



Avaya Solution & Interoperability Test Lab

Application Notes for RedSky Technologies E911 Manager and Network Discovery with Avaya Communication Manager – Issue 1.0

Abstract

These Application Notes describe a compliance-tested configuration consisting of Avaya Communication Manager and the RedSky Technologies E911 Manager and Network Discovery. The RedSky E911 Manager retrieves emergency numbering and location information for a station from a PBX. The RedSky E911 Manager validates, reformats, and uploads the information to public Automatic Location Identification (ALI) databases. With Network Discovery, E911 Manager is automatically notified by the PBX in real-time when an IP telephone registers on the network. Network Discovery determines the location of the telephone based on its IP address, port, and network device. During compliance testing, the RedSky E911 Manager successfully retrieved station emergency numbering and location information after Avaya Communication Manager stations were added, deleted, and changed. In addition, the RedSky E911 Manager was able to use Network Discovery to determine the port and network device of the user and assign the proper ELIN (Emergency Location Identification Number (ELIN) that corresponds to the location of the user.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe a compliance-tested configuration consisting of Avaya Communication Manager and the RedSky Technologies E911 Manager and Network Discovery. The RedSky E911 Manager retrieves emergency numbering and location information for a station from a PBX. The RedSky E911 Manager validates, reformats, and uploads the information to public Automatic Location Identification (ALI) databases. With Network Discovery, E911 Manager is automatically notified by the PBX in real-time when an IP telephone registers on the network. Network Discovery determines the location of the telephone based on its IP address, port, and network device. During compliance testing, the RedSky E911 Manager successfully retrieved station emergency numbering and location information after Avaya Communication Manager stations were added, deleted, and changed. In addition, the RedSky E911 Manager was able to use Network Discovery to determine the port and network device of the user and assign the proper Emergency Location Identification Number (ELIN) that corresponds to the location of the user.

Figure 1 illustrates a sample configuration consisting of:

- Avaya S8720, S8500, S8300 Servers
- Avaya G650 and G350 Media Gateways
- Avaya IP, digital, and analog telephones
- RedSky E911 Manager primary and backup servers

The compliance testing focused on verifying the generation of the ALI records and not on the transfer of ALI records to ALI databases.

The RedSky E911 Manager retrieves station numbering and location information from Avaya Communication Manager at user defined intervals.

There are two options for location identification, Network Range and Network Discovery. A Network Range can be defined in the RedSky E911 manager to associate each network region or subnet to a range of IP addresses. Each IP address range will have an assigned Emergency Location Identification Number (ELIN) that serves as the 10-digit number that is sent over the network for 911 calling.

Network Discovery is a protocol used by the RedSky E911 Manager to detect and track a more specific location of new users registering on the network. When a phone registers on the network, the RedSky E911 Manager captures the port and network device and assigns the proper ELIN to the Emergency Location Extension field of the station form on the PBX.

A network matrix is maintained in the RedSky E911 Manager that contains associations of Emergency Response Locations (ERL) to Emergency Location Identification Numbers (ELIN). Each network device or port is assigned to an ERL that describes the building, floor, and quadrant location. Each ERL has an associated ELIN which is the ten-digit telephone number that is sent over the Public Switched Telephone Network (PSTN) when a 911 call is placed.

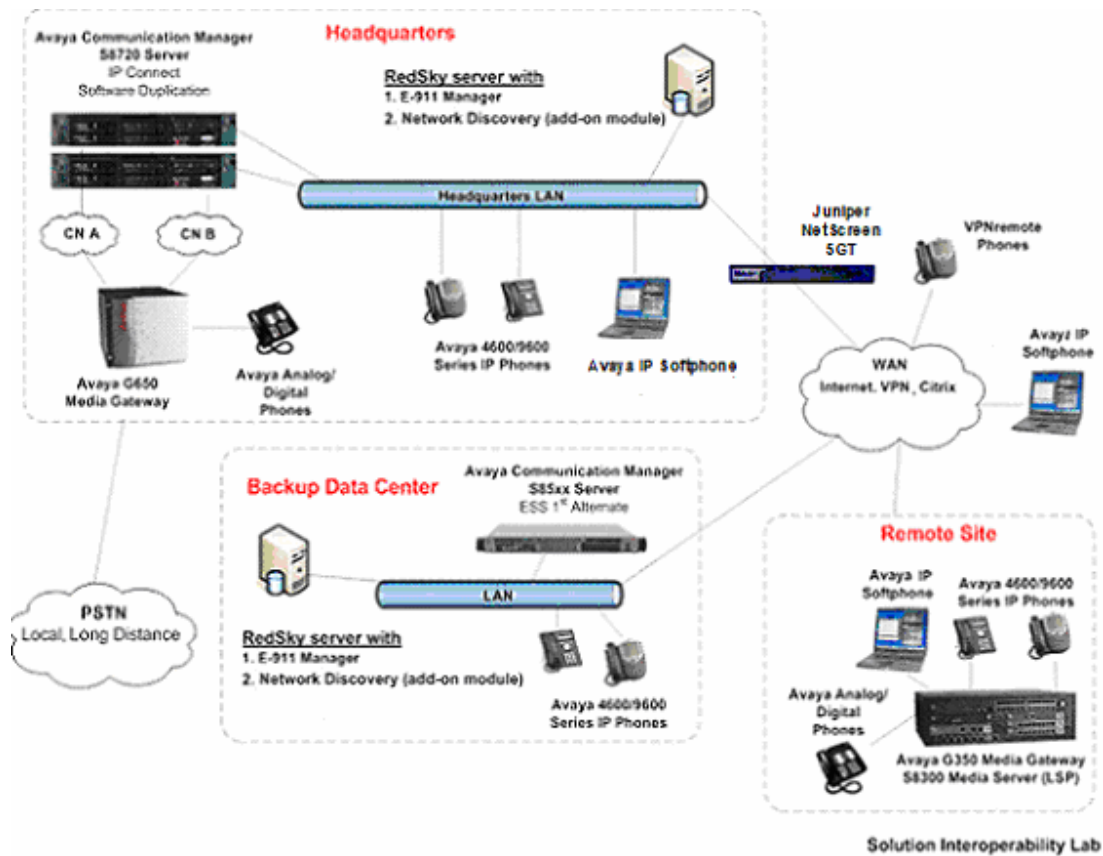


Figure 1 – Sample Configuration

2. Equipment and Software Validated

The following equipment and version were used for the sample configuration provided:

Equipment	Version
Avaya Communication Manager <ul style="list-style-type: none">- Avaya S8720 Servers- Avaya S8500 Server- Avaya S8300 Server	5.0 (R015x.00.0.825.4) Headquarter ESS LSP
Avaya G650 Media Gateway <ul style="list-style-type: none">- IPSI (TN2312BP)- C-LAN (TN799DP)- MedPro (TN2602AP)	HW15 FW039 HW01 FW156 HW02 FW033
Avaya 4600 Series H.323 Phones	2.8
Avaya G350 Media Gateway	27.26.0
Avaya 9600 Series H.323 Phones	1.5
Avaya IP Softphone	6.0.0.25
Avaya 6211 Analog Phone	---
Avaya 2420 Digital Phone	---
Juniper NetScreen 5GT	5.3.0r2.0
RedSky Technologies <ul style="list-style-type: none">- E911 Manager- Network Discovery	Windows 2003 Server Standard Edition with SP2 5.4.2 5.4.2

3. Configure Avaya Communication Manager

This section describes the steps for configuring IP registration logging, the public/unknown numbering formats and stations with location information (e.g., room, floor, building), System Access Terminal (SAT) access for the RedSky servers, and the ARS dial plan for alerts. The commands shown were issued from the SAT.

