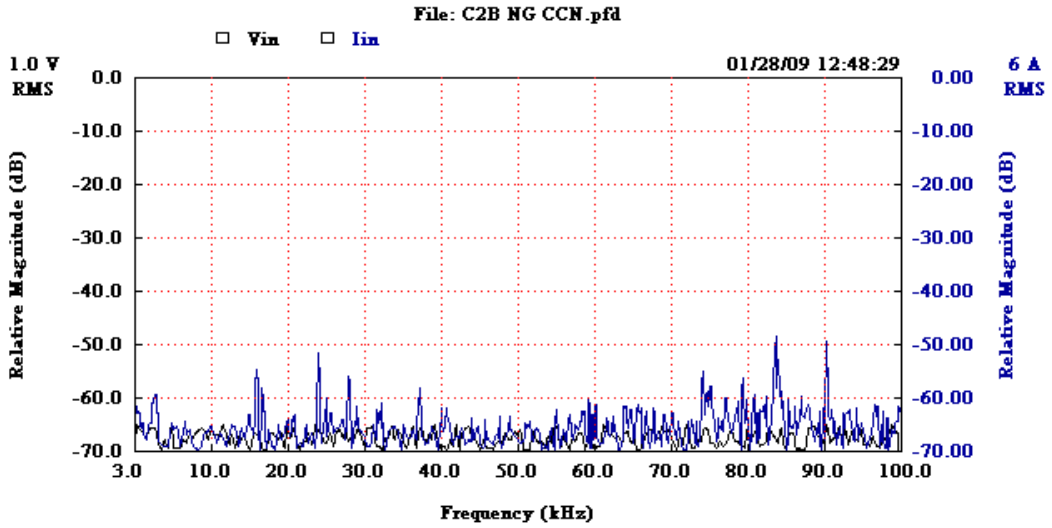


This is the after filter data for Panel C2B Phase C to Phase A. No Before picture was taken.



This is the after filter data for Panel C2B Phase N to Ground. No Before picture was taken

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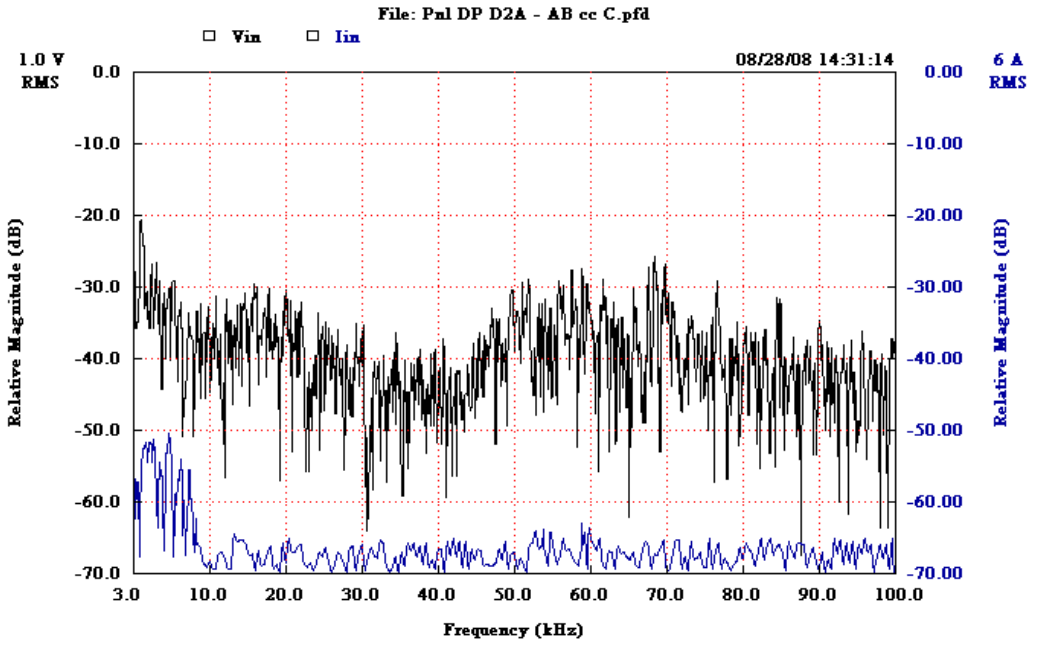

