Avaya Solution & Interoperability Test Lab

Application Notes for the ProCurve 2626-PWR Switch by HP Supporting Power over Ethernet with Avaya Communication Manager, Avaya IP Office, Avaya one-X Quick Edition G10 PSTN Gateway, Avaya AP-8 Access Point and Avaya IP Telephones – Issue 1.0

Abstract

These Application Notes describe the procedures for configuring the ProCurve 2626-PWR Switch by HP to provide inline Power over Ethernet (PoE) to Avaya 4600/5600/9600 Series IP Telephones registered to Avaya Communication Manager, Avaya IP Office and the Avaya one-X Quick Edition G10 PSTN Gateway. During compliance testing, Avaya IP Telephones successfully obtained power and transferred data over standard Ethernet cables from the ProCurve Switch. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

Power over Ethernet (PoE) allows both power and data to be simultaneously carried over standard Ethernet cables. PoE-enabled Ethernet switches can supply power directly to Ethernet devices, thereby simplifying installation and removing the need for separate power supplies for those devices. The IEEE 802.3af standard defines the mechanisms for Power Sourcing Equipment (PSE), such as PoE-enabled Ethernet switches, to detect, classify, and supply power to Powered Devices (PDs), such as PoE-enabled IP telephones. In the compliance-tested configuration described in these Application Notes, the ProCurve 2626-PWR Switch is configured to supply inline PoE to Avaya PDs. There is no need for ProCurve-specific configuration on Avaya Communication Manager, Avaya IP Office or Avaya one-X Quick Edition G10 PSTN Gateway to support this solution. Refer to http://support.avaya.com for station administration.

As illustrated in **Figure 1**, the Avaya PDs covered in these Application Notes include the following:

- Avaya one-X Quick Edition G10 PSTN Gateway
- Avaya 9630 one-X Deskphone Edition IP Telephone with and without 24-Button Expansion Module
- Avaya 9620 one-X Deskphone Edition IP Telephone
- Avaya 4601SW IP Telephone
- Avaya 4602SW IP Telephone
- Avaya 4610SW IP Telephone
- Avaya 4620 IP Telephone
- Avaya 4620SW IP Telephone
- Avaya 4621SW IP Telephone
- Avaya 4622SW IP Telephone
- Avaya 4625SW IP Telephone
- Avaya 5602SW IP Telephone
- Avaya 5610SW IP Telephone
- Avaya 5620SW IP Telephone
- Avaya 4610 one-X Quick Edition IP Telephone
- Avaya 4621 one-X Quick Edition IP Telephone
- Avaya AP-8 Wireless Access Point