3.1. Enable Logging for IP Registrations

Use the **change logging-levels** command to set the *Log IP Registrations and events* field to **y** on Page 2 of the **Logging Levels** form.

change logging-levels	Page 2 of 2
LOGGING LEVELS	
Log All Submission Failures: y	
Log PMS/AD Transactions: n	
<u>Log IP Registrations and events: y</u>	
Log CTA/PSA/TTI Transactions: y	

3.2. Configure Numbering

Use the **change public-unknown-numbering** command to specify the digits which will be prefixed to the calling party number of outbound calls routed to ISDN trunk groups. In the example shown below, 5-digit calling party numbers that begin with a “2” will be prefixed with “73285” to form a 10-digit calling party number. If the *Trk Grp(s)* field is blank, then the entry applies to all calls originated by “2xxxx” extensions and routed to any ISDN trunk group. The RedSky E911 Manager retrieves the information in this table from Avaya Communication Manager to form 10-digit numbers for stations before uploading to the ALI databases.

change public-unknown-numbering 0					Page 1 of 2
NUMBERING - PUBLIC/UNKNOWN FORMAT					
Ext Len	Ext Code	Trk Grp(s)	CPN Prefix	Total CPN Len	
5	2		73285	10	Total Administered: 4
5	4			5	Maximum Entries: 9999
5	5			5	
5	49		73224	10	

3.3. Configure Station Location Information

Use the **change station n** command, where **n** is an existing station. On Page 1 of the **station** form, enter a *Name* if one has not been entered yet.

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On Page 2 of the **station** form, if external callers can reach the station extension directly, set the *Emergency Location Ext* field to the station extension (default). If not, set the *Emergency Location Ext* field to the extension of a DID station. The *Emergency Location Ext* is used, along with any modifications defined in the **public-unknown-numbering** form (see Section 3.2), to form the Calling Party Number for an outbound 911 call and provides the PSAP with a direct call back number. The *Always Use* field should be set to **y**, so that the *Emergency Location Ext* is always used to form the Calling Party Number. The RedSky E911 Manager does not currently consider the *Always Use* parameter.

change station 23000		STATION		Page	2 of	5
FEATURE OPTIONS						
LWC Reception: spe		Auto Select Any Idle Appearance?	n			
LWC Activation? y		Coverage Msg Retrieval?	y			
LWC Log External Calls? n		Auto Answer:	none			
CDR Privacy? n		Data Restriction?	n			
Redirect Notification? y		Idle Appearance Preference?	n			
Per Button Ring Control? n		Bridged Idle Line Preference?	n			
Bridged Call Alerting? n		Restrict Last Appearance?	y			
Active Station Ringing: single		EMU Login Allowed?	y			
H.320 Conversion? n		Per Station CPN - Send Calling Number?				
Service Link Mode: as-needed		Audible Message Waiting?	n			
Multimedia Mode: enhanced		Display Client Redirection?	n			
MWI Served User Type:		Select Last Used Appearance?	n			
AUDIX Name:		Coverage After Forwarding?	s			
		Multimedia Early Answer?	n			
		Direct IP-IP Audio Connections?	y			
		IP Audio Hairpinning?	n			
Emergency Location Ext: 23000		Always Use? y				

3.4. Configure IP Node Names

Use the **change node-names ip** command to create node names (e.g., **RedSky1** and **RedSky2**) and enter the IP addresses (e.g., **9.1.1.55** and **9.1.1.56**) for the RedSky E911 servers. Note the node-name and IP address of the C-LAN board which will be used by E911 Manager to connect and retrieve station and location information from Avaya Communication Manager.

change node-names ip		Page 1 of 2
IP NODE NAMES		
Name	IP Address	
AES1	9.1.1.50	
CLAN-01A02	9.1.1.8	
CLAN-01B02	9.1.1.9	
CLAN-RETAIL	30.1.1.4	
FCSWinsuite	9.1.1.203	
GVT-S8300-LSP	9.1.4.2	
MedPro-01A03	9.1.1.5	
MedPro-01B07	9.1.1.6	
RedSky1	9.1.1.55	
RedSky2	9.1.1.56	
S8500-ESS	9.1.1.13	
SES1	9.1.1.34	
VAL-01A12	9.1.1.12	
clan-trade	5.1.1.4	
default	0.0.0.0	
govmas1	9.1.1.31	

3.5. Configure IP Services

Use the **change ip-services** command to configure entries for the RedSky E911 servers as follows:

- *Service Type* – Set to **SAT**.
- *Enabled* – Set to **y**.
- *Local Node* – Set to the node name (e.g., **CLAN-01A02**) of the C-LAN in Section 3.5.
- *Local Port* – Set to **5023**.
- *Remote Node* – Set to the node names (e.g., **RedSky1** and **RedSky2**) of the RedSky E911 servers in Section 3.5.
- *Remote Port* – Set to the default value.

change ip-services					Page	1 of	4
IP SERVICES							
Service Type	Enabled	Local Node	Local Port	Remote Node	Remote Port		
PMS		CLAN-01A02	0	FCSWinsuite	5103		
CDR1		CLAN-01A02	0	FCSWinsuite	5050		
SAT	y	CLAN-01A02	5023	RedSky1	0		
SAT	y	CLAN-01A02	5023	RedSky2	0		
AESVCS	y	CLAN-01A02	8765				
AESVCS	y	CLAN-01B02	8765				

3.6. Configure ARS Dial Plan for Alerts

Use the **change ars analysis 911** command to alert for E911 calls. Add an entry to set the *Call Type* to **alrt** for “**911**” calls. If the digit “**9**” is used as the ARS Feature Access Code in Avaya Communication Manager, then add an entry for the Dialed String of “**9911**” with *Call Type* set to **alrt**. These two entries allow the caller to dial either “**911**” or “**9911**” when placing a 911 call.

change ars analysis 911							Page 1 of 2
ARS DIGIT ANALYSIS TABLE							
Location: all							Percent Full: 1
Dialed String	Total Min	Total Max	Route Pattern	Call Type	Node Num	ANI Reqd	
911	3	3	1	alrt		n	
976	7	7	deny	hnpa		n	
9911	4	4	1	alrt		n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	
						n	

3.7. Create Login for RedSky E911 Manager

Launch the Maintenance web interface for Avaya Communication Manager. Click the **Administrator Accounts** option under *Security* on the left half of the screen. On the screen that appears (not shown), select the **Add Login** action and the *Privileged Administrator* radio button. Click **Submit**. On the Administrator Accounts – Add Login screen, enter a *Login name* and *password* that will be used by the Redsky E911 Manager to log into Avaya Communication Manager. The login and password will be used in Step 3 of Section 4. Click **Submit**.

The screenshot shows a web browser window titled "Administrator Accounts -- Add Login: Privileged Administrator - Microsoft Internet Explorer". The address bar shows "https://9.1.1.4/cgi-bin/secAdminAcct/w_adminAcct". The page header includes the Avaya logo and "Integrated Management Maintenance Web Pages". A status bar at the top right indicates "This Server: [1] sa-gvt-1 Duplicate Server: [2] sa-gvt-2".

The main content area is titled "Administrator Accounts -- Add Login: Privileged Administrator". Below the title, a message states: "This page allows you to add a login that is a member of the **SUSERS** group. This login has the greatest access privileges in the system next to root."

The form contains the following fields and options:

- Login name:
- Primary group:
- Additional groups (profile):
- Linux shell:
- Home directory:
- Lock this account: ☐
- Date after which account is disabled-blank to ignore (YYYY-MM-DD):
- Select type of authentication:
 - ☒ Password
 - ☐ ASG: enter key
 - ☐ ASG: Auto-generate key
- Enter password or key:
- Re-enter password or key:
- Force password/key change on next login:
 - ☐ Yes
 - ☒ No

At the bottom of the form are three buttons: **Submit**, **Cancel**, and **Help**.

4. Configure RedSky E911 Manager

This section provides the steps for configuring the RedSky E911 Manager to retrieve station numbering and location information from Avaya Communication Manager.

1. Launch a web browser and enter <http://<IP address of E911 Manager server>/home.aspx> as the URL and log in with the appropriate credentials. The following *Tasks* list is shown. The tasks listed will change depending on the *Switch Type* selected in Step 7 for the “Define Phone Switch Parameters” task.

Tasks			
1	<u>All Database Providers</u>	Incomplete	
2	<u>Define Phone Switch Connectivity</u>	Incomplete	
3	<u>Company Information</u>	Incomplete	
4	<u>Building Information</u>	Incomplete	
6	<u>Import Data From Phone Switch</u>	Incomplete	
8	<u>Define Phone Switch Parameters</u>	Incomplete	
7	<u>Create DIDs</u>	Incomplete	
8	<u>Create All Records</u>	Incomplete	
9	<u>Review E911 location data</u>	Incomplete	
10	<u>Review Downloaded Stations</u>	Incomplete	

2. From the *Tasks* list, click on **ALI Database Providers** and then click **Add Provider**.
Configure the following parameters:

- *Providers* – Select **AT&T Web** from the drop-down list.
- *Provider Name* – Enter **ATT**.
- *RAS Connections* – Select **test** from the drop-down list.
- *Next Cycle Counter* – Enter **1**.
- *E911 Account* – Enter **test**.
- *E911 Password* – Enter **test**.
- *Customer Code* – Enter **AVAYA**.
- *Company Name* – Enter **AVAYA**.
- *State* – Select **NJ** from the drop-down list.

