Avaya Solution & Interoperability Test Lab

Application Notes for IPC Unigy with Avaya Communication Server 1000 7.5 using QSIG Trunks – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for IPC Unigy to interoperate with Avaya Communication Server 1000 7.5 using QSIG trunks.

IPC Unigy is a trading communication solution. In the compliance testing, IPC Unigy used E1 QSIG trunks to Avaya Communication Server 1000, for turret users on IPC Unigy to reach users on Avaya Communication Server 1000 and on the PSTN.

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.

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1. Introduction

These Application Notes describe the configuration steps required for IPC Unigy to interoperate with Avaya Communication Server 1000 7.5 using QSIG trunks.

IPC Unigy (hereafter referred to as Unigy) is a trading communication solution. In the compliance testing, IPC Unigy used E1 QSIG trunks to Avaya Communication Server 1000 7.5 (hereafter referred to as Communication Server 1000), for turret users on IPC Unigy to reach users on Avaya Communication Server 1000 and on the PSTN.

2. General Test Approach and Test Results

The feature test cases were performed manually. Calls were manually established among Unigy turret users with Communication Server 1000 SIP, IP, Digital and/or PSTN users. Call controls were performed from various users to verify the call scenarios.

The serviceability test cases were performed manually by disconnecting and reconnecting the E1 connection to Unigy.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

2.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing included basic calls, basic display, G.711MU, G.729A, DTMF, hold/Resume, call forwarding unconditional/ring-no-answer/busy, blind/attended transfer, conference and Voice Mail.

The serviceability testing focused on verifying the ability of Unigy to recover from adverse conditions, such as disconnecting/reconnecting the E1 connection to Unigy.

2.2. Test Results

The objectives outlined in S**ection 2.1** were verified and met. All tests were executed and passed with the following observations:

- If the trunk service (D Channel) does not establish between the Communication Server 1000 and IPC Media Gateway automatically after a physical disconnect/connect or restart of Unigy server then the trunk service has to be manually enabled either from the IPC Media Gateway or Communication Server 1000.
- When Avaya IP (SIP) phone are used for Outgoing and Incoming calls. In the case of Attended and un-Attended call transfer, Calling Line ID does not update on the Avaya IP

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(SIP) phone. It shows the Calling Line ID of the last Calling/Connected party, not the current Calling/Connected party. These same scenarios work fine in case of Avaya IP (UNIStim) phone. This is a known limitation on Avaya IP (SIP) phone since it expects a re-INVITE message from the third party to trigger name and number modification and Unigy sends UPDATEs and not re-INVITEs to trigger name and number modifications.

- After Completion of Call Transfer, PSTN phone shows Trunk ID instead of connected party number/name.
- When Avaya IP (SIP) phone calls a busy Unigy phone, Avaya IP (SIP) phone Terminal Number (TN) gets stuck in BUSY State, the TN has to be disabled and enabled for Avaya IP (SIP) phone to make new calls. The issue is not seen on Avaya IP (UNIStim) phone. To overcome this problem, disable Call Completion Busy Integer (CCBI) which is found under Remote Capabilities (RCAP) field of the QSIG D Channel configuration of the Communication Server 1000.

2.3. Support

Technical support on IPC Unigy can be obtained through the following:

- **Phone:** (800) NEEDIPC, (203) 339-7800
- **Email:** systems.support@ipc.com

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3. Reference Configuration

As shown in **Figure 1** below, Unigy configuration consists of the Media Manager, Converged Communication Manager, Media Gateway, and Turrets. The Media Manager and Converged Communication Manager are typically deployed on separate servers. In the compliance testing, the same server hosted the Media Manager and Converged Communication Manager.

There is a physical connection between the 2Mb PRI circuit pack on Avaya Communication Server 1000 with the Unigy Media Gateway. E1 QSIG trunks are used from Unigy to Communication Server1000, to reach users on Communication Server 1000 and on the PSTN.

A five digit Uniform Dial Plan (UDP) was used to facilitate dialing between the Unigy and Communication Server 1000. During compliance testing, extension ranges 58xxx were associated with Communication Server 1000 users and 36xxx were associated with the Unigy turret users. The Avaya Call Pilot Directory Number (DN) is 58888 and the PSTN number is 96139655570.

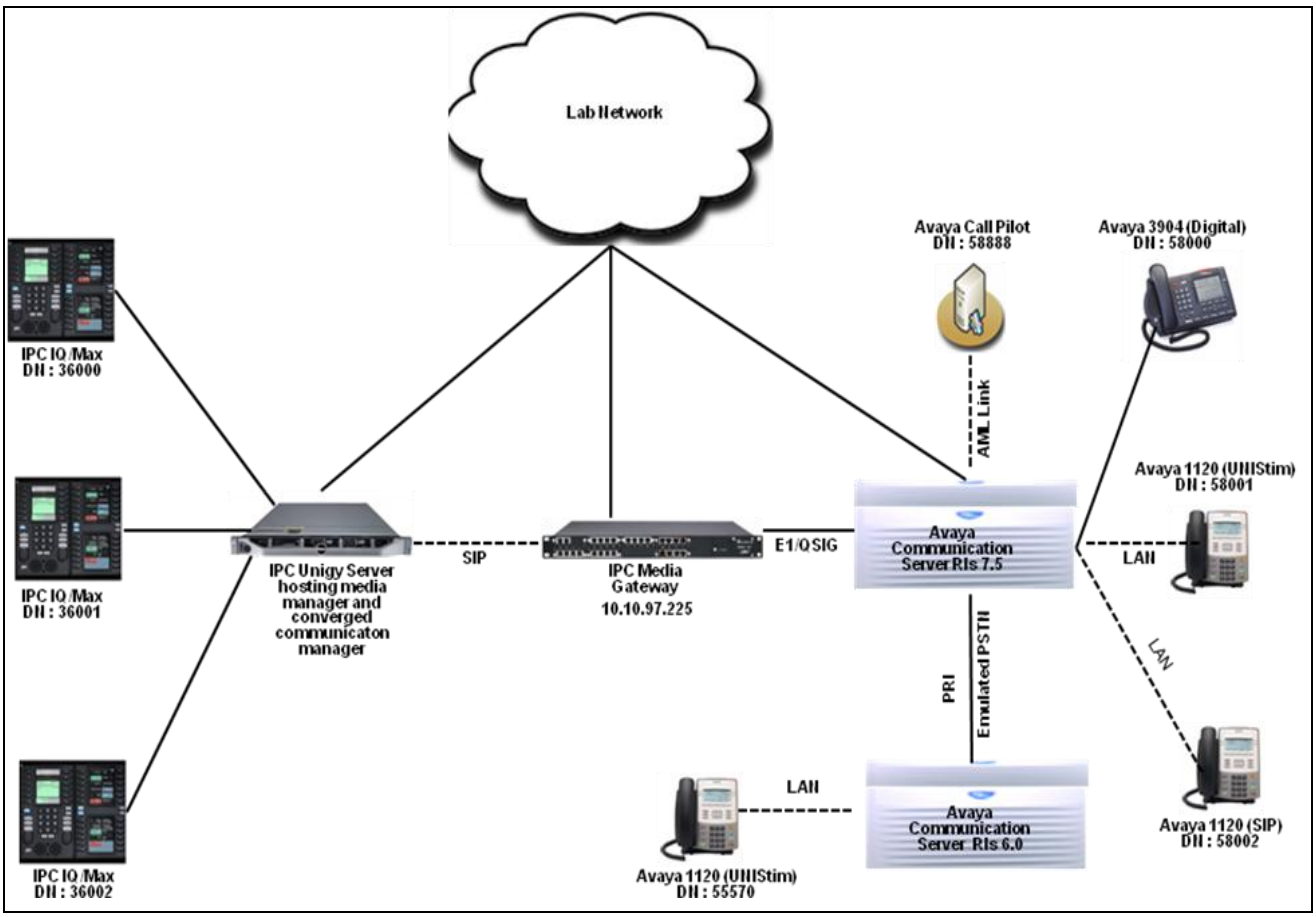

Figure 1: Compliance Test Setup in the lab

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4. Equipment and Software Validated

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

Equipment	Software
Avaya Communication Server 1000	7.50.17
Avaya Communication Server 1000 (for emulated PSTN)	6.0
Avaya Call Pilot (600r)	5.00.41.143
Avaya Digital user (3904)	NA
Avaya 1120 IP (UNIStim) Deskphone	0624C8A
Avaya 1120 IP (SIP) Deskphone	04.03.12.00
IPC Unigy • Media Manager • Converged Communication Manager • Media Gateway • Turret (IQ/Max)	 02.00.00.00.1536 02.00.00.00.1536 6.40A.042.0004 02.00.00.00.1536

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5. Configure Avaya Communication Server 1000

This section provides the procedures for configuring Communication Server 1000 system. The procedures include the following areas:

- Logging into the Element Manager via Unified Communications Manager.
- Configuring the D-Channel Loop.
- Configuring a D-Channel.
- Configuring Route and Trunks.
- Configuring Digit Manipulation Block.
- Configuring Route List Block.
- Configuring Distant Steering Code.

The Assumption is made here that the users are already created and also the PRI Trunk between the Communication Servers 7.5 and 6.0 is configured for emulated PSTN setup during compliance testing. For detail configuration details refer to the reference documentation in **Section 10[1]**.

5.1. Logging to Element Manager via Unified Communication Manager

To login to the Unified Communications Manager (UCM) open an IE browser and type in the IP address of the UCM in the URL (not shown). Screen below shows the login screen of the UCM. Enter the **User ID** and **Password** credentials and click on **Log In** to continue.

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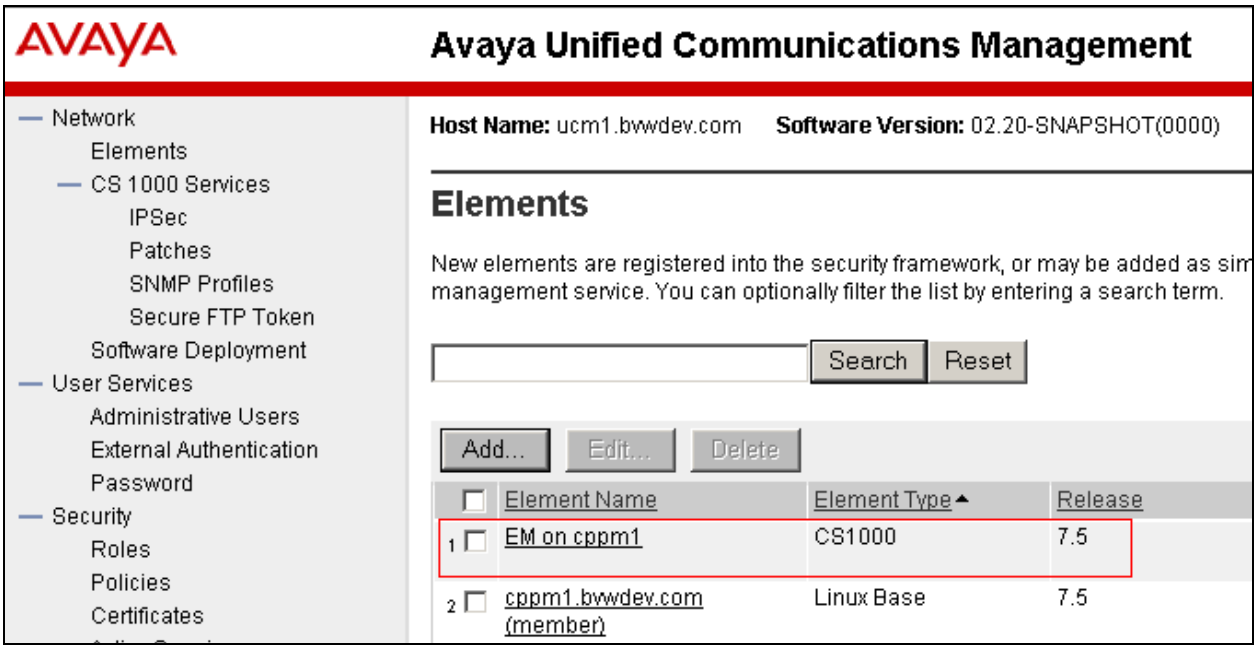
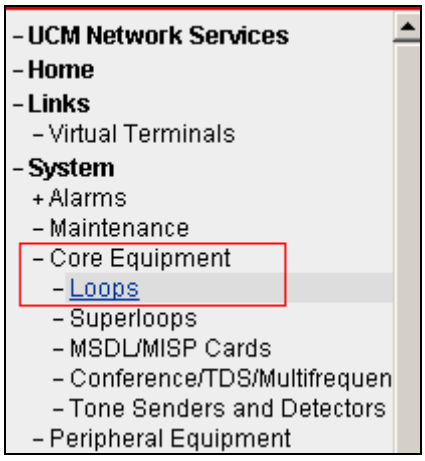
From the main screen as shown below, click on the Element **EM on cppm1**. This is the element which is configured to access the Element Manager (EM) for the Call Server.



