



**Avaya Solution & Interoperability Test Lab**

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**Using Cisco 2811 Integrated Service Router to Provide  
Inline Power to Avaya 4600 and 5600 Series IP  
Telephones and Avaya Wireless Access Points - Issue  
1.0**

**Abstract**

These Application Notes describe how to configure the Cisco 2811 Integrated Service Router to provide inline power to the Avaya 4600 and 5600 series IP Telephones and Avaya Wireless Access Points.

## 1. Introduction

Power over Ethernet (PoE) telephones are supplied power over the CAT-5 cable that connects them to the Layer 2 switch. This eliminates the need for a separate power supply to power the telephone. For it to work, the port the telephone is connected to must support Power over Ethernet or have a power adapter placed in series between the switch port and the telephone. The Layer 2 switches are power sourcing equipment (PSE) and comply with the IEEE 802.3af standard protocol. The telephones are powered devices (PD) that also comply with the IEEE 802.3af standard protocol.

All of the ports on the Cisco 2811 Integrated Service Router were capable of providing Power over Ethernet.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**. The following Avaya Powered Devices are directly connected to the router:

- Avaya 4601 IP Telephone
- Avaya 4602 IP Telephone
- Avaya 4610 IP Telephone
- Avaya 4620 IP Telephone
- Avaya 4621 IP Telephone
- Avaya 4622 IP Telephone
- Avaya 4625 IP Telephone
- Avaya 5601 IP Telephone
- Avaya 5602 IP Telephone
- Avaya 5610 IP Telephone
- Avaya 5620 IP Telephone
- Avaya Gen-2 4606, 4612, and 4624 IP Telephone
- Avaya Wireless AP-4/5/6 802.11a/b/g Access Point

The Avaya 4606, 4612, and 4624 are identified as Gen-2 by the 2A in their model number. The model number can be found by:

- Inspecting the label attached to the bottom of the telephone.

Or

- Pressing the **Hold** or **Mute, V, I, E, W, #** on the keypad and then pressing the \* button to cycle through everything, and then the # button to exit and resume normal phone operation.

An example of a model number is 4612D02A-003 (Gen-2).

The 4620SW IP Telephone comes in both Class 2 and Class 3. The Class 2 telephone has one microphone hole at the bottom right side of the telephone while the Class 3 has two holes.

The Institute of Electrical and Electronics Engineers (IEEE) 802.3af classifications classifies the powered devices such as the Avaya IP Telephones. The power the switch supplies to the PD depends on the PD's class (The IEEE 802.3af PSE and Powered-Device Power Classifications chart can be seen in **Table 2**).

The testing included verification of the following:

- Successful boot operation
- For Avaya IP Telephones, successful registration with Avaya Communication Manager or Avaya IP Office and completion of a test call.
- For the Wireless LAN Access Point, there should be a successful signal to a Laptop.



**Figure 1 – Avaya 4600 and 5600 Series IP Telephones and Wireless Access Point with the Cisco 2811 Integrated Service Router**

## 2. Equipment and Software Validated

The following Equipment and software were used for the sample configuration provided:

Equipment	Software Version
Avaya Communication Manager S8710 Media Servers with Avaya G650 Media Gateway	3.1.2 (R013x.00.1.632.0)
Avaya IP Office 406V2	3.1.56
Avaya 4602/4602SW IP Telephone	2.3
Avaya 4610SW IP Telephone	2.3
Avaya Gen-2 4606 IP Telephone	1.8.3
Avaya Gen-2 4612/4624 IP Telephone	1.8.3
Avaya 4625SW IP Telephone	2.5
Avaya 4621SW IP Telephone	2.2
Avaya 4622SW IP Telephone	2.3
Avaya 4620/4620SW IP Telephone	2.3
Avaya 5602SW IP Telephone	2.3
Avaya 5610SW IP Telephone	2.3
Avaya 5620SW IP Telephone	2.3
Avaya Wireless AP-4/5/6 Access Point	2.5.2 (894)
Avaya 5601 IP Telephone	2.3
Avaya 4601 IP Telephone	2.3
Cisco 2811 Integrated Service Router with PoE Blade NME-16ES-1G-P and power supply model 341-0067-02 Rev A0, type HP-U2850X5	12.2(25)FY

**Table 1 – Network Component Software versions**

## 3. IEEE 802.3af PoE Implementation on the Avaya PDs and Cisco 2811 Integrated Service Router

In June 2003, the IEEE approved a standard for Power over Ethernet that allows a maximum of 15.4 W per PSE port. The maximum power delivered to the device, after cable loss, can be no more than 12.95W. Optionally, the powered devices can be classified according to the maximum power the device uses. This optional classification is supported on the Cisco 2811 Integrated Service Router and Avaya PDs and the appropriate power is allocated to the PD.