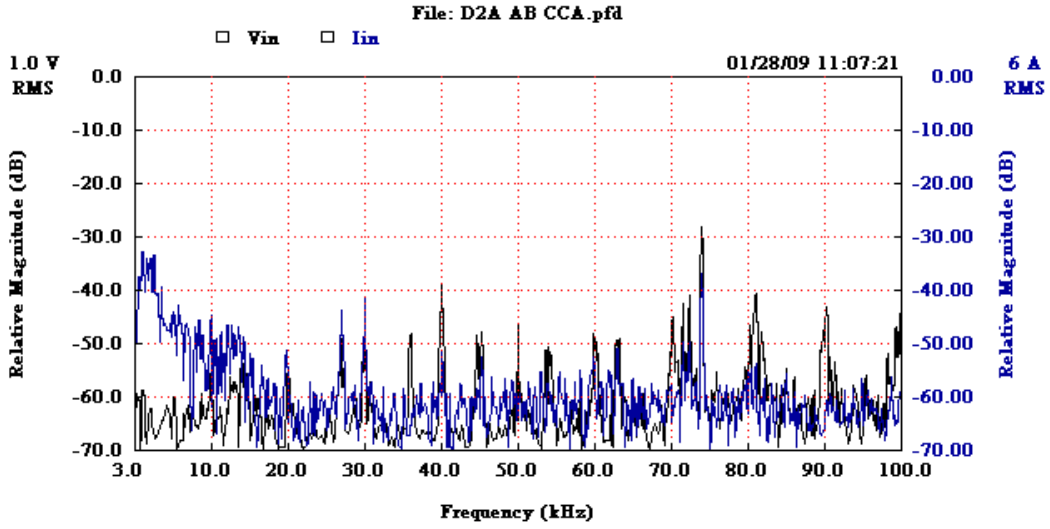

Panel D2A Phase A to B before filters showed noise levels on voltage line basically around the -35 dB marker. After filter was installed, this base line dropped down to earth noise level between -65 and -70 dB. Basically a reduction of the power of the noise by a factor of 35.

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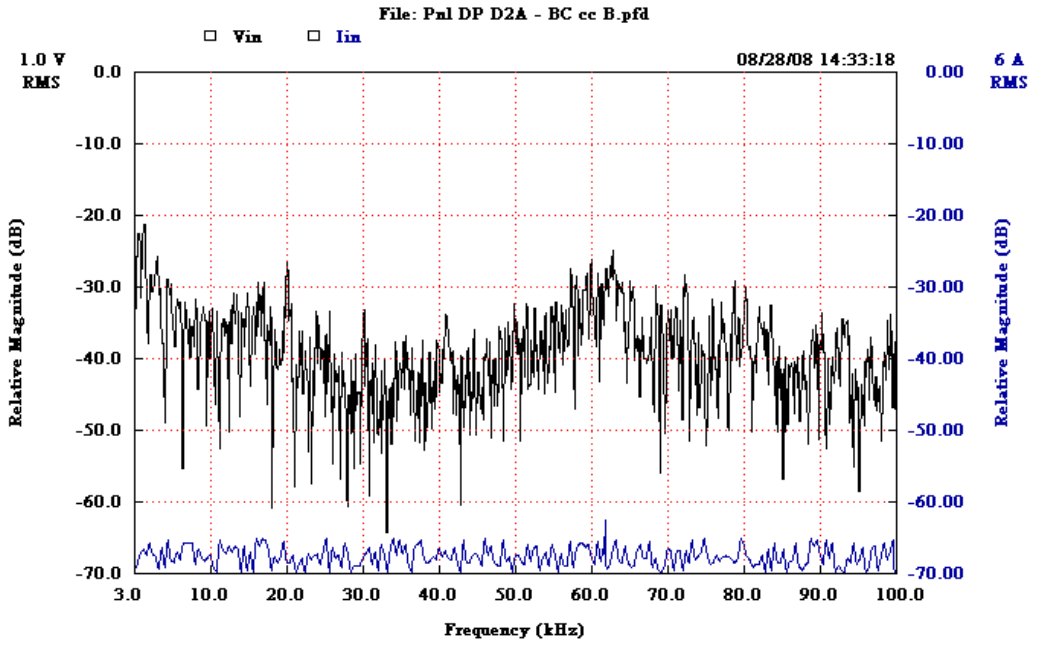