5.2. Configuring D-Channel Loop

This section explains the configuration required to add a D-Channel loop which will be used to configure the D-Channel on. In the EM left navigator screen, navigate to **System → Core Equipment → Loops** as shown below.



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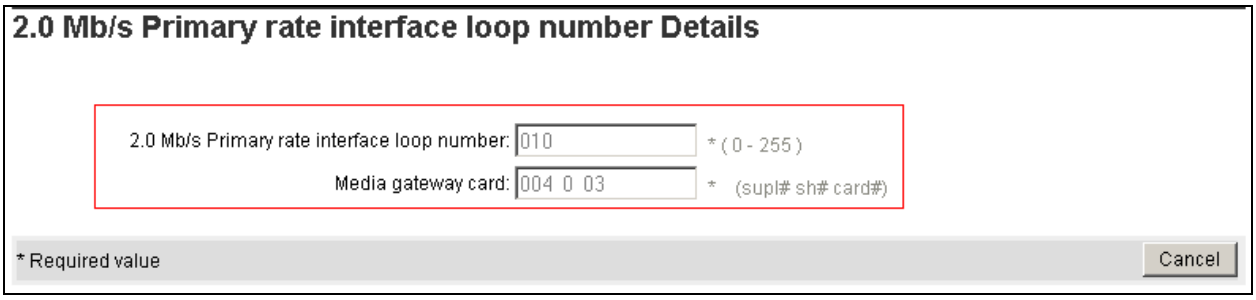
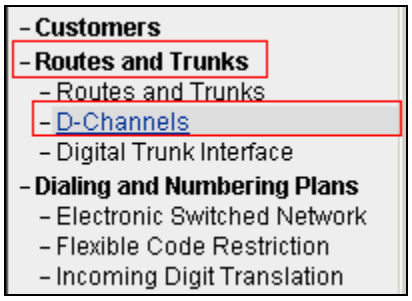
Add a Loop by selecting **2.0 Mb/s Primary Rate Interface** from the drop down menu and click on **Add** to continue as shown below.

During compliance testing a loop number of **10** was selected and the physical location of the circuit pack was in **004 0 03**. Enter these values as shown below to complete adding the loop.



5.3. Configuring D-Channel

This section explains the configuration of a D-Channel on the 2Mb PRI circuit pack. From the EM navigation screen, navigate to **Routes and Trunks → D-Channels** as shown in below.



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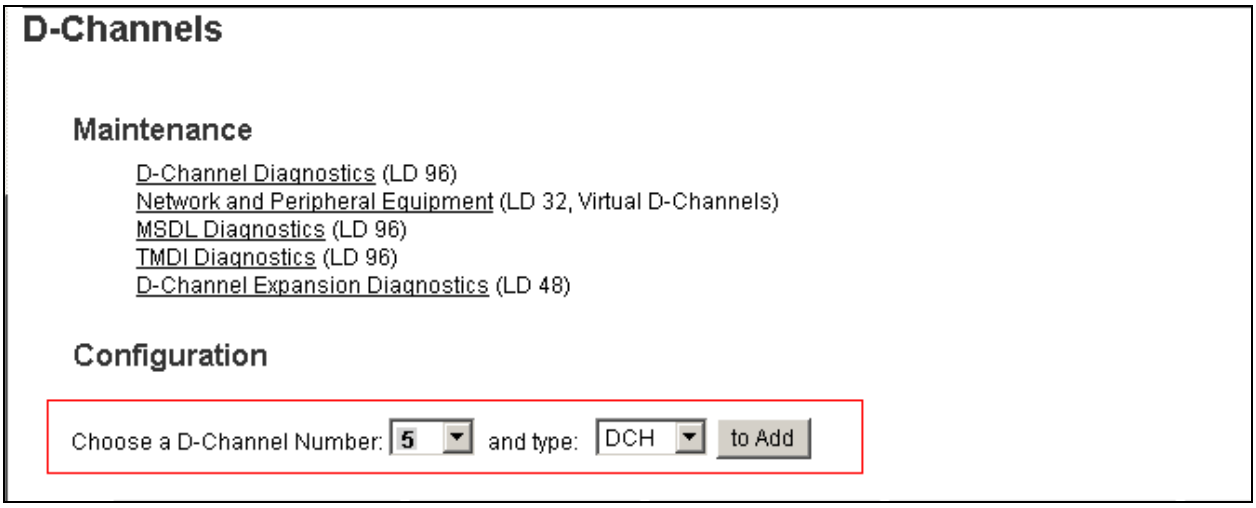
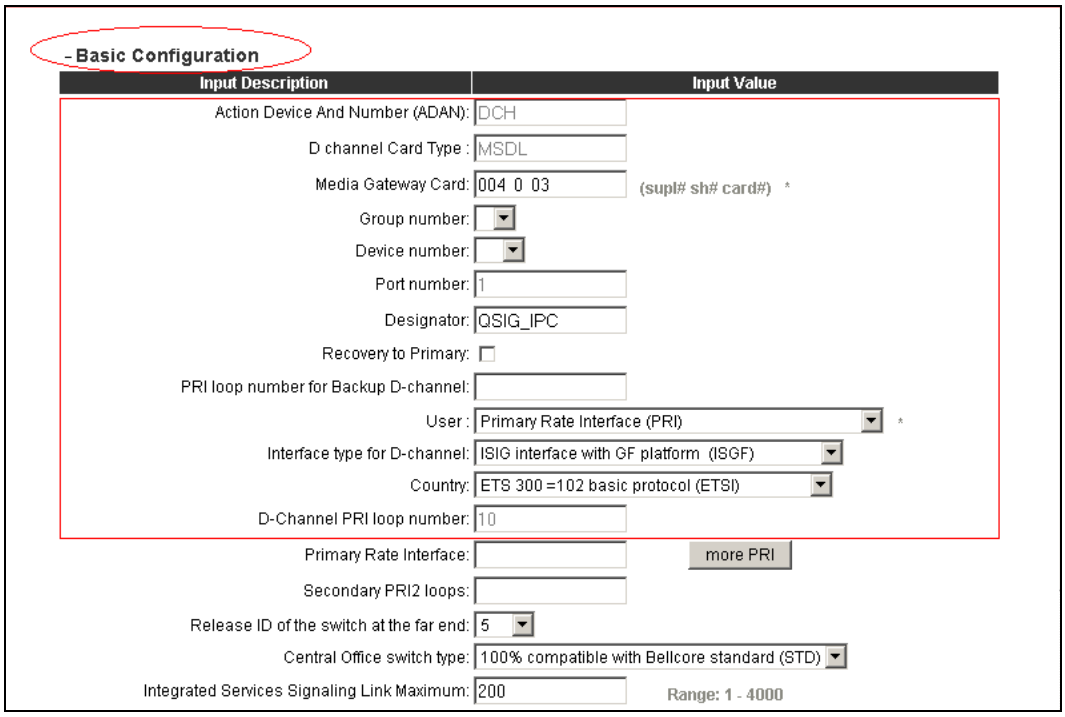
Choose a D-Channel number to add as shown below. During compliance testing D-Channel number **5** was selected. Click on **to Add** to continue.



Configure the **Basic Configuration** values for the D-Channel as shown below. Note here that the D-Channel PRI loop number is the same one that was configured in **Section 5.2** above.



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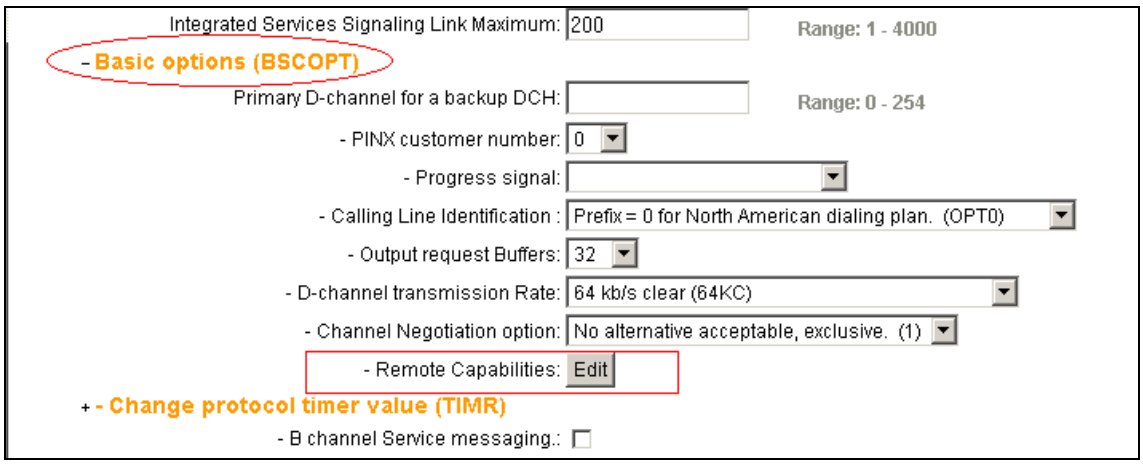
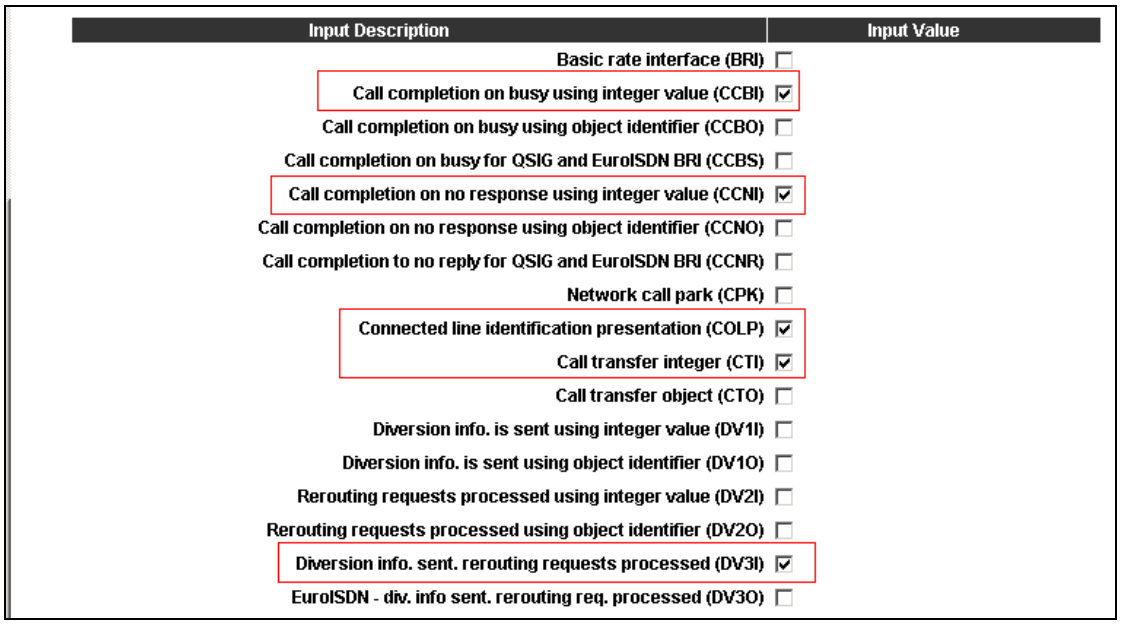
To edit the **Remote Capabilities** of the D-Channel, click on the **Edit** button as shown below.



Select the boxes values for the Remote Capabilities as shown in next two screens below. Click on **Return - Remote Capabilities** button to return back to the main screen to complete the D-Channel configuration.