Click **Save**, then **Done**.

RedSky Technologies - E911 Manager - PSAPProviders - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://9.1.1.55/psaproviders.aspx

Go Links SnagIt

RedSky E911 Manager

Logout: administrator
Version: 5.4.2.18572

E911 Manager EON Administration Reports Help

Quick Links

- Home
- Elin Data
- Reports
- Scheduler

RedSky

- Newsletter
- RedSky Site

ALI Database Providers

Please review/edit data for each ALI DB Provider, or add new via the "Add Provider" button.

ALI Database Providers

Providers	Provider Name	RAS Connections	Dialup Number	Dialup User Name	Dialup Password	Last Cycle Count	Next Cycle Counter	IP Address	IP Port	E911 Account	E911 Password	Customer Code	Customer State Code	Company Name	County ID	State	Com Ports	Third Username	Third Password	Remoting Port
AT&T Web	ATT	test					1			test	test	AVAYA	I (Illinois)	AVAYA		NJ	COM3			

Add Provider Save Done

Local intranet

3. From the **Tasks** list, click on **Define Phone Switch Connectivity**. Click on **Add Phone Switch**. Configure the following parameters:

- *Switch Name* – Enter a name for the switch.
- *Switch Type* – Select **Avaya** from the drop-down list.
- *Login* – Enter the login created in Section 3.7.
- *Password* – Enter the password created in Section 3.7.
- *Software Version* – Select **V15** from the drop-down list.
- *Connection Method* – Select **Network**.
- *PBX IP* – Enter the IP address of the C-LAN board on which the SAT service is enabled (see Section 3.4).
- *PBX Port* – Enter **5023**.
- *EON Settings* – Check to enable EON.
- *Phone Switch Polling Interval* – Accept the default.

Click **Save**, then **Done**.

PhoneSwitches - Microsoft Internet Explorer

Address: http://9.1.1.55/phoneswitches.aspx

RedSky **E911 Manager** Logout: administrator Version: 5.4.2.18572

E911 Manager EON Administration Reports Help

Quick Links: Home, Elin Data, Reports, Scheduler

RedSky: Newsletter, RedSky Site

Phone Switch Connectivity
Please review/edit data for each phone switch, or add a new phone switch via "Add Phone Switch" button.

Phone Switches
testlab

Switch Name	Switch Type	Login	Password	Software Version	Connection Method
testlab	Avaya	redsky3		V15	<input type="radio"/> Dialup <input checked="" type="radio"/> Network

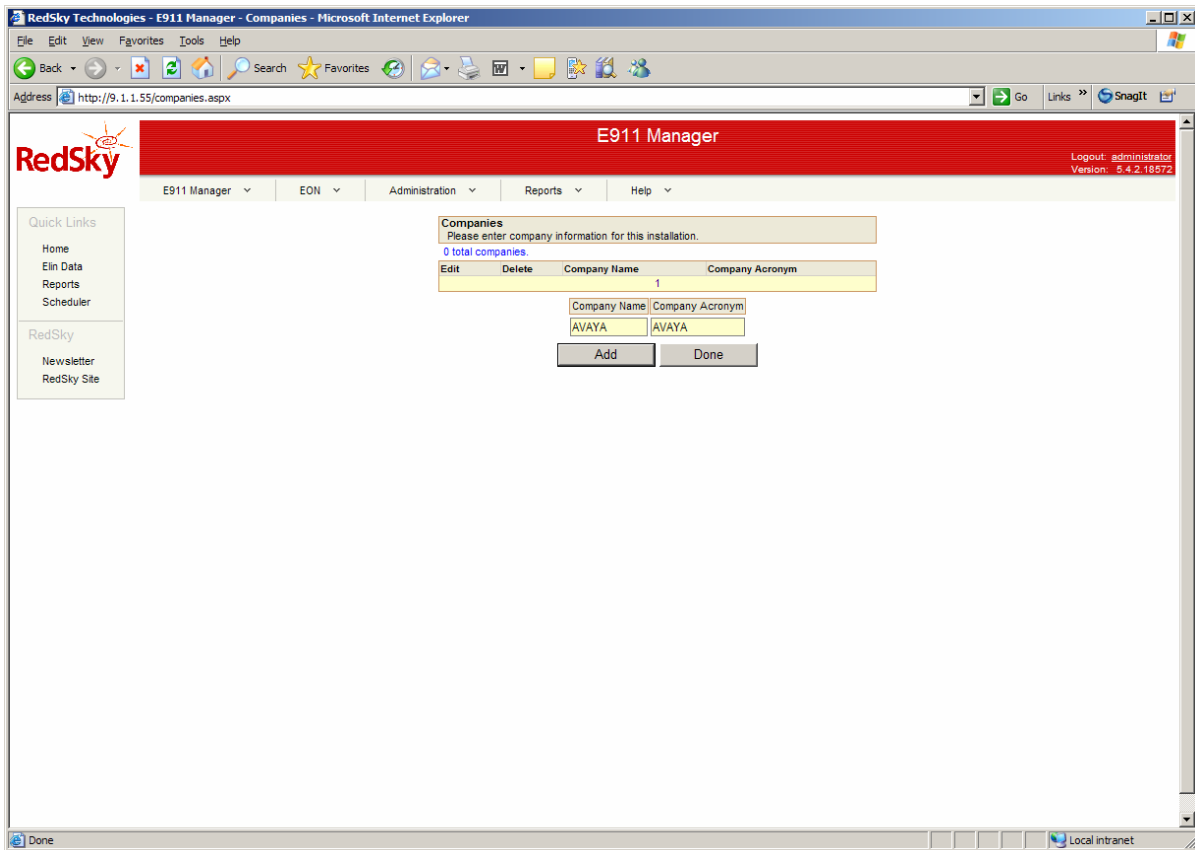
PBX IP	PBX Port	Connection Type
9.1.1.8	5023	<input checked="" type="radio"/> Telnet <input type="radio"/> SSH

EON Settings: RedSkyListener Implementation

Enabled for EON	Phone Switch Polling Interval
<input checked="" type="checkbox"/>	5 seconds

Add Phone Switch Save Done

4. From the **Tasks** list, click on **Company Information**. Enter a *Company Name* and an associated *Company Acronym*. Click on **Add**, then **Done**.



- From the **Tasks** list, click on **Building Information**. Click on **Add Building**. For each building defined in Avaya Communication Manager in Section 3.3, enter the *BuildingID* and a *Friendly Building Name*. The *BuildingID* value must match the value configured in Avaya Communication Manager. For Switch, select the phone switch configured in Step 3 from the drop-down list. Enter address and main telephone number information for the building in the *MSAG Address and Main NPA/Number* section. Accept the defaults for the other fields. Click on **Save**, then **Done**.

The screenshot shows the 'E911 Manager' web application in a Microsoft Internet Explorer browser. The page title is 'RedSky Technologies - E911 Manager - Buildings - Microsoft Internet Explorer'. The address bar shows 'http://9.1.1.55/buildings.aspx'. The page has a red header with the 'RedSky' logo and 'E911 Manager' text. A navigation menu includes 'E911 Manager', 'EON', 'Administration', 'Reports', and 'Help'. A 'Quick Links' sidebar on the left contains links to 'Home', 'Elin Data', 'Reports', 'Scheduler', 'RedSky', 'Newsletter', and 'RedSky Site'. The main content area is titled 'Buildings' and contains the following sections:

- Buildings**: A table with columns 'Edit', 'Delete', 'BuildingID', 'Switch', and 'Friendly Building Name'. It shows one entry: 'BLD-MAIN' with switch 'testlab' and name 'MAIN'.
- Building ID**: A text field with 'BLD-MAIN' and a 'Switch' dropdown menu with 'testlab' selected.
- MSAG Address and Main NPA/Number**: A form with fields for 'Number' (123), 'Ext', 'Street Dir', 'Street Name' (MAIN ST), 'Street Type', 'Post Dir', 'Community' (Lincroft), 'County ID' (025), 'State' (NJ), 'Zip' (07738), 'Main NPA' (732), and 'Main Number' (5555555).
- Other Building-related Information**: A form with fields for 'E911 DB Prov' (AT&T), 'TelcoID', 'Display Address and City', 'Company' (AVAYA), 'Friendly Building Name' (MAIN), 'Location Format (help)' (%F %R), and 'Name Format (help)' (%N).