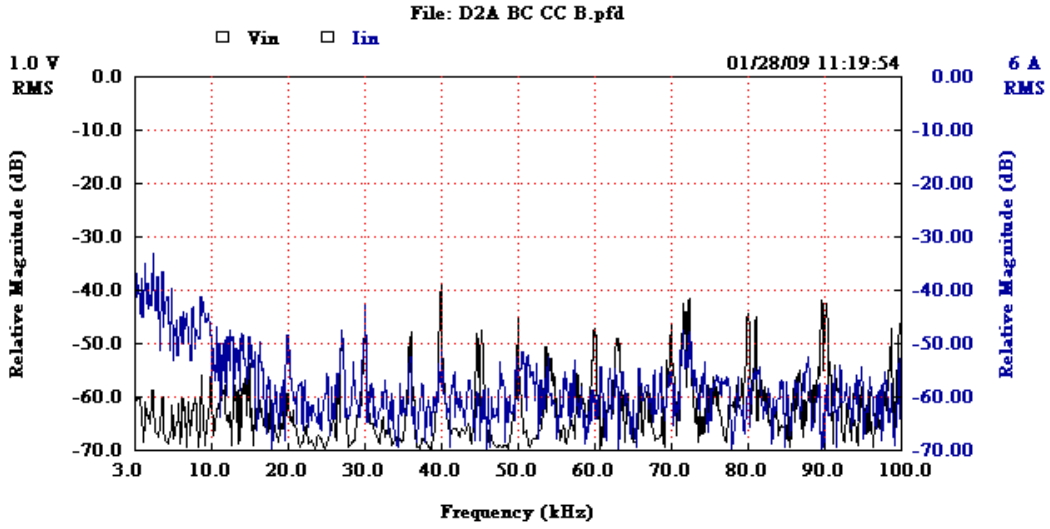

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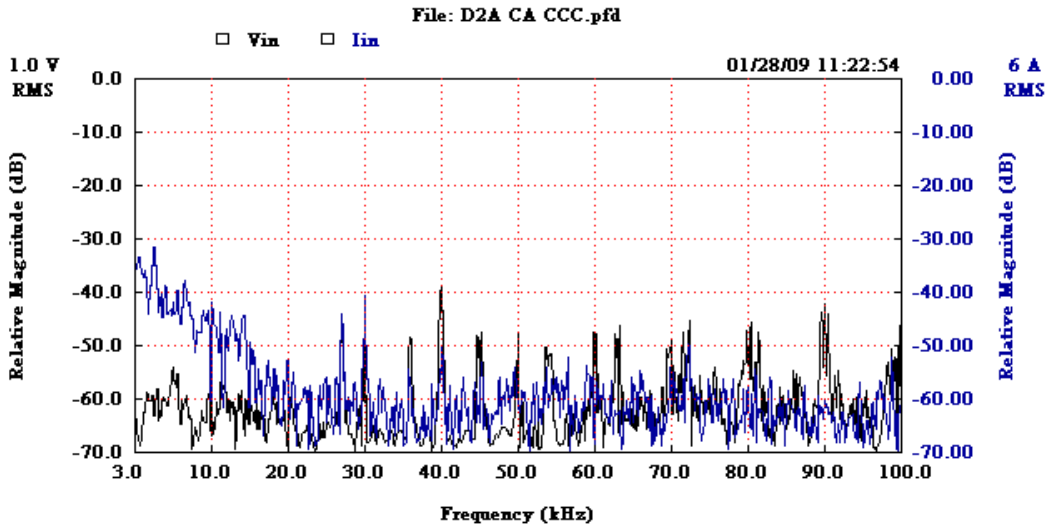