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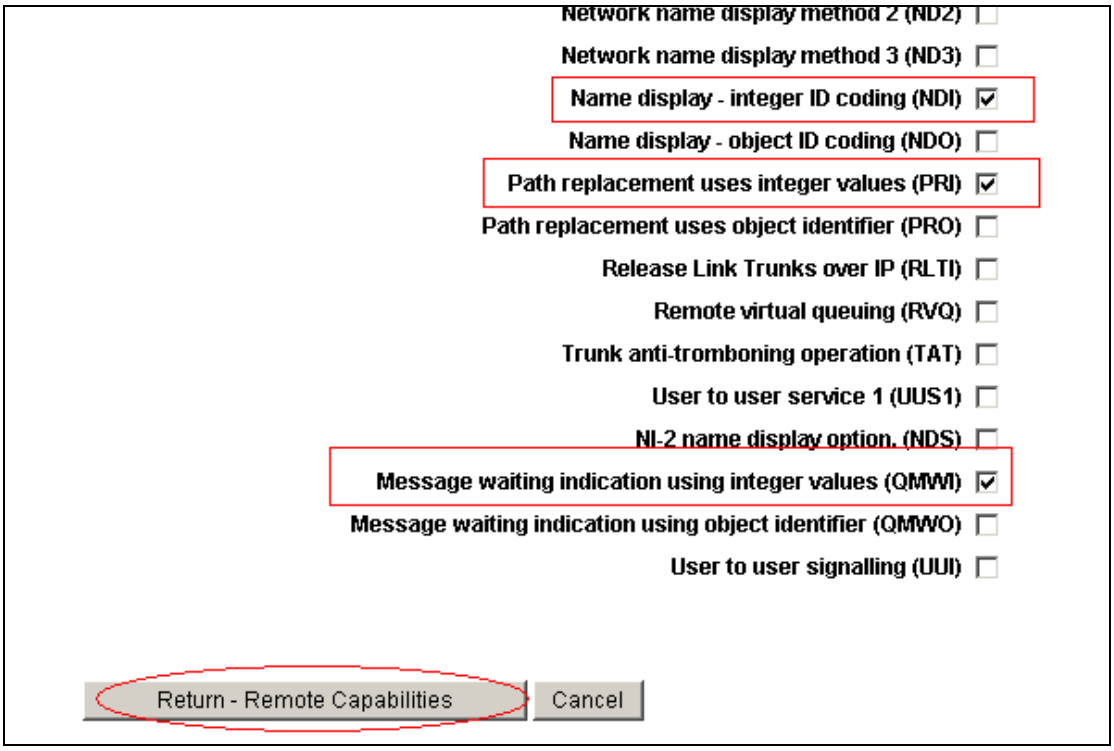
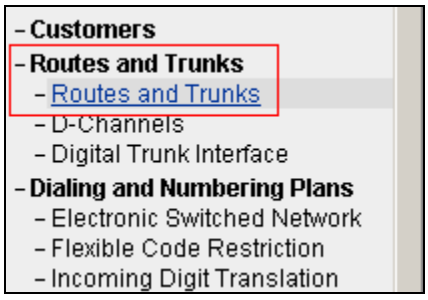


5.4. Configuring Route and Trunks

This section explains the configuration of the QSIG route and trunks which will be used by Communciation Server 1000 and Unigy. To add a new route, navigate to **Routes and Trunks → Routes and Trunks** from the EM left hand navigator window as shown below.



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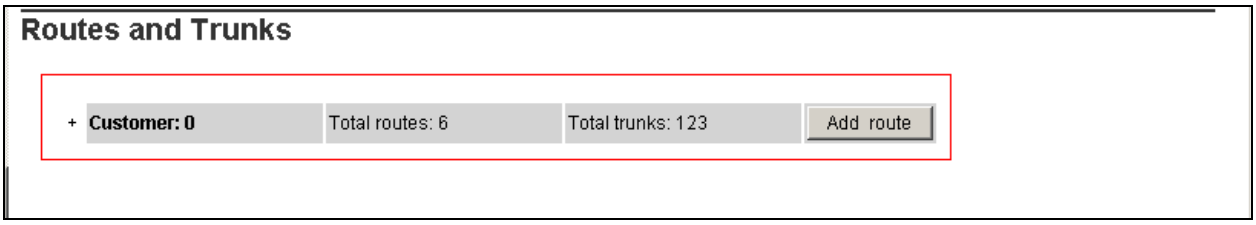
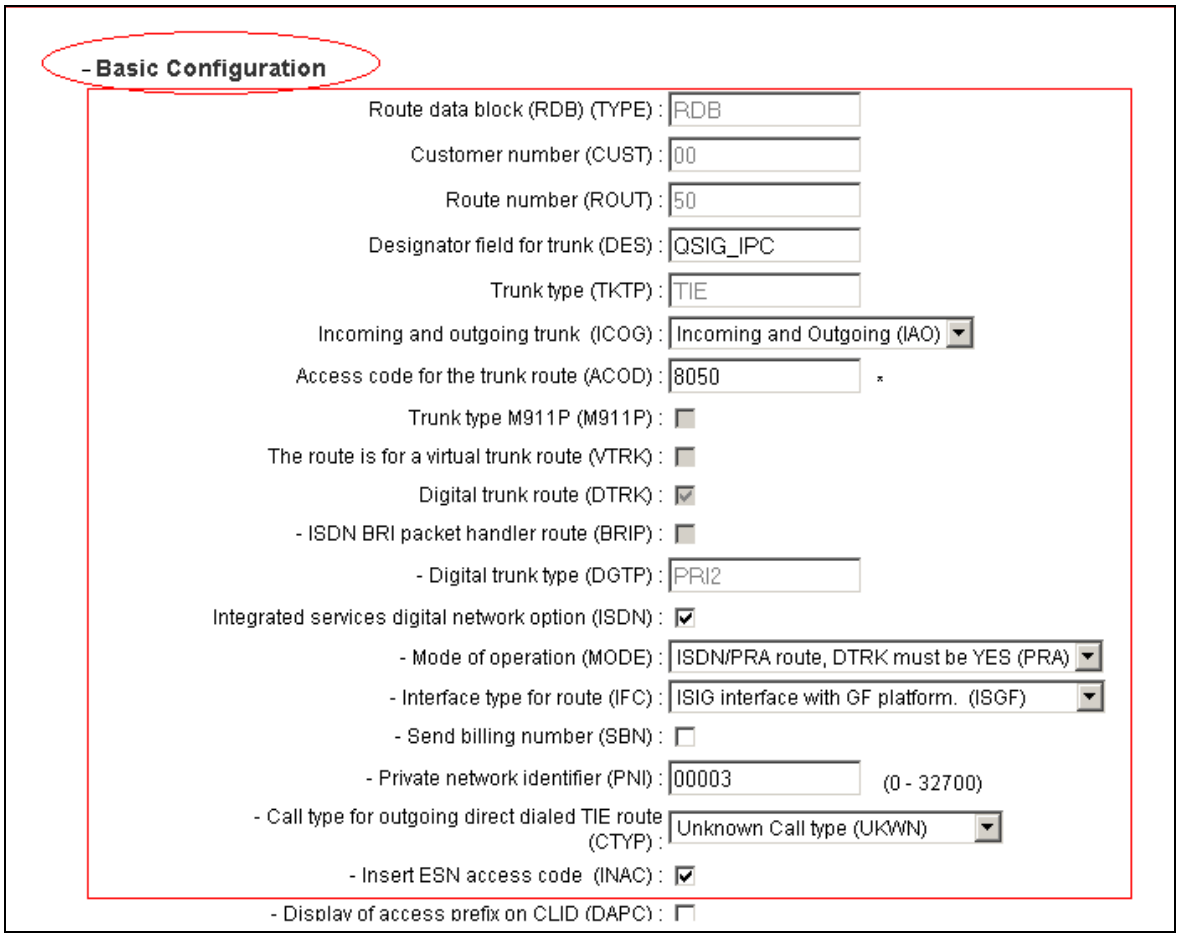
From the Routes and Trunks screen click on **Add route** button to start configuring a new route as shown below.



During compliance testing **Route number 50** was added. Select the values from the drop down menu and configure the values as shown in the next two screens below.



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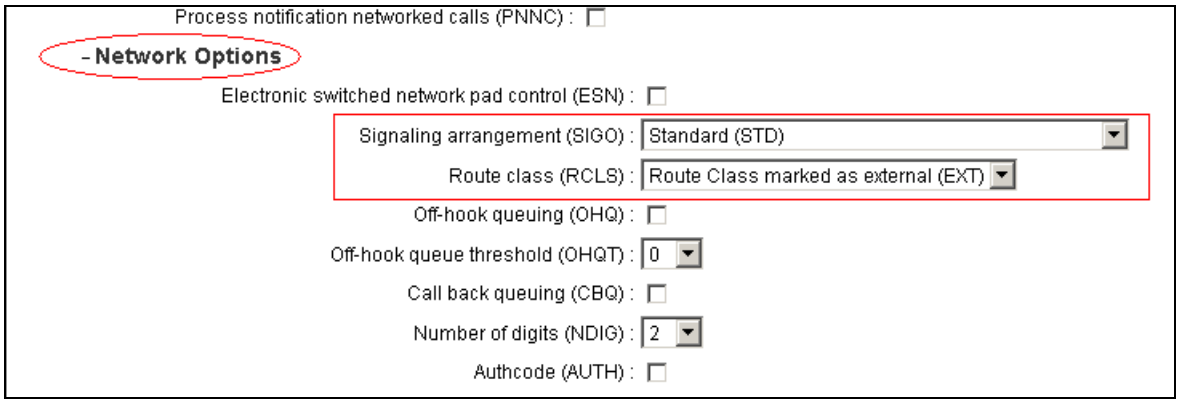
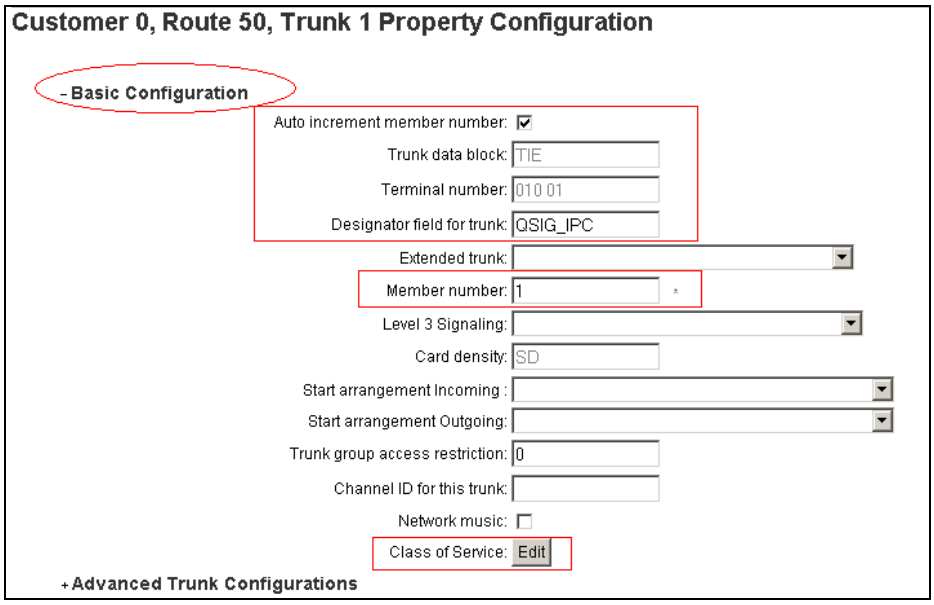


Configure the trunk values as shown below. Note that the **Terminal number** starts with **010 01** since the D-Channel loop was built on Loop 10. Click on **Edit** button to configure the required **Class of Service** for the trunks.



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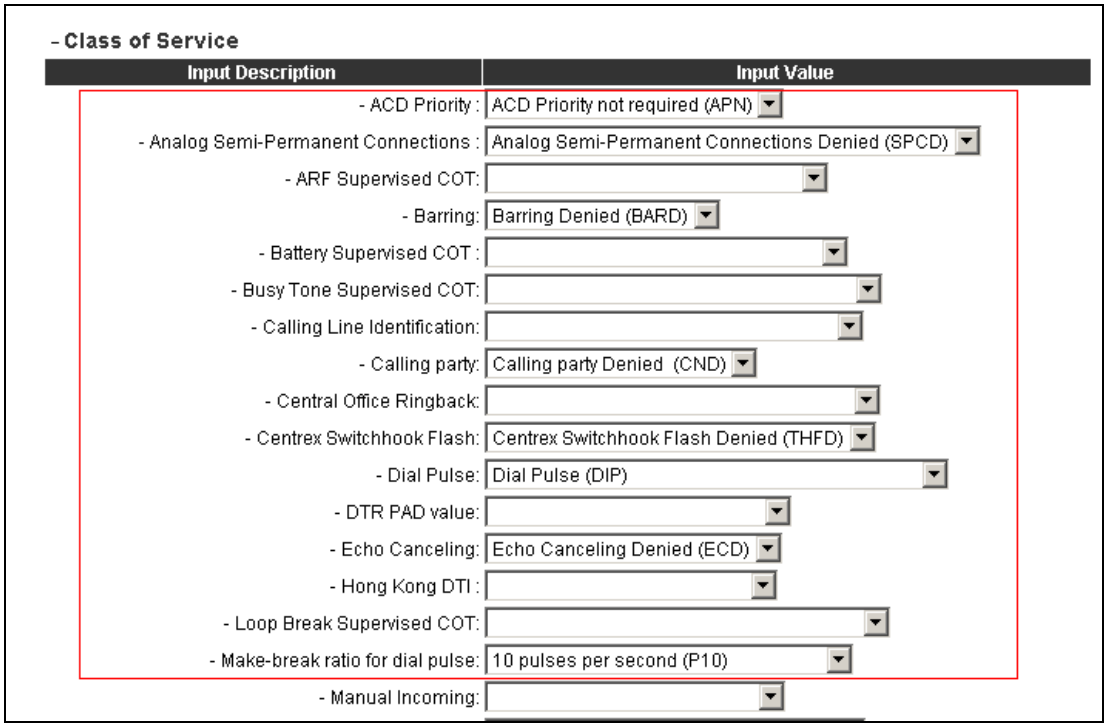
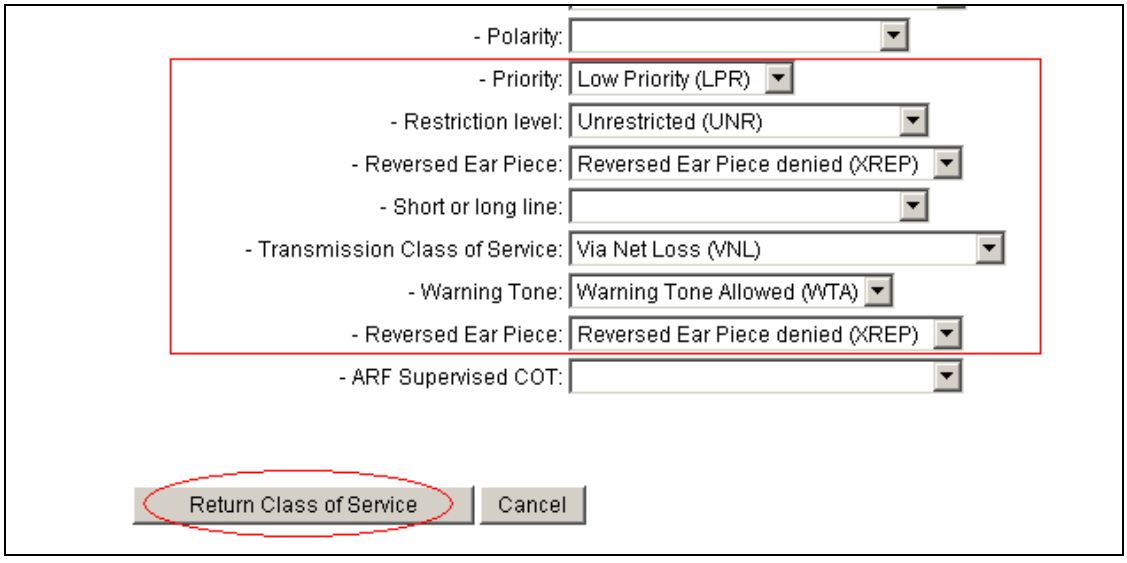
The two screens below shows the **Class of Service** values selected for the compliance testing from the drop down menu. Click on **Return Class of Service** button to complete the trunks configuration.