The IEEE 802.3af classifications for the PDs are given in **Table 2**. Note that Class 0 and Class 3 are identical. The reason for this is that Class 0 covers the case where a powered device is detected but the PSE cannot assign the powered device to Classes 1, 2, or 3.

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

**Table 2 – IEEE 802.3af PSE and Powered- Device Power Classifications**

**Table 3** shows the detected class and power allocated from the Cisco 2811 Integrated Service Router to the Avaya IP Telephones and the Wireless Access Point.

Avaya Product	Class	Power Allocated (Watts)
4601	2	7.0 Watts
4602	1	4.0 Watts
4610SW	2	7.0 Watts
4620SW*	2	7.0 Watts
4621SW	2	7.0 Watts
4622SW	2	7.0 Watts
4625SW	3	15.4 Watts
5601	2	7.0 Watts
5602	2	7.0 Watts
5610	2	7.0 Watts
5620SW	2	7.0 Watts
Gen-2 4606	0	15.4 Watts
Gen-2 4612	0	15.4 Watts
Gen-2 4624	0	15.4 Watts
Avaya AP 4/5/6	0	15.4 Watts

**Table 3 – Class and Power Allocation for Avaya IP Telephones and a Wireless Access Point**

\*Only the class 2 version of the Avaya 4620SW IP Telephone was tested.

## 4. Configuring Inline Power on the Cisco 2811 Integrated Service Router

The Cisco 2811 Integrated Service Router with a NME-16ES-1G-P Blade and power supply model number 341-0067-02 Rev A0 and type HP-U2850X5 supports 160 Watts of inline power, which is enough to support Class 2 and some Class 3 PDs on all 16 ports. The testing associated with these Application Notes did not cover loading of all ports on the PSE.

The following describes how the Cisco 2811 router interacts with the power devices.

1. PoE capable ports are by default set to auto mode, meaning the Powered Device Discovery is enabled. If the power from the Ethernet port is

insufficient, there is no guarantee the powered devices will receive enough power to run.

2. The PoE ports can be configured to never provide inline power.

The Ports connecting to the Avaya IP Telephones and Wireless Access point must be set to default auto mode in order to receive power from the router.

## 4.1 Configuring and Verifying Inline Power on the Cisco 2811 Router

The Cisco 2811 Router can be accessed through a HyperTerminal window. To access the router, the computer needs to be connected to the router's console port located in the front of the router.

To access the PoE module, assign an IP address to the interface and then open a session to it. See the command sequence below. When the IP address is entered, make sure a subnet mask is also entered after it (255.255.255.0 is the subnet mask in the example).

```
yourname#config t
yourname#interface gigabitEthernet 1/0
yourname#ip address 192.168.0.1 255.255.255.0
yourname#no shut
yourname#service-module gigabitethernet 1/0 session
```

The power inline of each port is set to auto by default. The command **show power inline** will display the inline power configuration and status.

```
Switch#show power inline
```

Module	Available (Watts)	Used (Watts)	Remaining (Watts)				
-----	-----	-----	-----				
1	160.0	144.0	16.0				
Interface	Admin	Oper	Power (Watts)	Device	Class	Max	
-----	-----	-----	-----	-----	-----	-----	-----
Fal/0/1	auto	on	15.4	Ieee PD	0	15.4	
Fal/0/2	auto	on	15.4	Ieee PD	0	15.4	
Fal/0/3	auto	on	15.4	Ieee PD	3	15.4	
Fal/0/4	auto	on	4.0	Ieee PD	1	4.0	
Fal/0/5	auto	on	15.4	Ieee PD	0	15.4	
Fal/0/6	auto	on	15.4	Ieee PD	0	15.4	
Fal/0/7	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/8	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/9	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/10	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/11	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/12	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/13	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/14	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/15	auto	on	7.0	Ieee PD	2	7.0	

To change the power mode, access the port and then use the command **power inline** <**auto|never|static**>. The mode should be set to auto for Avaya IP Telephones to work.

```
Switch#config t
Switch(config)#interface fastethernet 1/0/5
Switch(config-if)#power inline ?
  auto    Automatically detect and power inline devices
  never   Never apply inline power
  static  High priority inline power interface
```

## 5. Verification Steps

- Connect Avaya IP Telephones to Cisco 2811 Integrated Service Router. Verify the Avaya IP Telephones can be powered properly.
- Verify that the Avaya IP Telephones can register with Avaya Communication Manager and/or Avaya IP Office and calls can be made successfully.
- Use the command **show power inline** to check the power status of the Cisco 2811 router ports.
- Reset the switch and verify the IP telephones can be powered up properly.

## 6. Conclusion

All of the tested Avaya IP Telephones were powered and worked properly with the Cisco 2811 router. The router took about three minutes after restarting to begin powering the telephones.

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