At the bottom of the form are three buttons: 'Add Building', 'Save', and 'Done'.

- From the **Tasks** list, click on **Import Data from Phone Switch**. Click on **Start Download**. Click on **Done** after the download completes.

The screenshot shows the 'E911 Manager' web application in a Microsoft Internet Explorer browser. The page title is 'PhoneData - Microsoft Internet Explorer'. The address bar shows 'http://9.1.1.55/PhoneData.aspx'. The page has a red header with the 'RedSky' logo and 'E911 Manager' text. A navigation menu includes 'E911 Manager', 'EON', 'Administration', 'Reports', and 'Help'. A 'Quick Links' sidebar on the left contains links to 'Home', 'Elin Data', 'Reports', 'Scheduler', 'RedSky', 'Newsletter', and 'RedSky Site'. The main content area is titled 'Phone Switch Imports' and contains the following sections:

- Phone Switch Imports**: A section with the text 'Configured switches and their download status.' and a link 'Download process is not running'.
- Switch**: A table with columns 'Switch' and 'Status'. It shows one entry: 'testlab' with status 'Completed. E911 locations update complete'.

At the bottom of the form are two buttons: 'Start Download' and 'Done'.

7. From the **Tasks** list, click on **Define Phone Switch Parameters**. Select the switch configured in Step 3, and enter the following information:
- *Switch Description* – Enter a description for the switch.
 - *NPA* – Enter the area code.
 - *NXX* – Enter the region code.
 - *Include in E911 Update* – Check this checkbox.
 - *Switch Type* – Select **IP Disco (ELE Update)** from the drop-down menu box.
 - *Include in IP Discovery* – Check this checkbox.
 - *E911 Trunk Types* – Select **ISDN** from the drop-down menu list.
 - *E911 Trunk Group*- Leave blank if a trunk group is not specified in the public-unknown-numbering form (see Section 3.2) in Avaya Communication Manager. Alternatively, if outbound 911 calls are routed to a specific trunk group, and that trunk group is specified in the public-unknown-numbering form, then select the number of that trunk group.

Click on **Save**, then **Done**.

RedSky Technologies - E911 Manager - Switch Parameters Input Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://9.1.1.55/switchparameters.aspx

Logout: administrator
Version: 5.4.2.18572

E911 Manager EON Administration Reports Help

Quick Links
Home
Elin Data
Reports
Scheduler

RedSky
Newsletter
RedSky Site

Phone Switch Parameters
Define NPA/NPX, switch type and E911 trunk type for each phone switch listed below.

testlab

Switch Description	NPA	NXX	Include in E-911 Update	E911Trunk Types	Trunk Groups *
testlab	732	852	<input checked="" type="checkbox"/>	ISDN CAMA SIP	0 Not Assigned 1 (ISDN) 4 (ISDN) 5 (ISDN) 6 (ISDN) 7 (ISDN)

Switch Type
IP Disco (ELE Update)