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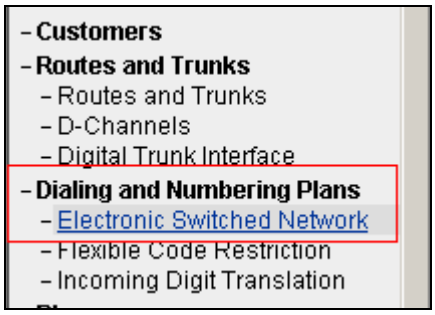
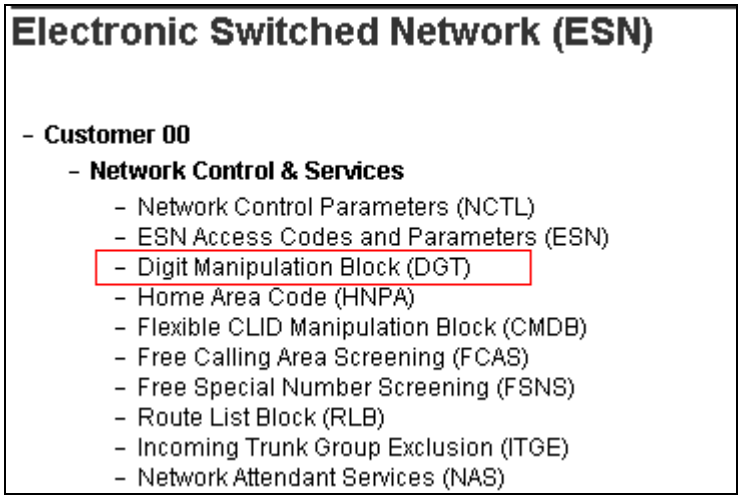
5.5. Configuring Digit Manipulation Block

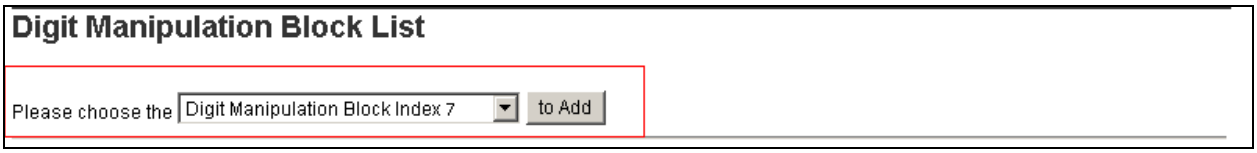
This section explains the digit manipulation block that is to be configured in the Communication Server 1000dialing plan for its users to communicate with the Unigy system. From the EM navigator pane, navigate to **Dialing and Numbering Plans → Electronic Switched Network** as shown below.



Click on **Digit Manipulation Block (DGT)** option as shown below.



Select a block index to configure and click on **to Add** button as shown in below. During compliance testing **Digit Manipulation Block Index** of **7** was added.



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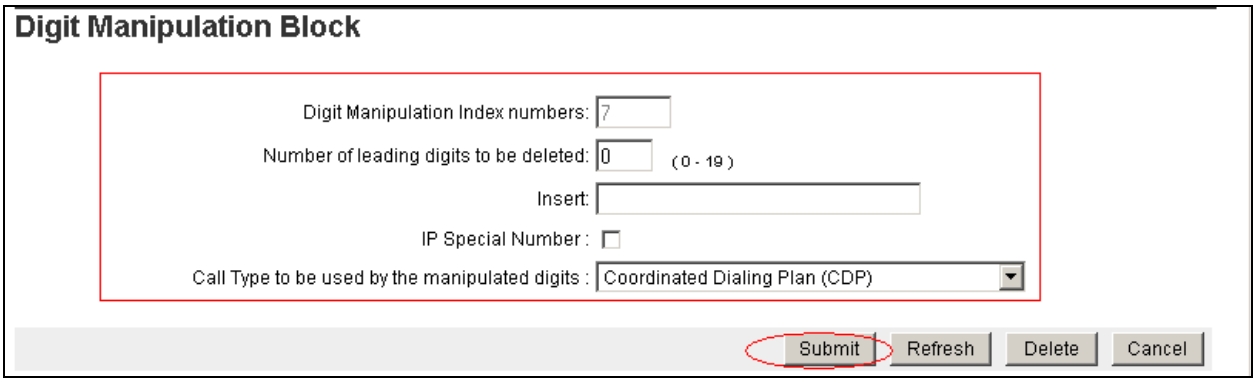
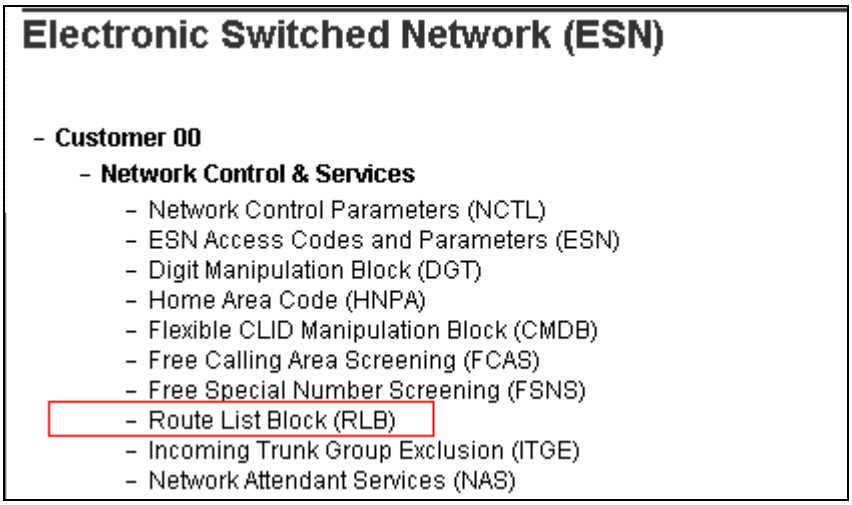
Screen below shows the values configured. Click on **Submit** to complete adding the Digit Manipulation Block configuration.



5.6. Configuring Route List Block

This section explains the route list block that is to be configured in the Communication Server 1000dialing plan for its users to communicate with the Unigy system. From the EM navigator pane, navigate to **Dialing and Numbering Plans → Electronic Switched Network** (shown in **Section 5.5**). Click on **Route List Block (RLB)** option as shown below.



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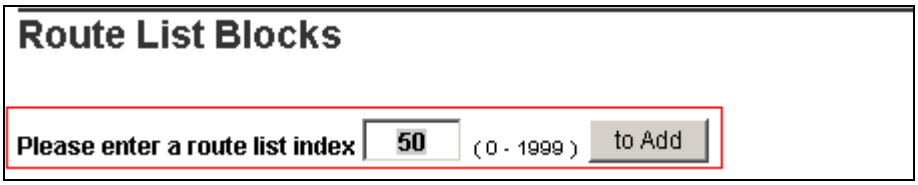
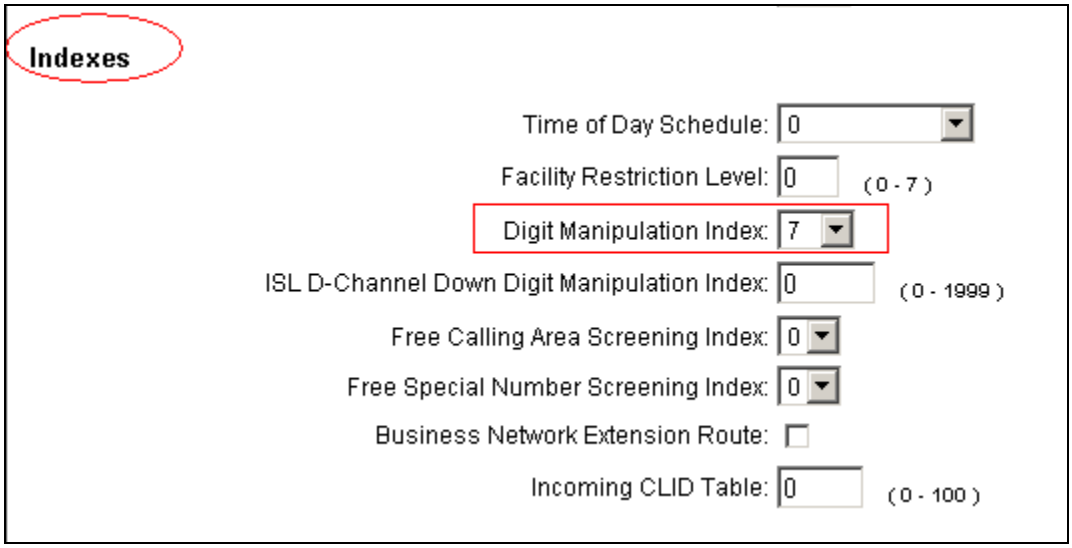
Start adding a **route list index** as shown below. During compliance testing list index **50** was added. Click on **to Add** to continue.



Add a **Data Entry Index** as shown below. During compliance testing entry index **1** was selected and click on **to Add** to continue.

Next two screens below show the values configured for the index block used during compliance testing. **Route Number** of **50** and **Digit Manipulation Index** of **7** were selected as per the configuration explained in **Sections 5.4** and **5.5** respectively. Click on **Submit** to complete the configuration.