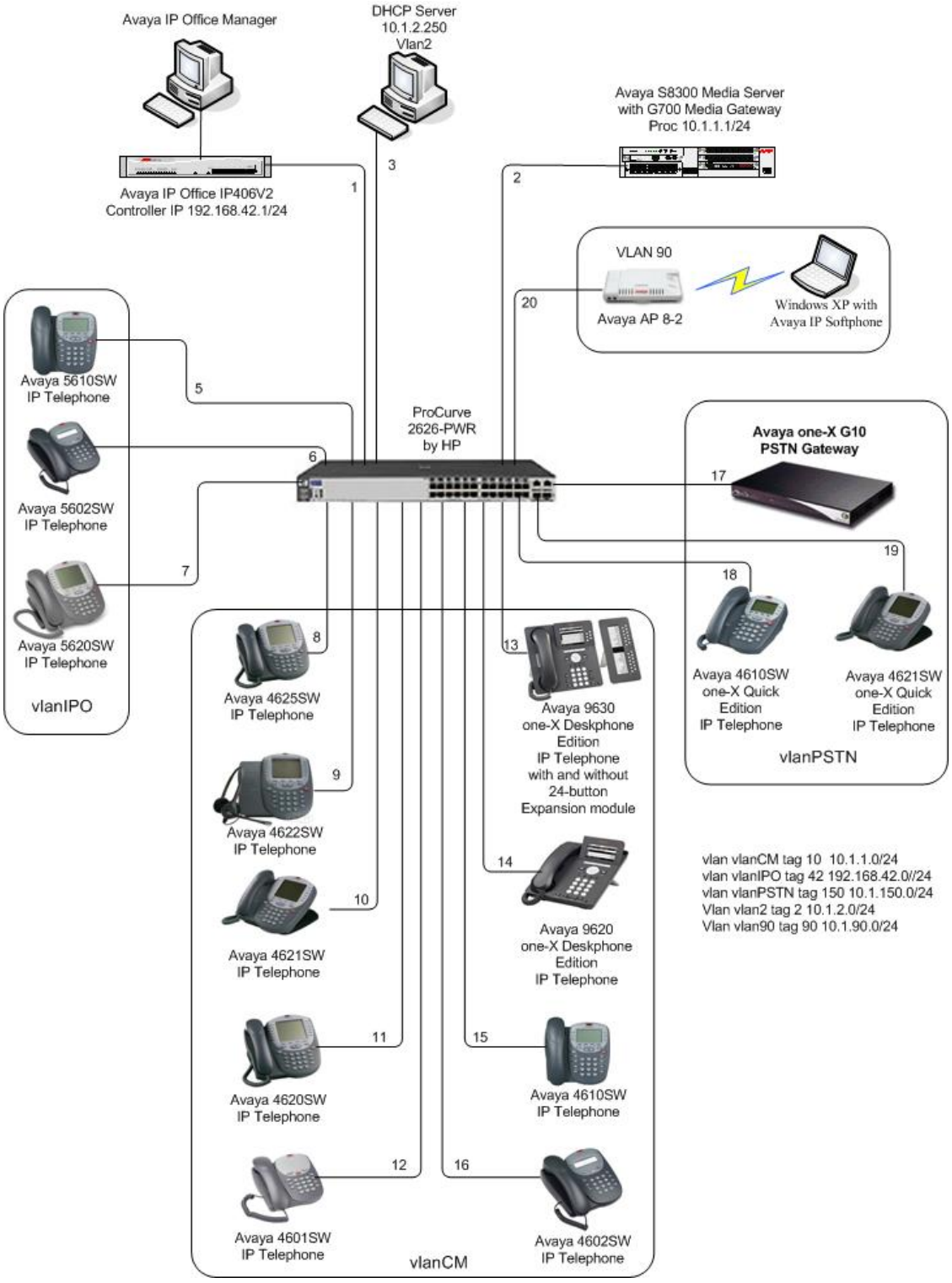

Figure 1: PoE Interoperability between ProCurve 2626-PWR, Avaya IP Telephones and Avaya one-X Quick Edition G10 PSTN Gateway

2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration provided:

Equipment	Software/Firmware
Avaya IP Office IP406V2	3.2(17)
Avaya S8300 Media Server with a G700 Media Gateway	Avaya Communication Manager 3.1.2
Avaya G700 Media Gateway	25.28.0
Avaya IP Office Manager	3.2(17)
Avaya AP-8 Wireless Access Point	3.1.0
Avaya IP Softphone	5.2 sp1
Avaya one-X Quick Edition G10 PSTN Gateway	2.0
Avaya 9630 one-X Deskphone Edition IP Telephone with and without 24-button module	1.1
Avaya 9620 one-X Deskphone Edition IP Telephone	1.1
Avaya 4601SW IP Telephone	2.3
Avaya 4602SW IP Telephone	2.3
Avaya 4610SW IP Telephone	2.6
Avaya 4620SW IP Telephone	2.6
Avaya 4621SW IP Telephone	2.6
Avaya 4622SW IP Telephone	2.6
Avaya 4625SW IP Telephone	2.6
Avaya 5610SW Telephone	2.3
Avaya 5620SW Telephone	2.3
Avaya 5602SW Telephone	2.3
Avaya 4610SW one-X Quick Edition IP Telephone	2.0
Avaya 4621SW one-X Quick Edition IP Telephone	2.0
ProCurve 2626-PWR by HP (model number J8164A)	H.08.98

3. Configuration of the ProCurve 2626-PWR switch

Inline Power over Ethernet (PoE) is supported on the ProCurve 2626-PWR Switch. By default, PoE support is enabled on the system and on all ports.

Log into the ProCurve 2626-PWR Switch.

Connect to the ProCurve 2626-PWR Switch. Log in using the appropriate **Login** ID and **Password**.

Login:
Password:
ProCurve Switch 2626-PWR#

Enable Routing.