This is the after filter data for Panel D2A Phase C to Phase A

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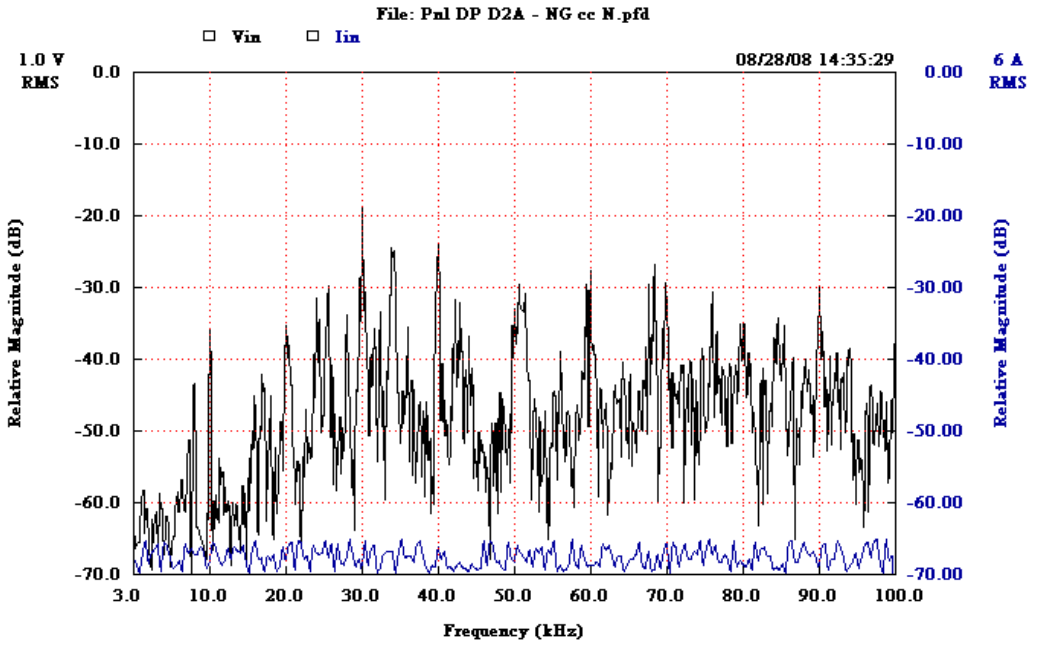