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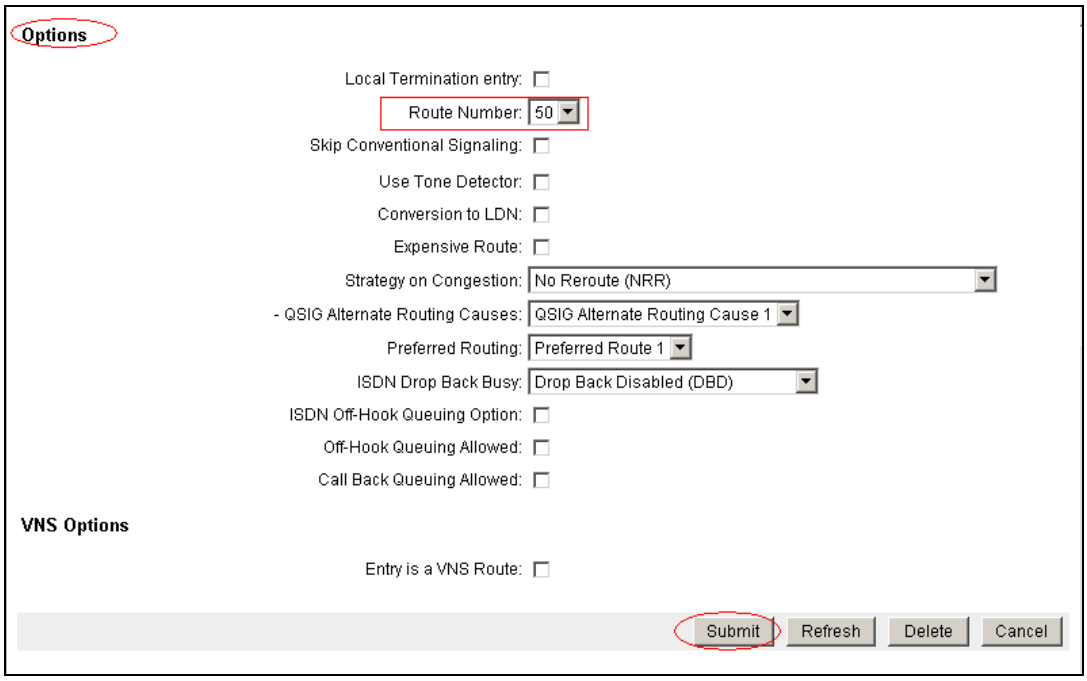
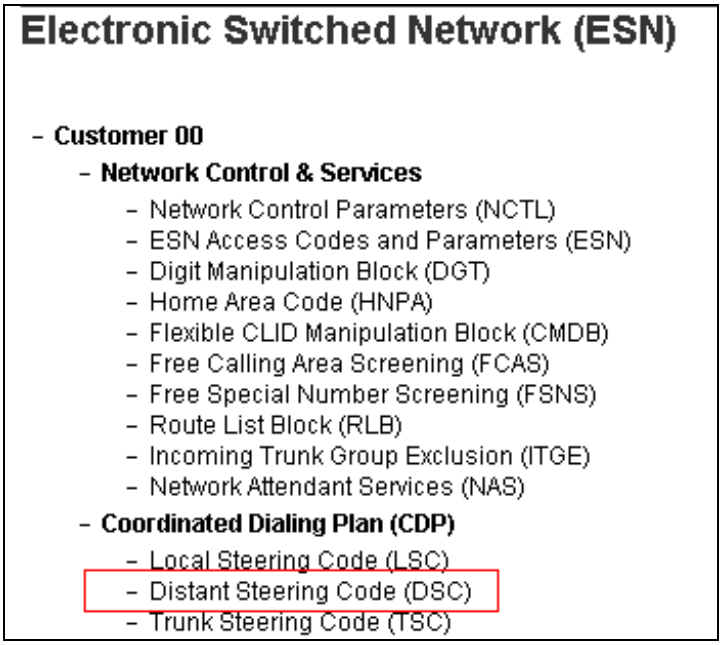


5.7. Configuring Distant Steering Code

This section explains the distant steering code that is to be configured in the dialing plan for its users to communicate with the Unigy system. From the EM navigator pane, navigate to **Dialing and Numbering Plans → Electronic Switched Network** (shown in **Section 5.5)**. Click on **Distant Steering Code (DSC)** option as shown below.



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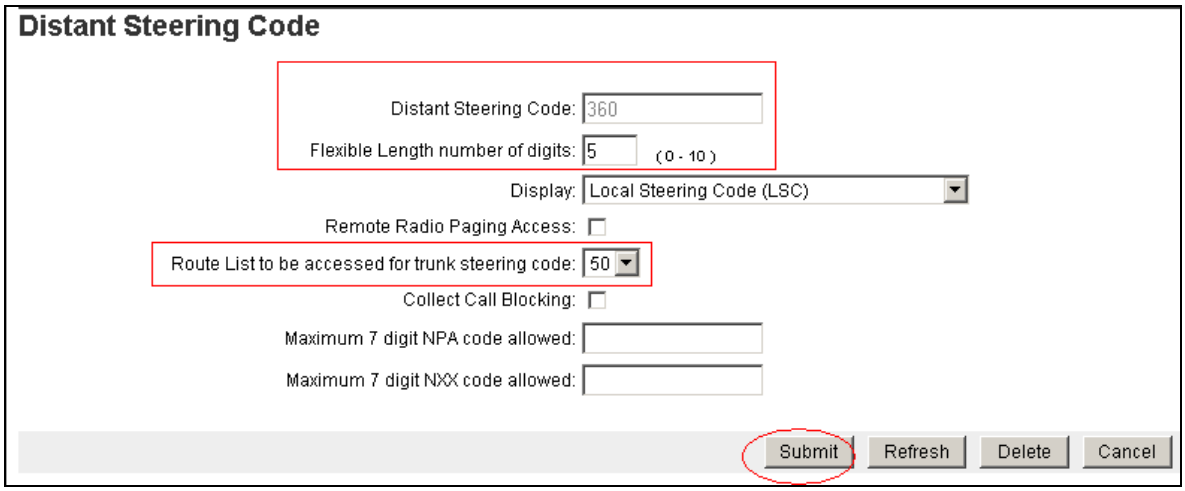
From the drop down menu select **Add** and enter a distant steering code to add as shown below. During compliance testing a code of **360** was added since the Unigy extension range started with 36xxx. Click on **to Add** to continue.

Enter the values as shown below. Note that **Route List to be accessed for trunk steering code** value selected is **50** based on the configuration explained in **Section 5.6** above. Click on **Submit** to complete the configuration.



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6. Configure IPC Converged Communication Manager

This section provides the procedures for configuring IPC Converged Communication Manager. The procedures include the following areas:

- Launch Unigy Management System
- Administer media gateway
- Administer trunk groups
- Administer route lists
- Administer dial patterns
- Administer route plans

The configuration of Converged Communication Manager is typically performed by IPC installation technicians. The procedural steps are presented in these Application Notes for informational purposes. For detail administration and configuration of Unigy system refer to **Section 10 [2]**.

6.1. Launch Unigy Management System

Access the Unigy Management System web interface by using the URL "http://ip-address" in an Internet browser window, where "ip-address" is the IP address of the Converged Communication Manager. Log in using the appropriate credentials.

The screen shown below is displayed. Enter the appropriate credentials. Check **I agree with the Terms of Use**, and click **Login**.

In the subsequent screen (not shown), click **Continue**.

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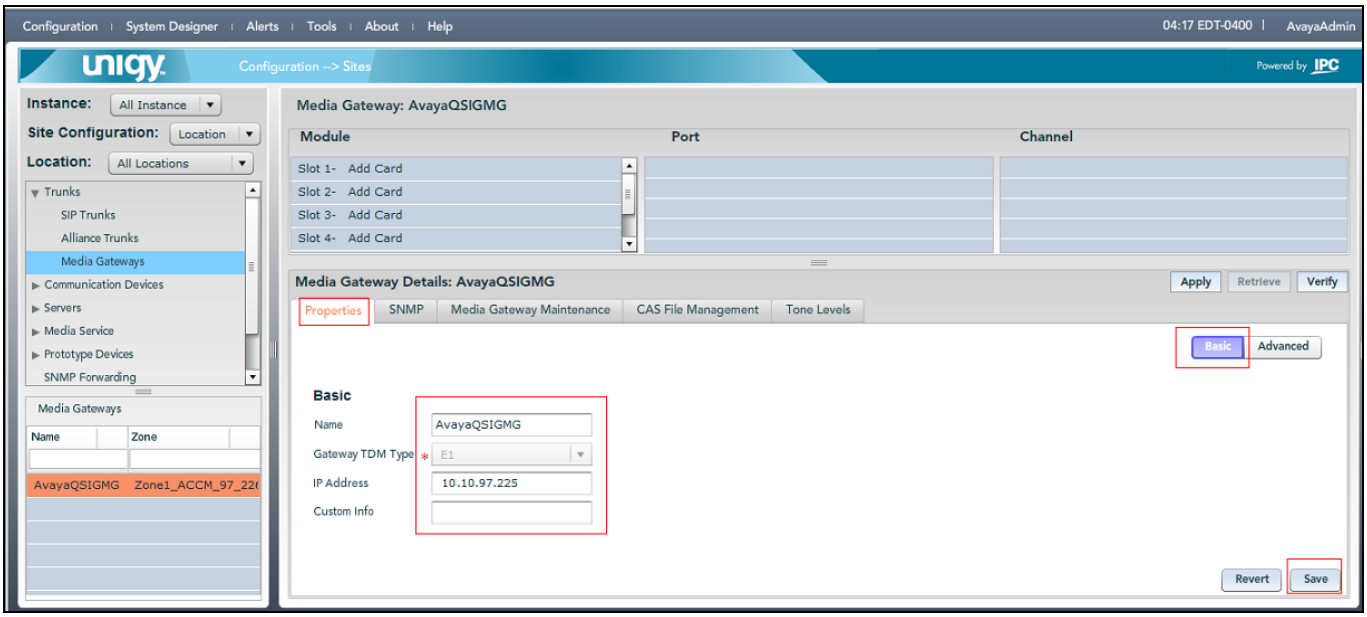
6.2. Administer Media Gateway

The screen as shown below is displayed next. Select **Configuration → Sites** (not shown) from the top menu.

Screen below shows the **Sites** information displayed in the left pane. Select **Trunks → Media Gateways** to view already added Media Gateway which was earlier added through Unigy Management System (**Tools → Hardware Deployment → Select Zone → Media Gateways → Add Device**). Under the **Properties** tab in the **Basic** configuration screen as shown below enter the **Name** and **IP Address** for the Media Gateway. From the **Gateway TDM Type** drop down menu select **E1** and click on **Save** to complete the configuration.



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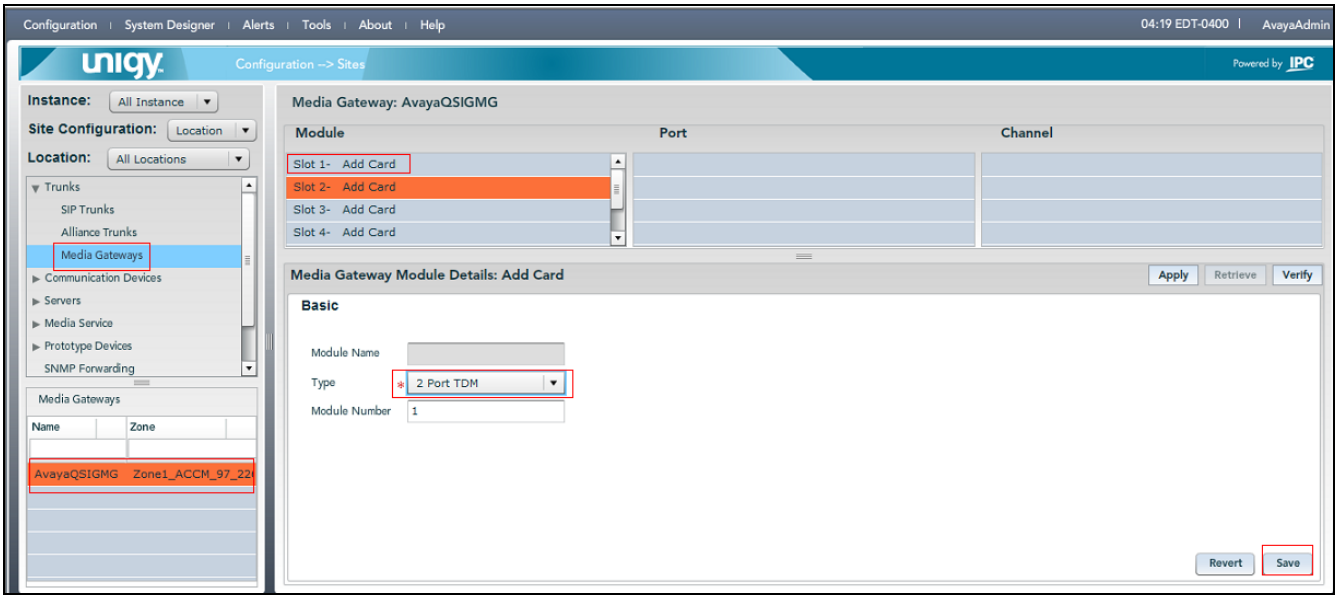
Screen below shows the **Sites** information displayed in the left pane. Select **Trunks → Media Gateways**, to display a list of media gateway in the lower left pane. Select the applicable media gateway from the listing, in this case **AvayaQSIGMG**.

The **Media Gateway** information is displayed in the upper right pane. Select the applicable **Module** to be added, in this case **Slot 1-Add Card**.

The **Media Gateway Module Details: Add Card** information is displayed in the lower right pane. Select **2 Port TDM** for **Type**, and click **Save**.