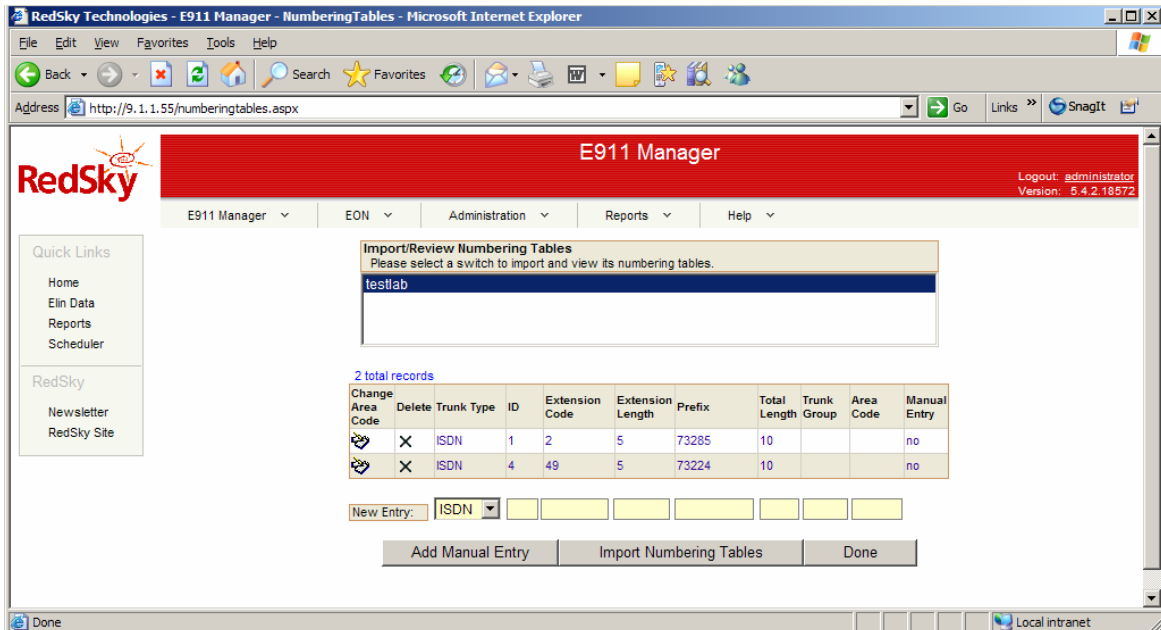
Include in IP Discovery ☒

* Use control key for multi-selects

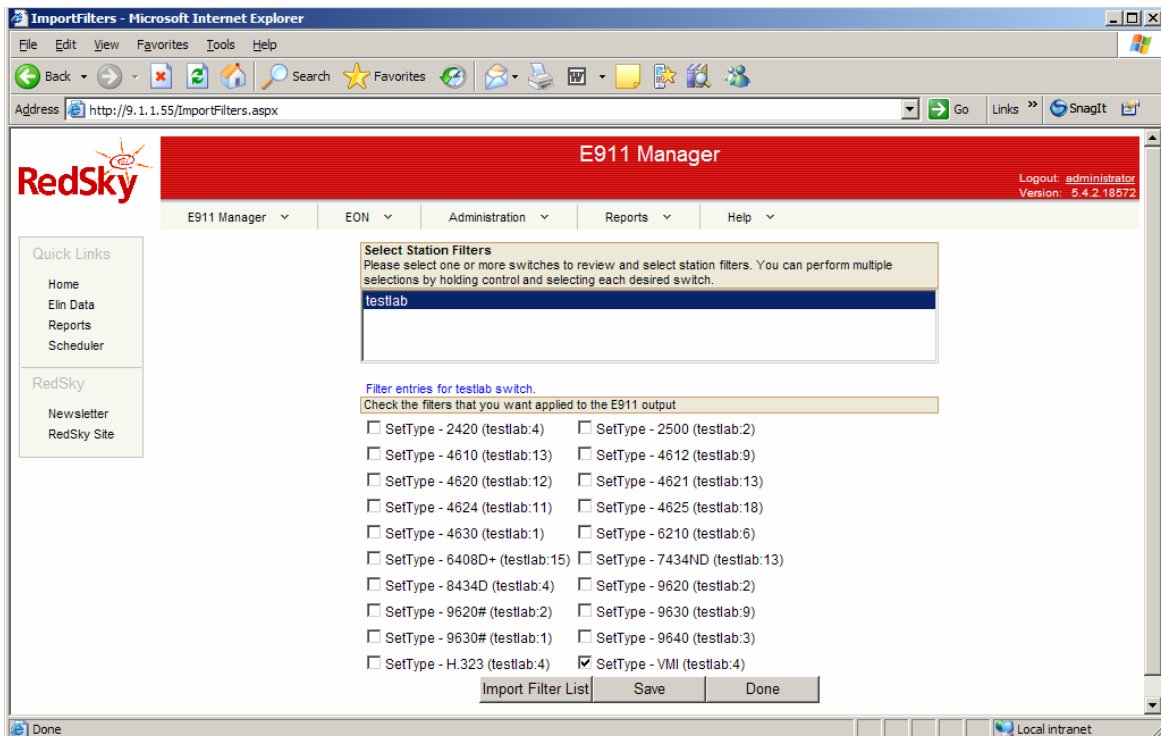
Save Done Clear Selections

Done Local intranet

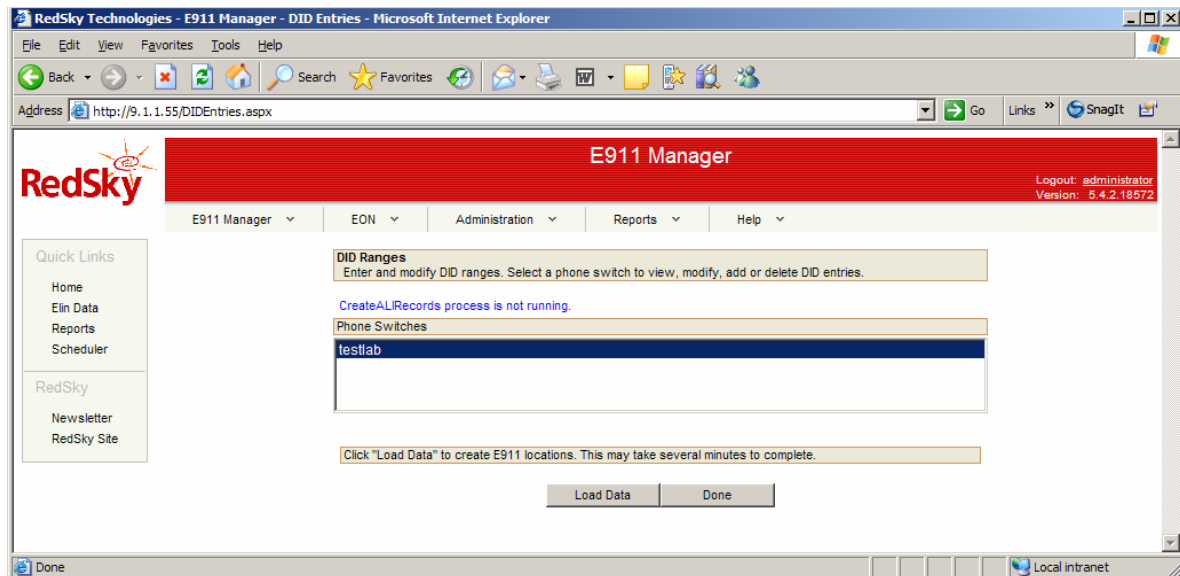
8. From the **Tasks** list, click on **Import/Review Numbering Tables**. Select the switch to import and view its numbering tables. Click on **Import Numbering Tables**. After the import completes, review the table entries and verify consistency with the public unknown-numbering form entries in Avaya Communication Manager. Only entries with a prefix are imported. Click on **Done**.



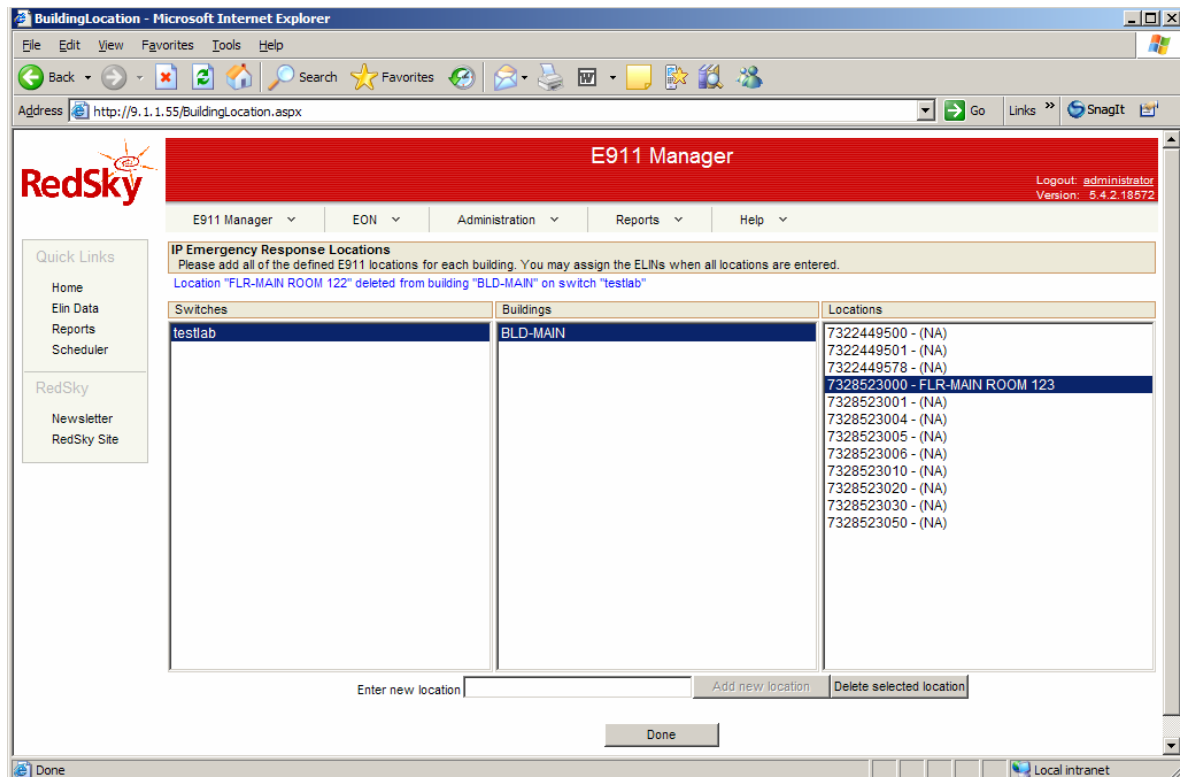
9. From the **Tasks** list, click on **Select Station Filters**. Select the switch to review and Click **Import Filter List**. Check the checkboxes of the phone types for which ALI records are NOT to be generated. Click on **Save**, then **Done**.



10. From the **Tasks** list, click on **Create DIDs**. Click on **Load Data**. Click on **Done** after the load data completes.



11. From the **Tasks** list, click on **Define IP Emergency Response Locations**. Select the Switch, Building and Location under each window. Enter a new location for the ELIN selected and click on **Add new location**. The location information added (e.g., **FLR-MAIN ROOM 123**) is displayed next to the ELE (e.g., **7328523000**). Click on **Done**.



12. From the **Tasks** list, click on **Enter Network Switch Information**.

- a) Enter *the IP Address* for the switch, *SNMP Community String*, *Voice VLAN* if any. Click on **Save**.

The screenshot shows the E911 Manager web application in a Microsoft Internet Explorer browser. The address bar shows <http://9.1.1.55/netswitches.aspx>. The page has a red header with the RedSky logo and the text "E911 Manager". Below the header is a navigation bar with links: E911 Manager, EON, Administration, Reports, and Help. On the left is a "Quick Links" sidebar with links to Home, Elin Data, Reports, Scheduler, Newsletter, and RedSky Site. The main content area is titled "Enter Network Switch Information" with the subtitle "Add, edit, and view network switches." Below this is a large empty box. At the bottom of the form are buttons: New, Save, Init, Delete, and Done. The form fields are: IP Address (9.1.1.1), Community String (public), Voice VLANs (comma separated) (2), Supported MIB (RFC1493 / Bridge), Logical Stack? (No), System Name, System Description, Number of Interfaces, and Subnet Mask.

- b) Select the switch that was just entered and click on **Init** to retrieve information regarding the switch. Click on **Done**.

The screenshot shows the E911 Manager web application in a Microsoft Internet Explorer browser. The address bar shows <http://9.1.1.55/netswitches.aspx>. The page has a red header with the RedSky logo and the text "E911 Manager". Below the header is a navigation bar with links: E911 Manager, EON, Administration, Reports, and Help. On the left is a "Quick Links" sidebar with links to Home, Elin Data, Reports, Scheduler, Newsletter, and RedSky Site. The main content area is titled "Enter Network Switch Information" with the subtitle "Add, edit, and view network switches." Below this is a table with one row: 9.1.1.1. At the bottom of the form are buttons: New, Save, Init, Delete, and Done. The form fields are: IP Address (9.1.1.1), Community String (public), Voice VLANs (comma separated) (2), Supported MIB (RFC1493 / Bridge), Logical Stack? (No), System Name (govt-main-sw-1), System Description (Cisco IOS Software, C3560 Software (C3560-IPSERVICESK9-M), Version 12.2(25)SEC, RELEASE SOFTWARE (fc2) Copyright (c) 1986-2005 by Cisco Systems, Inc. Compiled Fri 15-Jul-05 02:46 by antonino), Number of Interfaces (37), and Subnet Mask (255.255.255.0).