ProCurve Switch 2626-PWR# **configure**
ProCurve Switch 2626-PWR(config)#**ip routing**

Configure vlanCM on the ProCurve 2626-PWR Switch.

ProCurve Switch 2626-PWR# **configure**
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# **vlan 10 name vlanCM**

Assign an IP address and DHCP helper-address to vlanCM on the ProCurve 2626-PWR Switch.

ProCurve Switch 2626-PWR# **configure**
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# **vlan 10**
ProCurve Switch 2626-PWR (vlan-10)#**ip address 10.1.1.254/24**
ProCurve Switch 2626-PWR (vlan-10)# **ip helper-address 10.1.2.250**

Assign ports to vlanCM on the ProCurve 2626-PWR Switch.

ProCurve Switch 2626-PWR# **configure**
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# **vlan 10**
ProCurve Switch 2626-PWR (vlan-10)# **untagged 2,8-16**

Configure vlanIPO on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 42 name vlanIPO
```

Assign an IP address and DHCP helper-address to vlanIPO on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 42
ProCurve Switch 2626-PWR (vlan-42)#ip address 192.168.42.254/24
ProCurve Switch 2626-PWR (vlan-42)# ip helper-address 10.1.2.250
```

Assign ports to vlanIPO on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 42
ProCurve Switch 2626-PWR (vlan-42)# untagged 1,5-7
```

Configure vlan90 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 90 name vlan90
```

Assign an IP address and DHCP helper-address to vlan90 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 90
ProCurve Switch 2626-PWR (vlan-90)#ip address 10.1.90.254/24
ProCurve Switch 2626-PWR (vlan-90)# ip helper-address 10.1.2.250
```

Assign ports to vlan90 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 90
ProCurve Switch 2626-PWR (vlan-90)# untagged 20
```

Configure vlanPSTN on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 150 name vlanPSTN
```

Assign an IP address to vlanPSTN on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 150
ProCurve Switch 2626-PWR (vlan-150)#ip address 10.1.150.254/24
```

Assign ports to vlanPSTN on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 150
ProCurve Switch 2626-PWR (vlan-150)# untagged 17-19
```

Configure vlan2 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 2 name vlan2
```

Assign an IP address to vlan2 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 2
ProCurve Switch 2626-PWR (vlan-2)#ip address 10.1.2.1/24
```

Assign ports to vlan2 on the ProCurve 2626-PWR Switch.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)#
ProCurve Switch 2626-PWR(config)# vlan 2
ProCurve Switch 2626-PWR (vlan-2)# untagged 3
```

4. Interoperability Compliance Testing

The interoperability testing focused on verifying PoE interoperability between the ProCurve 2626-PWR Switch, Avaya IP Telephones and the Avaya one-X Quick Edition G10 PSTN Gateway.

The power tests included verification of the following after the powered device was connected to the switch:

- Successful boot operation.
- For Avaya IP Telephones, successful registration with Avaya Communication Manager or Avaya IP Office (the Avaya 5600-Series IP Telephones are only supported on IP Office).
- Completion of a test call, and raising speakerphone volume to maximum value.
- Connecting a mix of Avaya IP Telephones to the switch, power cycling the switch and verifying successful boot operation and registration of the devices.

5. General Test Approach

The general test approach was to:

- Connect the Avaya IP Telephones and Avaya one-X Quick Edition G10 PSTN Gateway to ports on the ProCurve Switch and verify that the PDs successfully booted.
- Make calls with background data to verify that power and data can be simultaneously carried on the PoE connections.

6. Test Results

All Power over Ethernet test cases completed successfully. The ProCurve 2626-PWR Switch successfully provided inline power to all of the Avaya IP telephones and one-X Quick Edition G10 PSTN Gateway.

Table 1 lists the IEEE 802.3af class, allocated power, and measured power of the Avaya IP Telephones and Avaya one-X Quick Edition G10 PSTN Gateway when connected to the ProCurve 2626-PWR switch. The power listed as measured by the ProCurve PoE switch is for PDs under idle conditions. Cable length and impedance affects power usage, so the measurements listed here may vary based on the cable used.