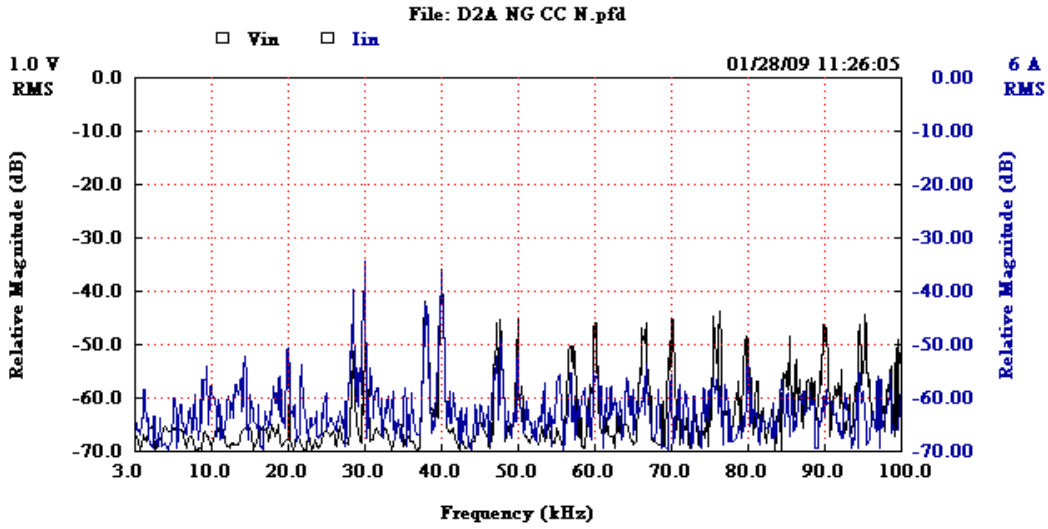

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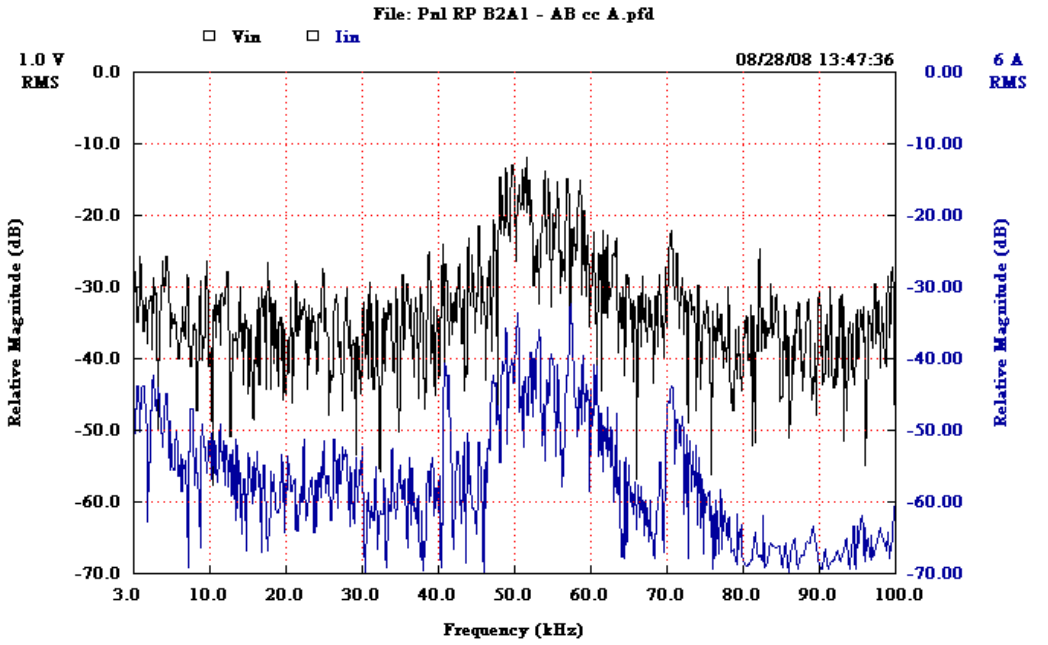