13. From the **Tasks** list, click on **Network Port Locations**.

- a) Select the network switch (**9.1.1.1**), Phone Switch (**testlab**), Building (**BLD-MAIN**), and Location (**FLR-MAIN ROOM 123**) and click on **Save Location**.

Net Port Location - Microsoft Internet Explorer

Address: http://9.1.1.55/netportlocation.aspx

E911 Manager

Logout: administrator
Version: 5.4.2.18572

Quick Links: Home, Elin Data, Reports, Scheduler

RedSky: Newsletter, RedSky Site

Network Port Locations
View network switches and assign building and locations information for each network port.

Network Switches and their port locations


Network Switch
9.1.1.1

Step 1. Select and save the location for the selected network switch

Phone Switch: testlab Building: BLD-MAIN Location: FLR-MAIN ROOM 123 Save Location

Done

- b) Click on the page (e.g., Page 2) to display the port location on the switch (e.g., **Port Number 13**) where the IP telephone for Station 23000 is connected.

- c) Click on the Edit icon  for Port 13.

Net Port Location - Microsoft Internet Explorer

Address: http://9.1.1.55/netportlocation.aspx

E911 Manager

Logout: administrator
Version: 5.4.2.18572

Quick Links: Home, Elin Data, Reports, Scheduler

RedSky: Newsletter, RedSky Site

Network Port Locations
View network switches and assign building and locations information for each network port.

Network Switches and their port locations











Network Switch
9.1.1.1

Location updated for network switch 9.1.1.1

Step 1. Select and save the location for the selected network switch

Phone Switch: testlab Building: BLD-MAIN Location: FLR-MAIN ROOM 123 Save Location

Step 2. Enter the locations of the ports for the selected network switch.

Change	Delete	Port Number	MAC Address	Location
	X	11		
	X	12		
	X	13		
	X	14		
	X	15		
	X	16		
	X	17		
	X	18		
	X	19		
	X	20		
+				

1 2 3 4

Done

- d) Select the IP Emergency Response Location (e.g., **FLR-MAIN ROOM 123**) that was configured in Step 11. Click on the Checkmark icon ✓ to save the change. Click on **Done**.

E911 Manager

Logout: administrator
Version: 5.4.2.18572

Quick Links: Home, Elin Data, Reports, Scheduler

RedSky: Newsletter, RedSky Site

Network Port Locations
View network switches and assign building and locations information for each network port.

Network Switches and their port locations

9.1.1.1

Edit mode: click check-mark icon to update, arrow to cancel

Step 1. Select and save the location for the selected network switch

Phone Switch: testlab Building: BLD-MAIN Location: FLR-MAIN ROOM 123 Save Location

Step 2. Enter the locations of the ports for the selected network switch.

Change	Delete	Port Number	MAC Address	Location
✓	X	11		
✓	X	12		
✓	X	13		FLR-MAIN ROOM 123
✓	X	14		
✓	X	15		
✓	X	16		
✓	X	17		
✓	X	18		
✓	X	19		
✓	X	20		
+				

1 2 3 4

Done

14. From the **Tasks** list, click on **Enter and review Network Range entries**. Click on **Add IP Range**. Enter the *Lower IP* and *Upper IP* ranges. Select the *Phone Switch*, *Building*, and *Location* from the drop-down list fields. Click on **Save**, then **Done**.

E911 Manager

Logout: administrator
Version: 5.4.2.18572

Quick Links: Home, Elin Data, Reports, Scheduler

RedSky: Newsletter, RedSky Site

Network Range Settings
Please enter each network IP range, and assign a location to each range.
Please enter the information for the new network IP range.

Edit	Del	ID	Lower IP	Upper IP	Phone Switch	Building	Location
		1	9.1.1.82	9.1.1.85	testlab	BLD-MAIN	FLR-MAIN ROOM 123

Lower IP: 9.1.1.82 Upper IP: 9.1.1.85

Phone Switch: testlab Building: BLD-MAIN

Location: FLR-MAIN ROOM 123

Add IP Range Save Done

15. From the **Tasks** list, click on **Launch IP setup and view station locations**.
 - a) Select the Switch (e.g., **testlab**) and click on **Launch Initialization Proc**. The status message “Network Discovery Setup program is running” appears.
 - b) Click on **Done** after the “Network Discovery Setup program is not running” status is displayed. The *IP Address* and *MAC Address* fields are now populated for those stations that are registered.

Note that the ELE for station 23001 is not the same as the station because the IP address of station 23001 (e.g., 9.1.1.85) fell within the IP network range entry that was created in Step 14. As a result, the ELIN (e.g., 7328523000) corresponding to the IP Emergency Response Location defined in Step 11 will be used instead.

The screenshot shows the RedSky E911 Manager interface in a Microsoft Internet Explorer browser window. The address bar shows <http://9.1.1.55/IPDiscoStations.aspx>. The page title is "RedSky - IP Discovery Stations - Microsoft Internet Explorer". The application header is "E911 Manager" with a "Logout: administrator" and "Version: 5.4.2.18572" link. The main navigation bar includes "E911 Manager", "EON", "Administration", "Reports", and "Help".

On the left, there is a "Quick Links" sidebar with links to "Home", "EIN Data", "Reports", "Scheduler", "RedSky", "Newsletter", and "RedSky Site".

The main content area displays a message: "Launch IP setup and view station locations. Select a phone switch to view information about IP discovery for that switch. IP Discovery Initialization process successfully launched." Below this, a table lists stations for the selected switch "testlab".

Station	ELE	ELIN	Location	Building	IP Address	MAC Address
23000	23000	7328523000	FLR-MAIN ROOM 123	BLD-MAIN	9.1.1.81	00:04:0d:ed:0d:e8
23001	23000	7328523000	FLR-MAIN ROOM 123	BLD-MAIN	9.1.1.85	00:04:0d:ef:73:e9
23004	23004	7328523004	(NA)	(NA)		
23005	23005	7328523005	(NA)	(NA)		
23006	23006	7328523006	(NA)	(NA)		
23010	23010	7328523010	(NA)	(NA)		
23020	23020	7328523020	(NA)	(NA)		
23030	23030	7328523030	(NA)	(NA)	10.10.10.1	00:09:6e:09:07:b8
23050	23050	7328523050	(NA)	(NA)		
40001	40001	XXXXX40001	(NA)	(NA)		
40002	40002	XXXXX40002	(NA)	(NA)		
40003	40003	XXXXX40003	(NA)	(NA)		
40005	40005	XXXXX40005	(NA)	(NA)	9.1.1.88	00:09:6e:0b:95:97
40007	40007	XXXXX40007	(NA)	(NA)		
40008	40008	XXXXX40008	(NA)	(NA)		

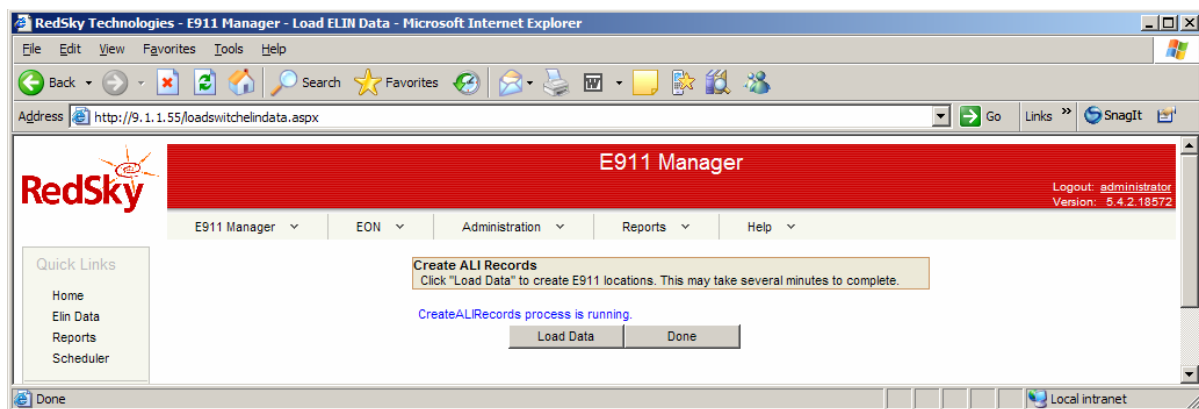
Below the table, it says "111 stations displayed." and a pagination bar shows "1 2 3 4 5 6 7 8".