Avaya Powered Device	802.3af Class	Volts	Measured Power (Watts) (Idle)
4601SW	2	49.2	3.1
4602SW	2	49.3	3.1
4610SW	2	49.4	3.1
4620SW (*)	2	49.4	4.0
4621SW	2	49.4	4.7
4622SW	2	49.3	5.0
4625SW	3	49.1	8.0
5602SW	2	49.4	3.0
5610SW	2	49.5	3.1
5620SW	2	49.4	4.0
9620	2	49.3	4.7
9630	2	49.3	4.8
9630 with 24-button module	2	49.2	5.1
4610 one-X Quick Edition	2	49.4	3.1
4610 one-X Quick Edition	2	49.3	5.0
one-X Quick Edition G10 PSTN gateway	0	49.5	4.1
AP-8 Wireless Access Point	0	49.3	3.5

Table 1

Note: To tell the difference between a 4620SW Class 3 IP Phone that was made before November 4th, 2004 and a 4620SW Class 2 IP Phone made after November 4th, 2004, look at the bottom right corner of the phone at the mic input. The Class 2 phones have one hole and the Class 3 phones have two holes for the mic input.

Table 2 summarizes the power at the PSE for the IEEE 802.3af classes.

Class	PSE Output Max. Power (W)
0	15.4
1	4.0
2	7.0
3	15.4
4	Reserved-Treat as Class 0

Table 2

7. Verification Steps

Inline Power over Ethernet (PoE) is supported on the ProCurve 2626-PWR Switch. By default, PoE support is enabled on the system and on all ports.

The following steps may be used to verify the configuration for Power over Ethernet:

- Ensure that PoE has not been disabled on the system or the ports that serve the PDs by entering **show power-management brief.**
- Connect the Avaya PD to a PoE enabled port on the ProCurve 2626-PWR Switch and verify that the PD powers on successfully. If the PD does not power on, enter the command **show inline-power info detail ports <portlist>**.
- For the Avaya 4600/5600/9600 Series IP Telephones, verify successful registration and complete phone calls to other phones (assumes the IP telephone has been configured with the correct IP and call control information).

To view the inline power information for the ProCurve 2626-PWR switch, enter the command **show power-management.**

Verify POE is enabled.

```
ProCurve Switch 2626-PWR# show power-management

Status and Counters - System Power Status

Maximum Power     : 406 W            Operational Status  : On
Power In Use      :  61 W +/- 6 W    Usage Threshold (%) : 80
```

To display an overview of PoE status on all ports, enter the command **show power-management brief.**

Verify that PoE support is enabled and view power class information. A detailed explanation of each field is in **Appendix A**.

ProCurve Switch 2626-PWR# **show power-management brief**

```
Status and Counters - Port Power Status

       | Power             Configured       Detection   Power
 Port  | Enable  Priority  Type             Status      Class
 ----- + ------- --------- ---------------- ----------- ------
 1     | Yes     Low                        Searching   0
 2     | Yes     Low                        Searching   0
 3     | Yes     Low                        Searching   0
 4     | Yes     Low                        Searching   0
 5     | Yes     Low                        Delivering  2
 6     | Yes     Low                        Delivering  2
 7     | Yes     Low                        Delivering  2
 8     | Yes     Low                        Delivering  3
 9     | Yes     Low                        Delivering  2
 10    | Yes     Low                        Delivering  2
 11    | Yes     Low                        Delivering  2
 12    | Yes     Low                        Delivering  2
 13    | Yes     Low                        Delivering  2
 14    | Yes     Low                        Delivering  2
 15    | Yes     Low                        Delivering  2
 16    | Yes     Low                        Delivering  2
 17    | Yes     Low                        Delivering  0
 18    | Yes     Low                        Delivering  2
 19    | Yes     Low                        Delivering  2
 20    | Yes     Low                        Delivering  0
 21    | Yes     Low                        Searching   0
 22    | Yes     Low                        Searching   0
 23    | Yes     Low                        Searching   0
 24    | Yes     Low                        Searching   0
```

Display the PoE Status on a specific port. A detailed explanation of each field is in **Appendix B**.