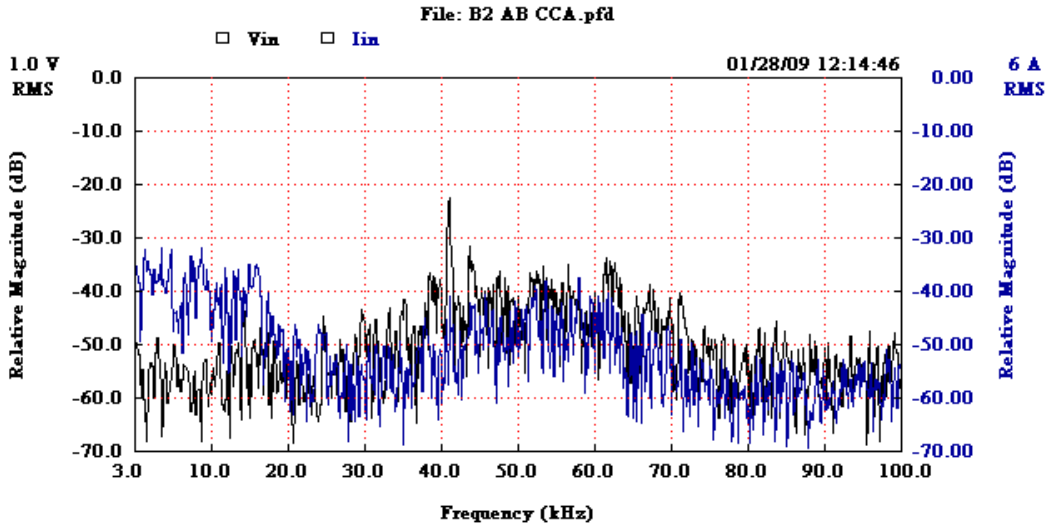

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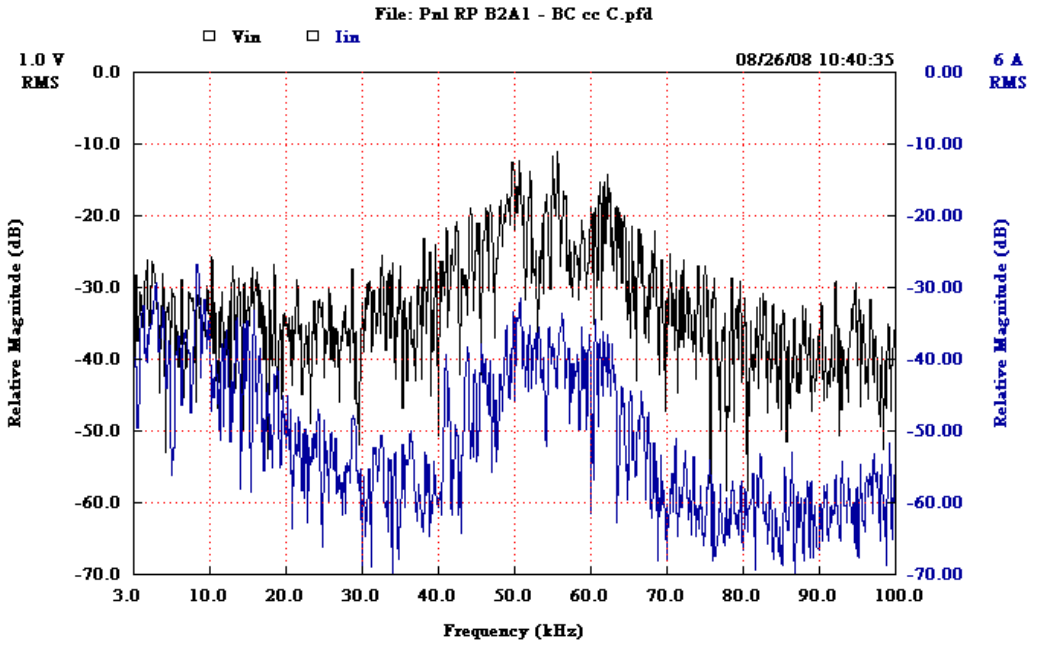