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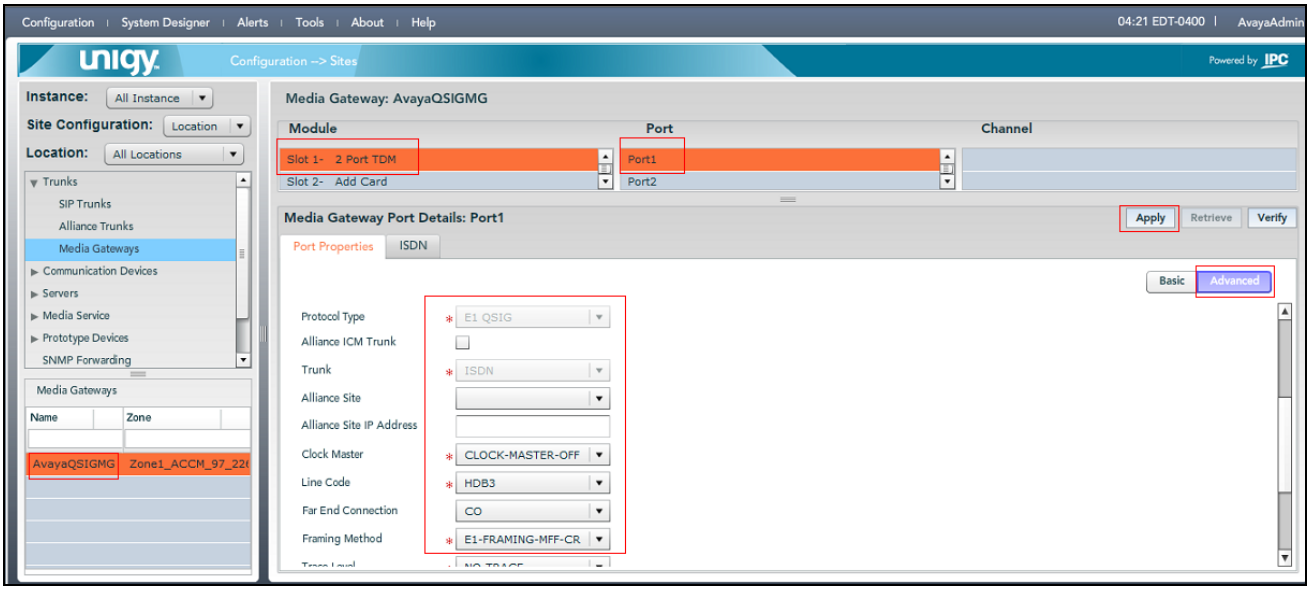
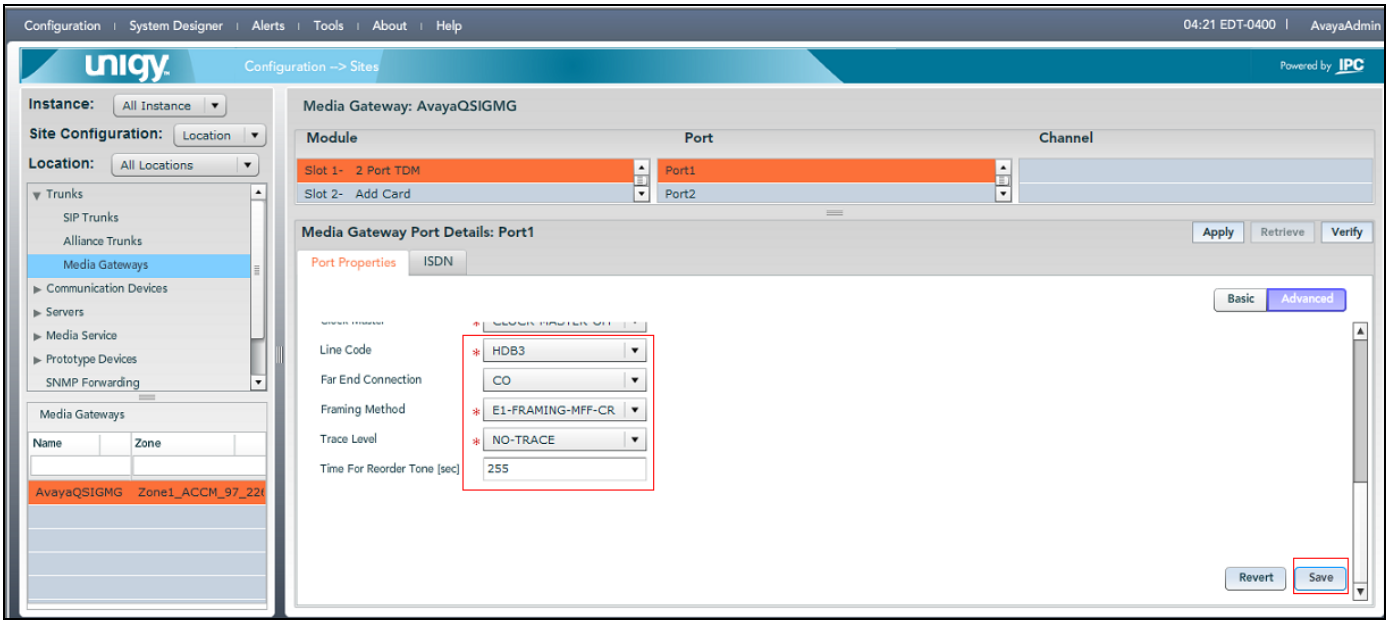
Screen below shows the added Port 1. Click on a desired **Port** in the upper right pane, in this case **Port 1**.

The **Media Gateway Port Details: Port 1**screen is shown below. Select the **Advanced** option for the **Port Properties** tab. The values shown in the screen were used during compliance testing.



Screen below shows the **Port Properties** values continued. Click **Save** followed by **Apply** to complete port properties configuration.



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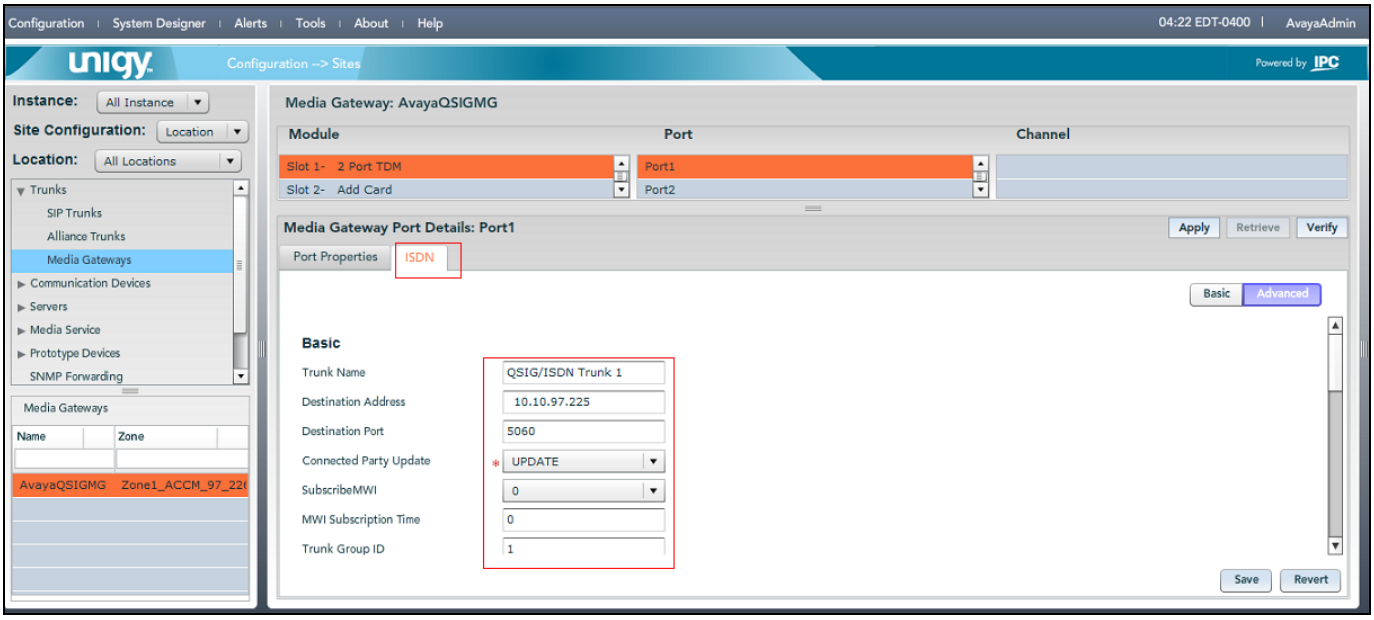
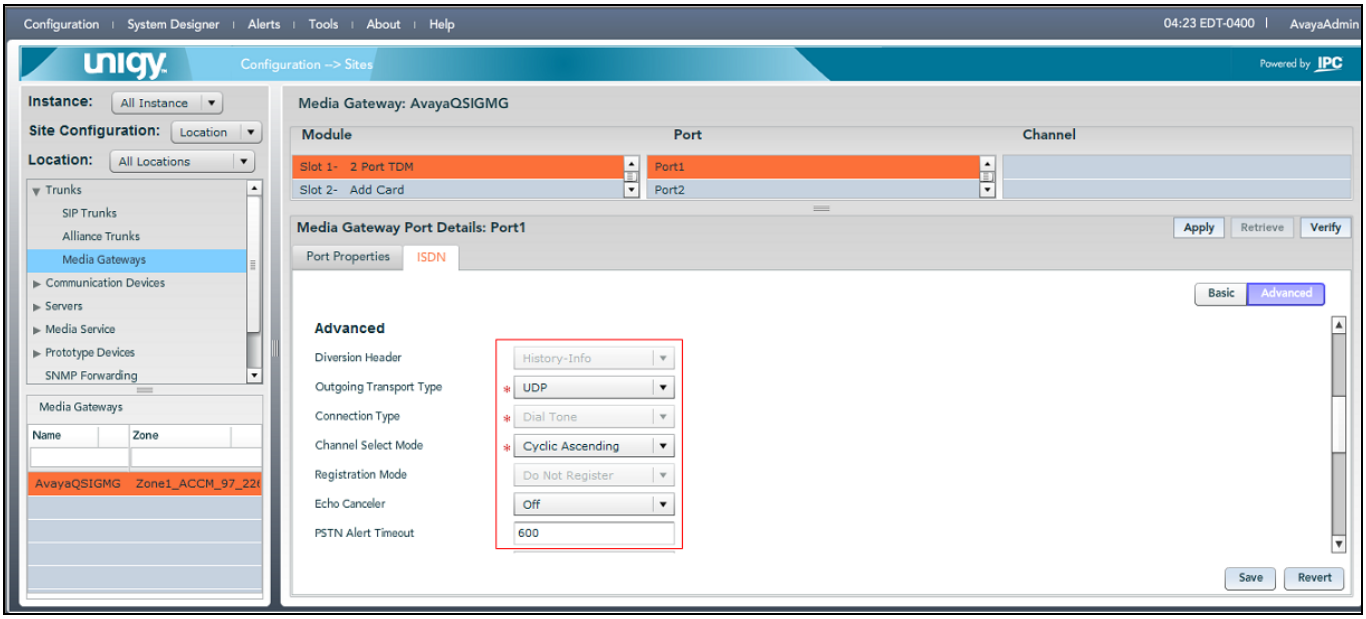
Following four screens shows the values configured for the **ISDN** tab. Note that 10.10.97.225 is the IP address of the Media Gateway. Click **Save** followed by **Apply** to complete the configuration.





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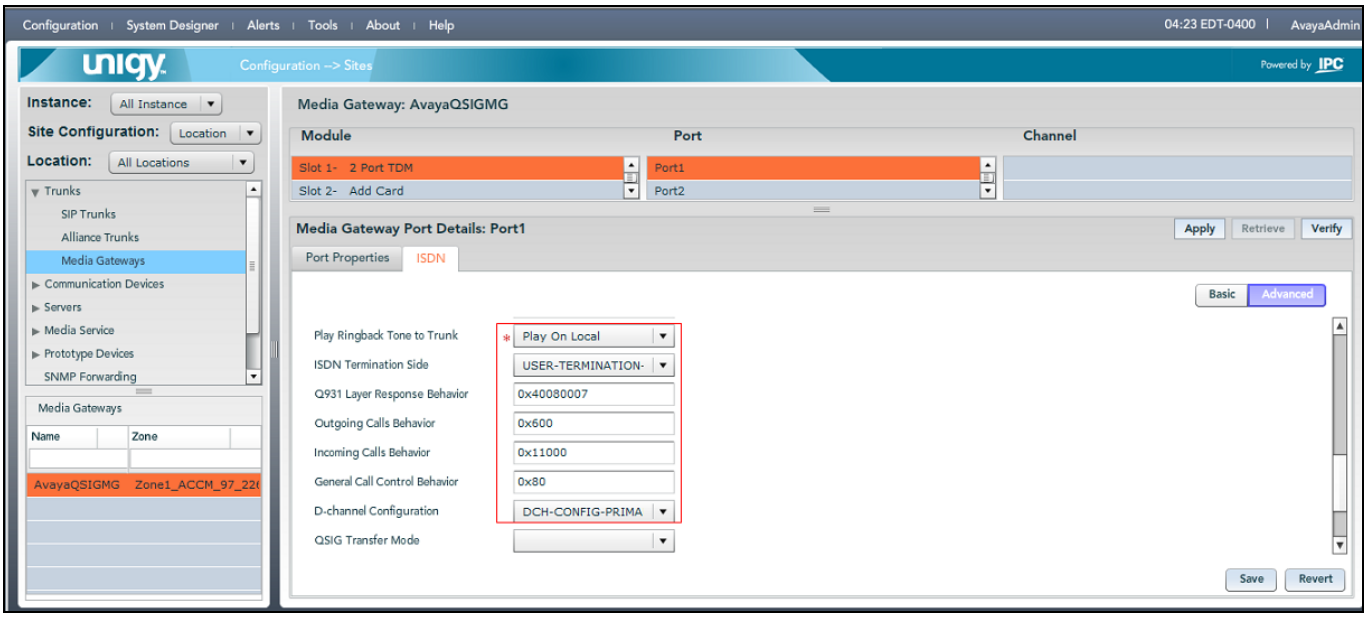