ProCurve Switch 2626-PWR# **show power-management <portlist>**

```
Status and Counters - Port Power Status for port 5

 Power Enable      : Yes

 Priority          : Low               Configured Type   :
 Detection  Status : Delivering        Power Class       : 2

 Over Current Cnt  : 0                 MPS Absent Cnt    : 0
 Power Denied Cnt  : 0                 Short Cnt         : 0

 Voltage           : 493 dV            Current           : 84 mA
 Power             : 4141 mW
```

Disable PoE on a specific port.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)# no interface 1 power
```

Enable PoE on a specific port.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)# interface 1 power
```

Disable PoE on all ports.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)# no interface 1-24 power
```

Enable PoE on all ports.

```
ProCurve Switch 2626-PWR# configure
ProCurve Switch 2626-PWR(config)# interface 1-24 power
```

8. Troubleshooting

- If the PD does not power up, check the inline power settings. Enter **show power-management brief.**
- If the PD does not power up, check the inline power configuration. Enter **show power-management 1-24.** Check to see if there is a limit or priority setting on the port. If the output shows that the "Detection Status" is at "Fault" there may be a priority setting or insufficient available power to power the PD. The ProCurve 2626-PWR provides up to 15.4 W per port. For more information refer to http://www.hp.com/rnd/support/manuals .

9. Support

For technical support on HP products, consult the support pages at http://www.hp.com/rnd

10. Conclusion

These Application Notes describe the steps for configuring the ProCurve 2626-PWR to provide inline Power over Ethernet to the Avaya PDs, Avaya 9600 Series IP Telephones, Avaya 4600 Series IP Telephones, Avaya 5600 Series IP Telephones, Avaya one-X Quick Edition G10 PSTN Gateway and Avaya AP-8 Access Point. Features and functionality were successfully validated.

11. Additional References

This section references the Avaya and HP product documentation that are relevant to these Application Notes.

The Avaya product documentation can be found at:
http://support.avaya.com

The HP product documentation can be found at:
http://www.hp.com/rnd/support/manuals

Appendix A: Description of fields for "show power-management brief"

- **Port:** Lists all PoE-capable ports on the switch. Power Enable: Shows Yes for ports enabled to support PoE (the default) and No for ports on which PoE is disabled.
- **Priority:** Lists the power priority (Low, High, and Critical) configured on ports enabled for PoE.
- **Configured Type:** Lists the type of PD connected to each port. For example: Telephone, Webcam, Wireless, Other.
- **Detection Status:**
  - **Searching:** *The port is trying to detect a PD connection.*
  - **Delivering:** *The port is delivering power to a PD.*
  - **Disabled:** PoE support is disabled on the port.
  - **Fault:** The switch detects a problem with the connected PD.
- **Power Class:** Shows the 802.3af power class of the PD detected on the indicated port. Classes include:
  0: 0.44w to 12.95W
  1: 0.44w to 3.84W
  2: 3.84w to 6.49W
  3: 6.49w to 12.95W
  4: reserve

Appendix B: Description of fields for "show power-management <portlist>"

Power Enable: Shows **Yes** for ports enabled to support PoE (the default) and **No** for ports on which PoE is disabled.

Priority: Lists the power priority (**Low**, **High**, and **Critical**) configured on ports enabled for PoE.

Detection Status:

- **– Searching:** The port is available to support a PD connection.
- – **Delivering:** The port is delivering power to a PD.
- – **Disabled:** PoE support is disabled on the port.
- – **Fault:** The switch detects a problem with the connected PD.

Over Current Cnt: Shows the number of times a connected PD has attempted to draw more than 15.4 watts. Each occurrence generates an Event Log message.

Power Denied Cnt: Shows the number of times PDs requesting power on the port have been denied due to insufficient power available. Each occurrence generates an Event Log message.

Voltage: The total voltage, in dV, being delivered to PDs.

Power: The total power, in mW, being delivered to PDs.

Configured Type: Shows the type of PD detected on the port.

Power Class: Shows the power class of the PD detected on the indicated port. Classes include:

- **0**: 0.44w to 12.95W
- **1**: 0.44w to 3.84W
- **2**: 3.84w to 6.49W
- **3**: 6.49w to 12.95W
- **4:** reserved

MPS Absent Cnt: This value shows the number of times a detected PD has no longer requested power from the port. Each occurrence generates an Event Log message. ("MPS" refers to the "Maintenance Power Signature".)

Short Cnt: Shows the number of times the switch provided insufficient current to a connected PD.

Current: The total current, in mA, being delivered to PDs.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Developer*Connection* Program at devconnect@avaya.com.