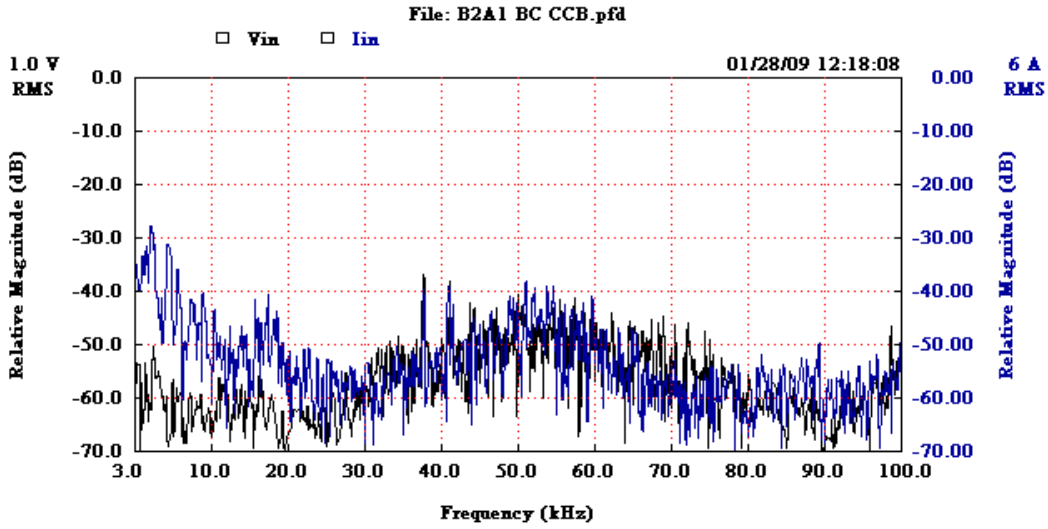

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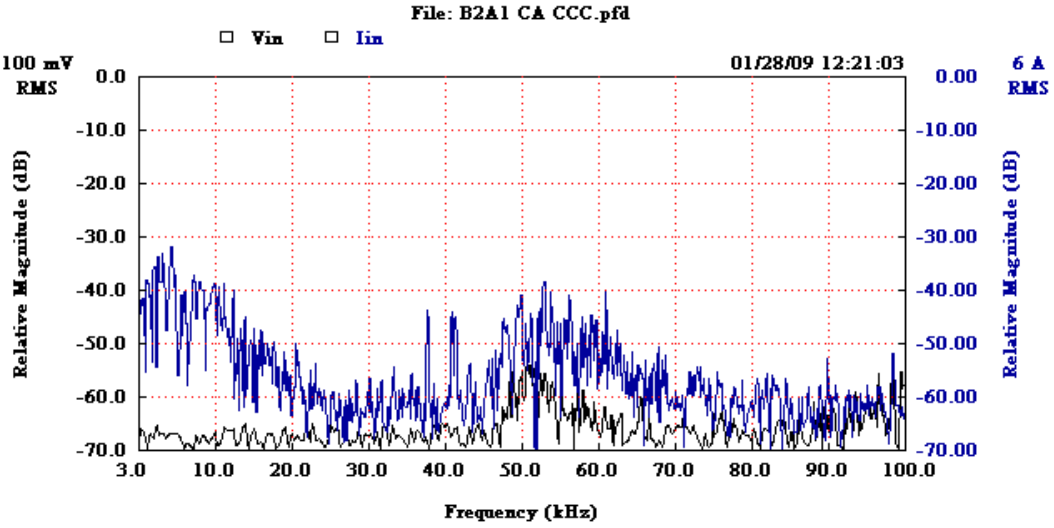

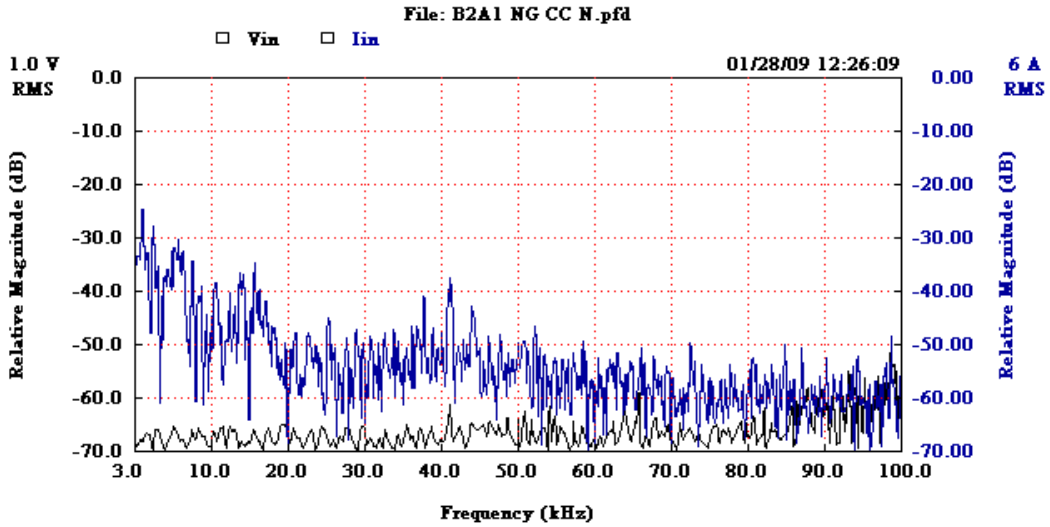

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