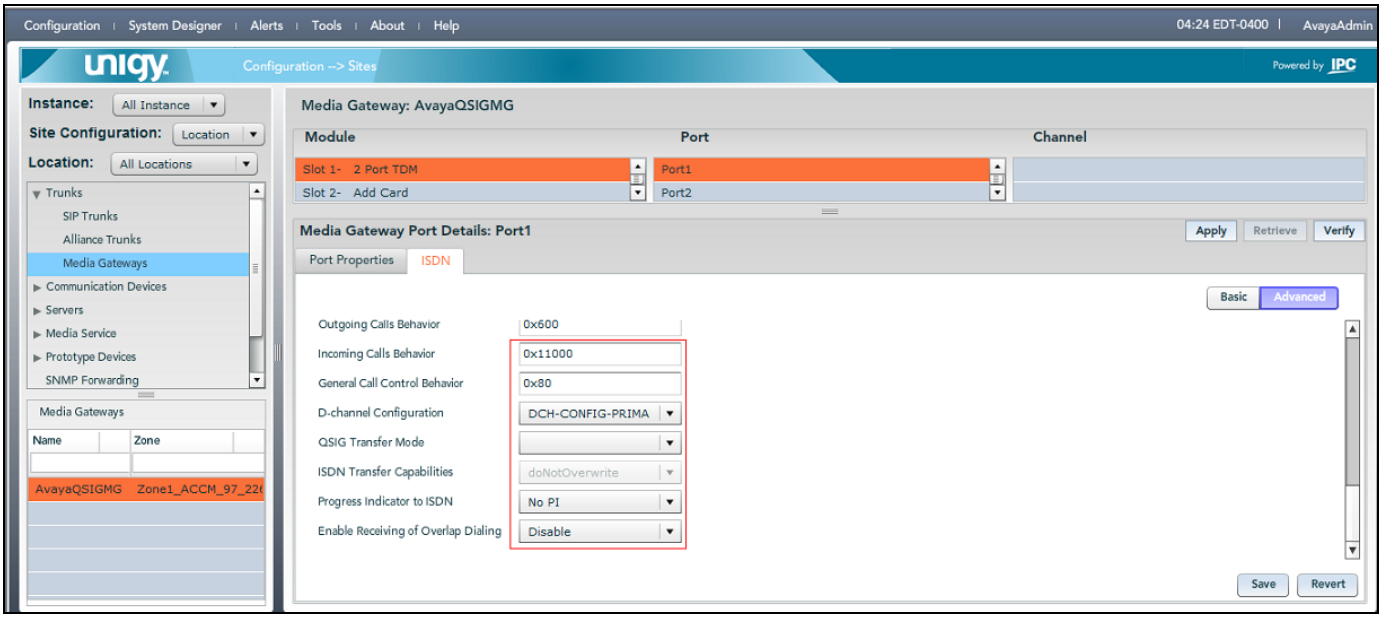

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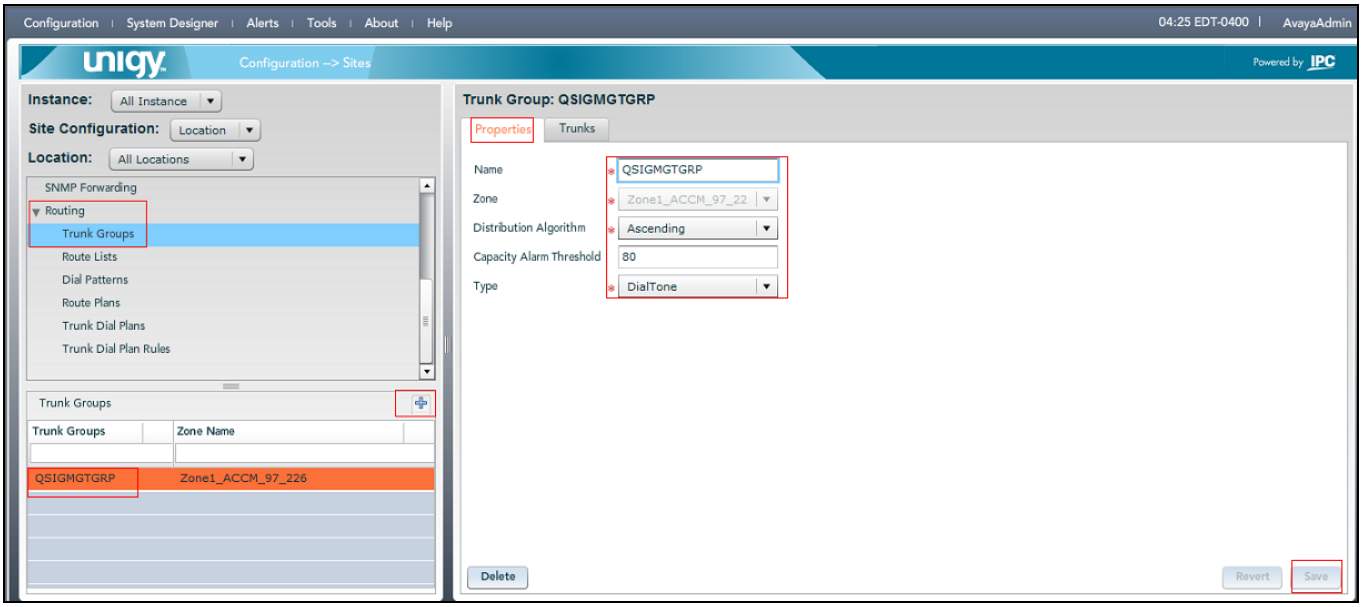
6.3. Administer Trunk Groups

From **Configuration → Sites**, select **Routing → Trunk Groups** in the left pane, and click the **"+"** icon in the lower left pane to add a new trunk group as shown in screen below.

The **Trunk Group** screen is displayed in the right pane. Select **Properties** tab, the screen shows the values configured for compliance testing. Click on **Save** to complete the configuration.



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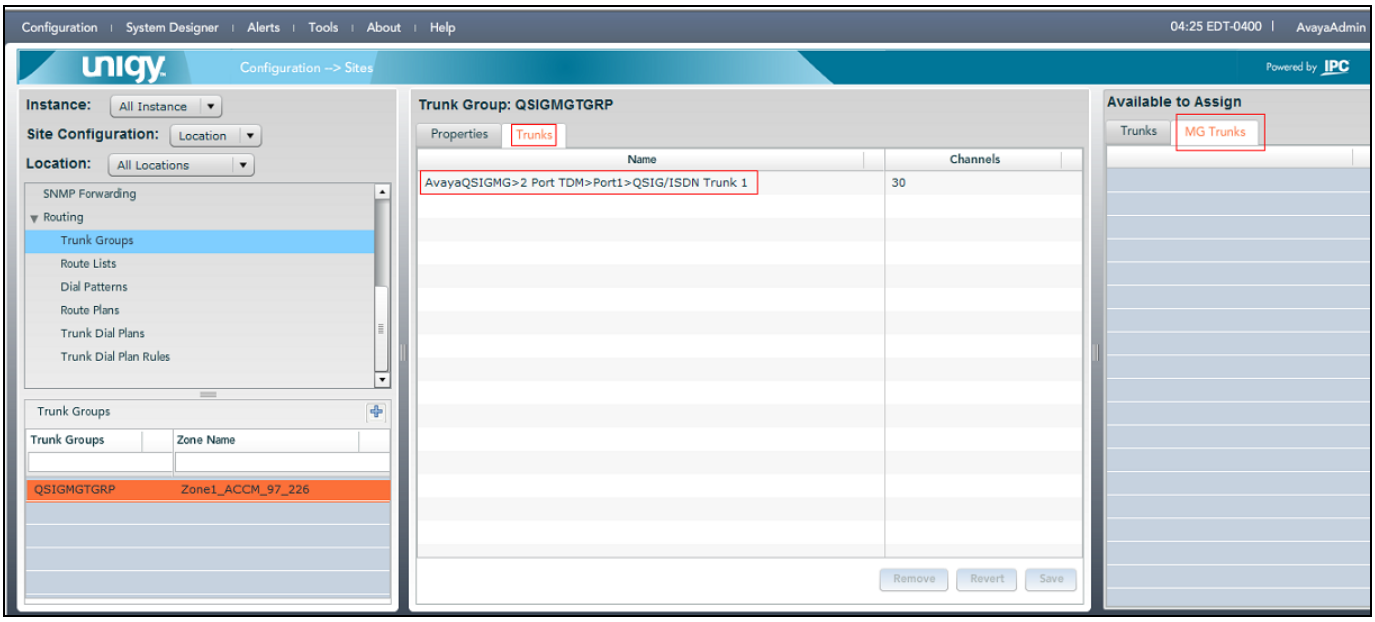
Select the **Trunks** tab in the right pane as shown in screen below. The screen is updated with three panes. In the new right pane, select the **MG Trunks** tab. In the **Media Gateway** listing, select and expand the applicable media gateway slot and port (not shown) from **Section 6.2,** and drag the selection to the **Name** column in the middle pane as shown below. Click on **Save** to complete the configuration.



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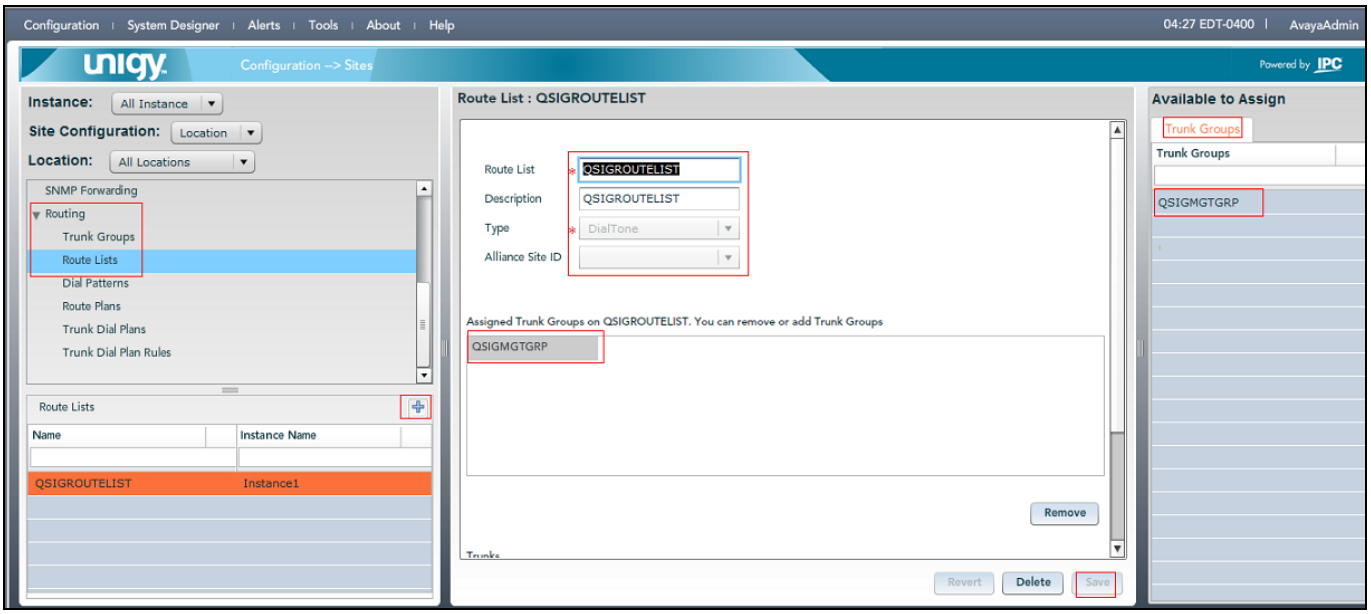
6.4. Administer Route Lists

Select **Routing → Route Lists** in the left pane from **Configuration → Sites**, and click the **"+"** icon in the lower left pane to add a new route list as shown in screen below.

The **Route List** screen is displayed in the middle pane. Screen shows the values configured for compliance testing. In the right pane, select the trunk group from **Section 6.3** and drag into the **Assigned Trunk Groups on QSIGROUTELIST** sub-section in the middle pane, as shown below. Click on **Save** to complete the configuration.