At the bottom, there is a "Launch Initialization Proc" button, a status message "Network Discovery Setup program is not running.", and a "Done" button.

- c) The **display station SAT** command can be used to verify that the *Emergency Location Ext* field has been set to **23000**.

display station 23001		Page 2 of 5
FEATURE OPTIONS		STATION
LWC Reception: none	Auto Select Any Idle Appearance? n	
LWC Activation? y	Coverage Msg Retrieval? y	
LWC Log External Calls? n	Auto Answer: none	
CDR Privacy? n	Data Restriction? n	
Redirect Notification? y	Idle Appearance Preference? n	
Per Button Ring Control? n	Bridged Idle Line Preference? n	
Bridged Call Alerting? n	Restrict Last Appearance? y	
Active Station Ringing: single		
	EMU Login Allowed? y	
H.320 Conversion? n	Per Station CPN - Send Calling Number?	
Service Link Mode: as-needed		
Multimedia Mode: enhanced		
MWI Served User Type:	Audible Message Waiting? n	
AUDIX Name:	Display Client Redirection? n	
	Select Last Used Appearance? n	
	Coverage After Forwarding? s	
	Multimedia Early Answer? n	
	Direct IP-IP Audio Connections? y	
	Always Use? y IP Audio Hairpinning? n	
<u>Emergency Location Ext: 23000</u>		

16. From the **Tasks** list, click on **Create ALI Records**. Click on **Load Data**. Click on **Done** after the load data completes.



17. From the **Tasks** list, click on **View IP ELIN E-911 Locations**. Click on the Phone Switch (e.g., **testlab**). Note that the *Status* for extensions **23000** and **23001** is “**Ready for Transfer**”. Click on **Done**.

The screenshot shows the RedSky E911 Manager web application in a Microsoft Internet Explorer browser window. The address bar shows the URL <http://9.1.1.55/pelin.aspx>. The application header is red with the RedSky logo and the title "E911 Manager". The user is logged in as "administrator" and the version is "5.4.2.18572".

On the left, there is a "Quick Links" sidebar with links to Home, Elin Data, Reports, and Scheduler. Below this is a "RedSky" section with links to Newsletter and RedSky Site.

The main content area is titled "Item View IP ELIN Locations" and displays "111 total records" for the selected switch "testlab". A table lists the IP ELIN locations with columns: Del, IP ELIN, Ext., Building, Location, and Status.

Del	IP ELIN	Ext.	Building	Location	Status
X	7322449500	49500			MissingInformation
X	7322449501	49501			MissingInformation
X	7322449578	49578			MissingInformation
X	7328523000	23000	BLD-MAIN	FLR-MAIN ROOM 123	ReadyForTransfer
X	7328523001	23001	BLD-MAIN	FLR-MAIN ROOM 122	ReadyForTransfer
X	7328523004	23004			MissingInformation
X	7328523005	23005			MissingInformation
X	7328523006	23006			MissingInformation
X	7328523010	23010			MissingInformation
X	7328523020	23020			MissingInformation

At the bottom of the table, there is a pagination bar showing "1 2 3 4 5 6 7 8 9 10 ..." and a "Done" button.

18. From the **Tasks** list, click on **Review ELIN E-911 location data**.

- a) Click on **Filter**. The subsequent screen shows the ALI records that were generated based on the information retrieved from Avaya Communication Manager. Only those records with **“Ready For Transfer”** status will be uploaded to the E911 database service provider. The records with **“Missing Information”** status are displayed because the Building (e.g., **BLD-LSP**) associated with the stations on the PBX has not been defined on E911 Manager. Repeat Steps 5 and 6 to define the building in E911 Manager and import the data from the phone switch again. Repeat Step 16 to create the ALI records. Click on **Done** to return to the Task list.

The screenshot shows the RedSky E911 Manager interface in a Microsoft Internet Explorer browser window. The address bar shows <http://9.1.1.55/elin.aspx>. The page title is "E911 Manager". The user is logged in as "administrator" with version "5.4.2.18572".

On the left, there is a "Quick Links" sidebar with links to Home, Elin Data, Reports, Scheduler, RedSky, Newsletter, and RedSky Site.

The main content area is titled "ELIN and ERL Data" and says "Please review the ELIN and ERL data for each switch listed below: 142 total filtered records (142 subtotal)". It includes filters for Company (ALL), PBX/Switch (ALL), Building (ALL), and Status (ALL). A "Filter" button is present. Below the filters is a table of records.

Change	Delete	ELIN	Building	Location	Name	Status	Err Cd	Telco ID	E911 Prov	PBX	Ext#
	X	7322449500				Missing Information				testlab	1
	X	7322449501				Missing Information				testlab	1
	X	7322449502	BLD-LSP	ROOM 678 FLR-LSP	G350 Digital	Missing Information				testlab	1
	X	7322449578				Missing Information				testlab	1
	X	7328523000	BLD-MAIN	FLR-MAIN ROOM 123	AVAYA VoIP Station	Ready For Transfer (I)				testlab	2
	X	7328523001	BLD-MAIN	FLR-MAIN ROOM 122	AVAYA VoIP Station	Ready For Transfer (I)				testlab	0
	X	7328523002	BLD-MAIN	FLR-MAIN Room 333	HQ 2420	Ready For Transfer (I)				testlab	1
	X	7328523003	BLD-MAIN	FLR-MAIN Room 444	HQ 6211	Ready For Transfer (I)				testlab	1

Below the table, there is a search section with "Search In:" (ELIN) and "Search For:" (). There are also buttons for "Search" and "Reset Results".

At the bottom, there are status counts for various transfer states:

- In Transfer (All): 0
- Ready For Transfer (All): 4
- Missing Info: 110
- Normal: 0
- In Transfer (I): 0
- Ready For Transfer (I): 4
- Rejected: 0
- In Transfer (D): 0
- Ready For Transfer (D): 0
- Invalid ELIN: 28
- In Transfer (C): 0
- Ready For Transfer (C): 0
- Deleted: 0

At the very bottom, there are buttons for "Done" and "Reset In-transfer Items".

- b) Notice that the number of Extensions listed under the *Ext#* column is “2” for ELIN “7328523000” and “0” for ELIN “7328523001”. Click on ELIN “732852300” in the previous figure to display the ALI data.

The screenshot shows the 'E-911 Manager' web application in a Microsoft Internet Explorer window. The title bar reads 'ElinUpdateHistory - Microsoft Internet Explorer'. The browser's address bar and menu bar are visible. The main content area has a red header with the text 'E-911 Manager'. Below the header, a yellow box contains the text 'Current ALI Data for ELIN 7328523000 on switch testlab'. Underneath this box are five buttons: 'Imported Data', 'ALI Info', 'Extensions', 'Update History', and 'Close'. The 'ALI Info' button is selected, and its data is displayed in a table below. The table has two columns: 'ALI Information' and 'Current ALI Data for ELIN: 7328523000 on switch testlab'. The table contains the following data:

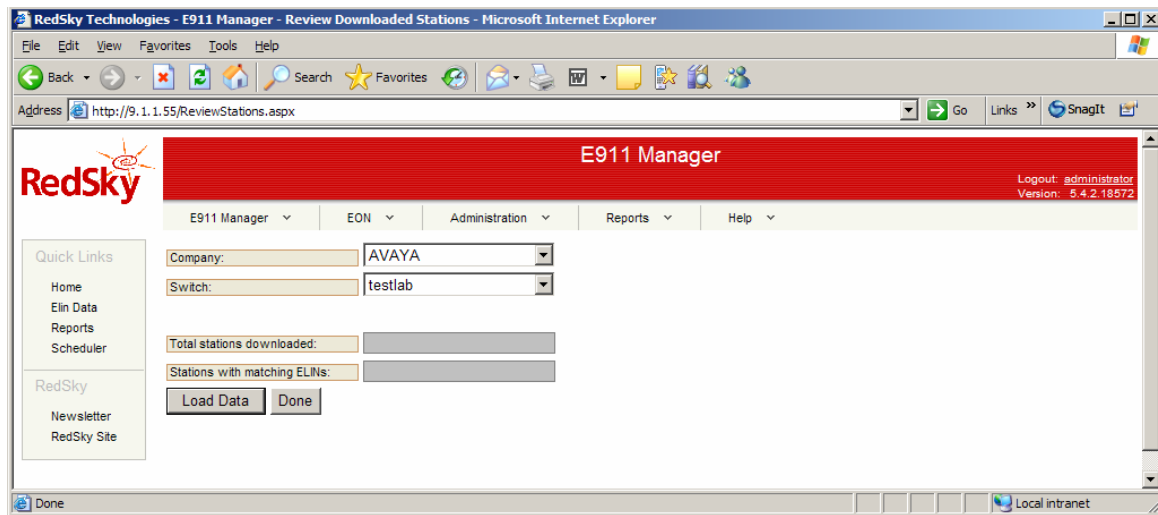
ALI Information	Current ALI Data for ELIN: 7328523000 on switch testlab
Function Code:	I
NPA/Calling No.:	7328523000
House Number:	123
House No. Suffix:	
Prefix Directional:	
Street Name:	MAIN ST
Street Suffix:	
Post Directional:	
Community Name:	LINCROFT
County ID:	025
State:	NJ
Zip Code:	07738
Location:	FLR-MAIN ROOM 123
Customer Name:	AVAYA VoIP Station
Comments:	
Telco Company ID:	
TAR Code:	
Exchange:	852
ESN:	
Main NPA:	732
Main Number:	5555555
Class of Service:	4
Type of Service:	1
Order Number:	
Source ID:	
Extract Date:	
General Use:	
X, Y, Z Coordinates:	
Cell ID:	
Sector ID:	
Reserved:	
ALT #:	
Expanded Extract Date:	
NENA Reserved:	

- c) Click on **Extensions** in the previous figure to display the *Extensions* associated with ELIN “7328523000”. Click on **Close**.

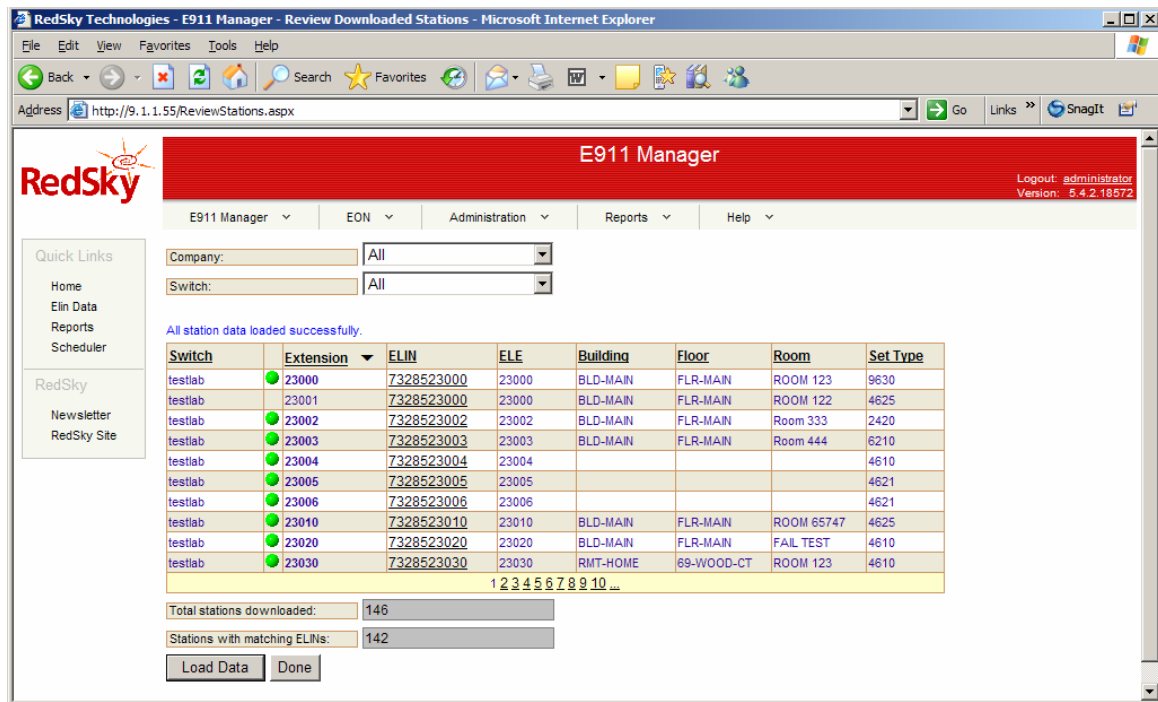
The screenshot shows the 'E-911 Manager' web application in a Microsoft Internet Explorer window. The title bar reads 'ElinUpdateHistory - Microsoft Internet Explorer'. The browser's address bar and menu bar are visible. The main content area has a red header with the text 'E-911 Manager'. Below the header, a yellow box contains the text 'Current ALI Data for ELIN 7328523000 on switch testlab'. Underneath this box are five buttons: 'Imported Data', 'ALI Info', 'Extensions', 'Update History', and 'Close'. The 'Extensions' button is selected, and its data is displayed in a table below. The table has two columns: 'Extension' and 'Name'. The table contains the following data:

Extension	Name
23000	HQ 9630
23001	HQ 4625

19. From the **Tasks** list, click on **Review Downloaded Stations**. Select **AVAYA** in the *Company* drop-down list and **testlab** for the *Switch* drop-down list. Click on **Load Data**.



The *Extensions* that have matching *ELINs* are indicated with a green circle. Click on **Done**.



20. Notice all of the task items on the main menu are now marked “Complete”.

5. Interoperability Compliance Testing

The interoperability compliance testing included functionality and serviceability testing. The functionality testing evaluated the ability of the RedSky E911 Manager to accurately retrieve station emergency numbering and location information from Avaya Communication Manager, and Network Discovery to determine the location of the telephone based on its IP address, port, and network device, and assigns an ELIN to a station based on Network Range entries. The serviceability testing introduced failure scenarios to see if the RedSky E911 Manager can resume operation after failure recovery.

5.1. General Test Approach

The main objective was to verify that:

- The RedSky E911 Manager accurately obtains station emergency numbering and location information from Avaya Communication Manager after stations were added, deleted, or changed.
- The RedSky E911 Manager can use Network Discovery to determine the location of the telephone based on its IP address, port, and network device,
- The RedSky E911 Manager can assign an ELIN to a station based on Network Range entries.

For serviceability testing, Ethernet cable disconnects and reconnects as well as device resets were applied.

5.2. Test Results

The main objectives of Section 5.1 were verified. For serviceability testing, the RedSky E911 Manager was able to retrieve station emergency numbering and location information from Avaya Communication Manager after connection to the active Avaya S8720 Server was disconnected and reconnected, as well as after resets of Avaya Communication Manager and the RedSky E911 Manager server.

6. Verification Steps

The following steps may be used to verify the configuration:

- Compare the station emergency numbering and location information reported in the RedSky E911 Manager and Avaya Communication Manager, and verify consistency.
- Register IP telephones and verify that the RedSky E911 Manager can use Network Discovery to determine the location of the telephone based on its IP address, port, and network device.
- Register IP telephones using IP addresses that fall within the range specified on the Network Range entries in the RedSky E911 Manager and verify that the Emergency Location Extension (ELE) for the station on the PBX reflects the Emergency Location Identification Number (ELIN) that corresponds to the Emergency Response Location specified for the Network Range entry.

7. Support

For technical support on RedSky Technologies products, contact RedSky Technologies at:

- Phone: 1-866-778-2435
- E-mail: support@redskytech.com

8. Conclusion

These Application Notes describe a compliance-tested configuration comprised of Avaya Communication Manager and the RedSky Technologies E911 Manager with Network Discovery. During compliance testing, the RedSky E911 Manager successfully obtained station emergency numbering and location information after Avaya Communication stations were added, deleted and changed. The RedSky E911 Manager, using Network Discovery, was able to determine the location of the telephone based on its IP address, port, and network device. The RedSky E911 Manager was also able to assign an ELIN to a station based on Network Range entries.

9. Additional References

Product documentation for Avaya products may be found at <http://support.avaya.com>.

[1] *Administrator Guide for Avaya Communication Manager*, Document ID 03-300509.

[2] *Feature Description and Implementation for Avaya Communication Manager*, Document ID 555-245-205.

Product information for RedSky Technologies E911 Manager may be found at <http://www.redskye911.com>.

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