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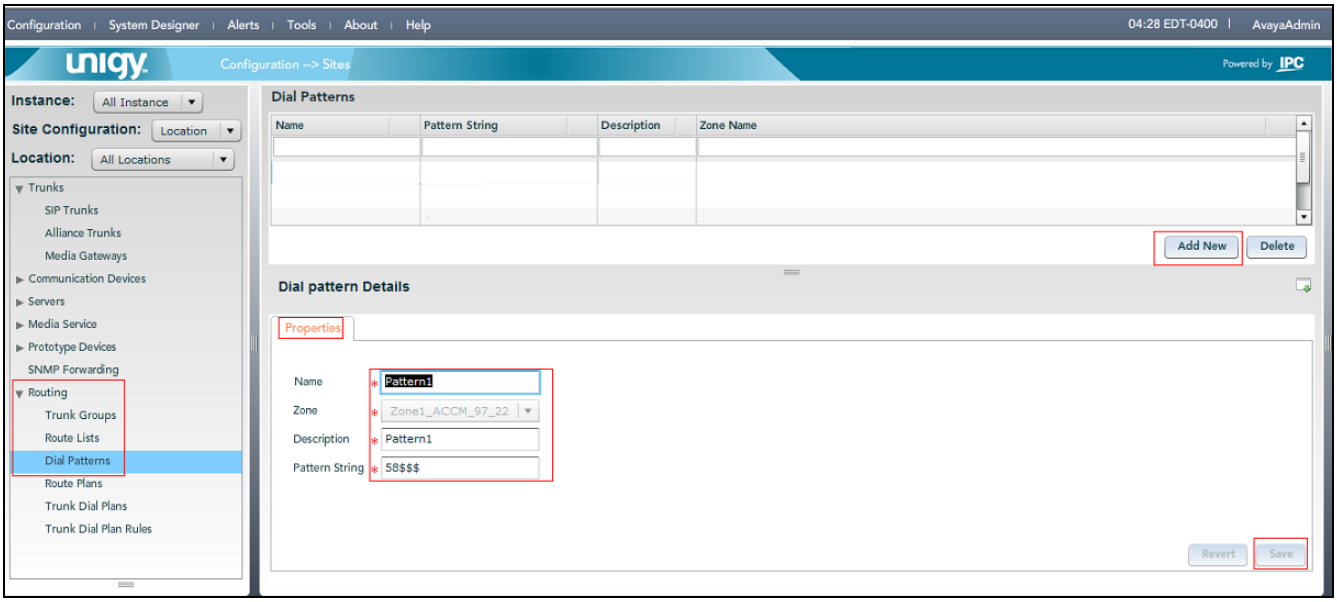
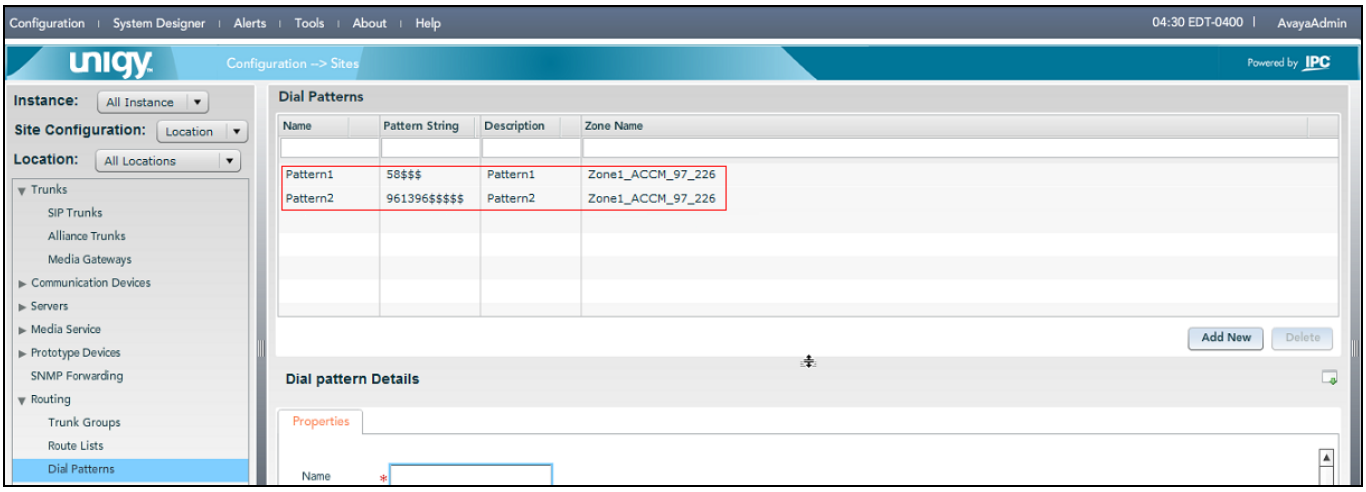
6.5. Administer Dial Patterns

Select **Routing → Dial Patterns** in the left pane from **Configuration → Sites** to display the **Dial Patterns** screen in the right pane. Click **Add New** in the upper right pane as shown in the screen below.

In the **Dial pattern Details** sub-section in the lower right pane, enter the desired **Name** and **Description**. For **Pattern String**, enter the dial pattern to match the Avaya extensions, in this case **58$$$** with "$" matching to any digit. Click on **Save** to complete adding a dial pattern.



Repeat this section to add another dial pattern to reach the PSTN, and include any required prefix. In the compliance testing, two dial patterns were created as shown in the screen below.



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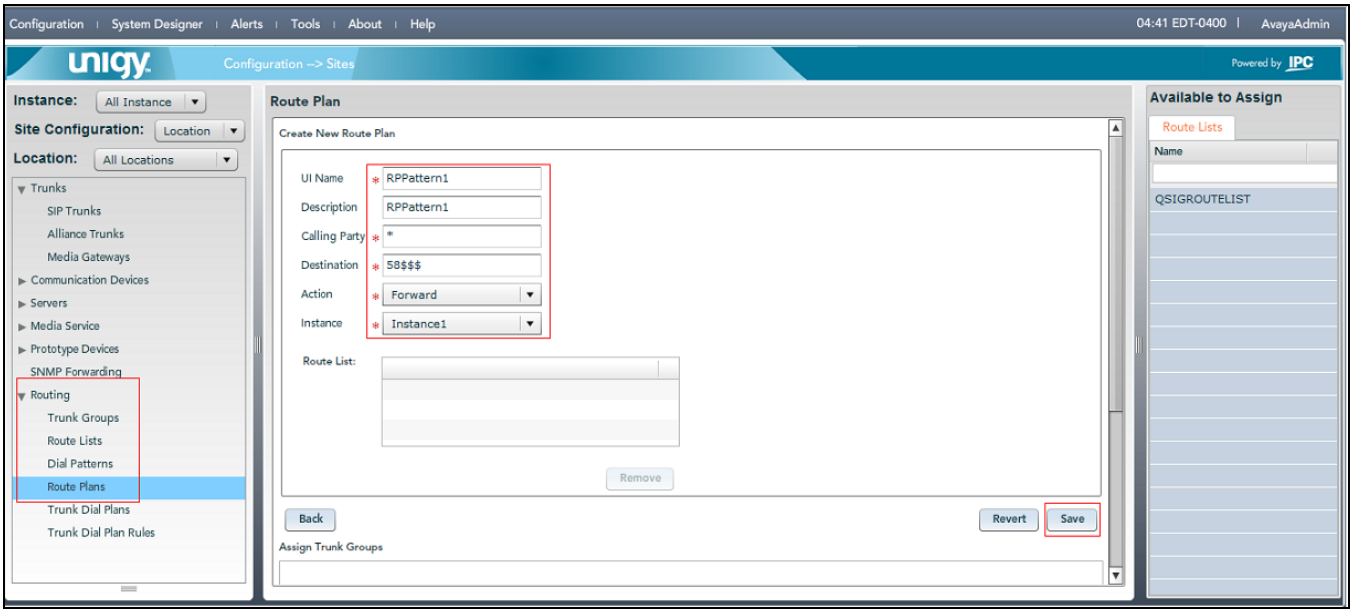
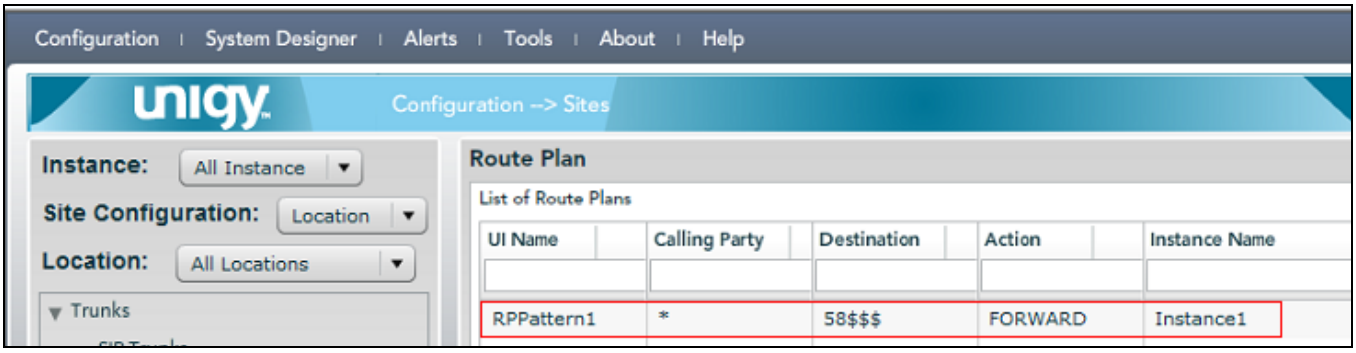
6.6. Administer Route Plans

Select **Routing → Route Plans** in the left pane from **Configuration → Sites** and click **Add New** (not shown) in the right pane to create a new route plan as shown in screen below.

The screen is updated with three panes, as shown below. In the **Route Plan** middle pane, enter a descriptive **UI Name** and optional **Description**. For **Calling Party**, enter ***** to denote any calling party from Unigy. For **Destination**, select the dial pattern for the Avaya users from **Section 6.5**. Select **Forward** for **Action**, **Instance 1** for Instance and click on **Save**.



The screen is updated with the newly created route plan as shown in **screen** below. Select the route plan, and click **Edit** toward the bottom of the screen (not shown).



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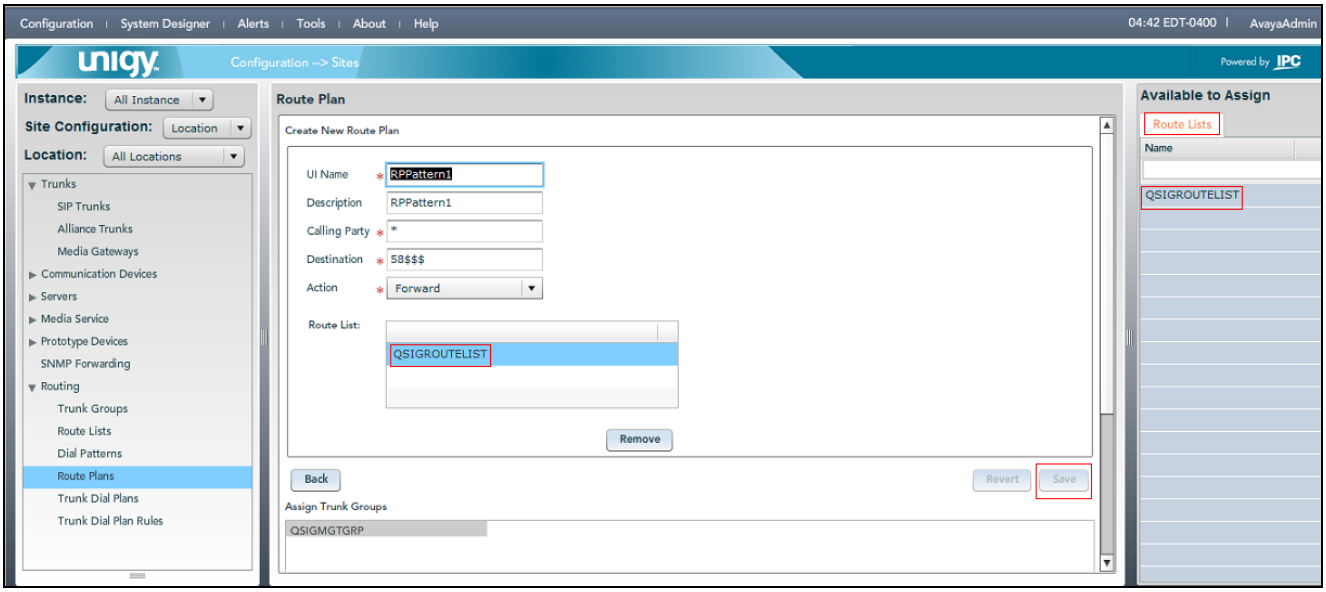
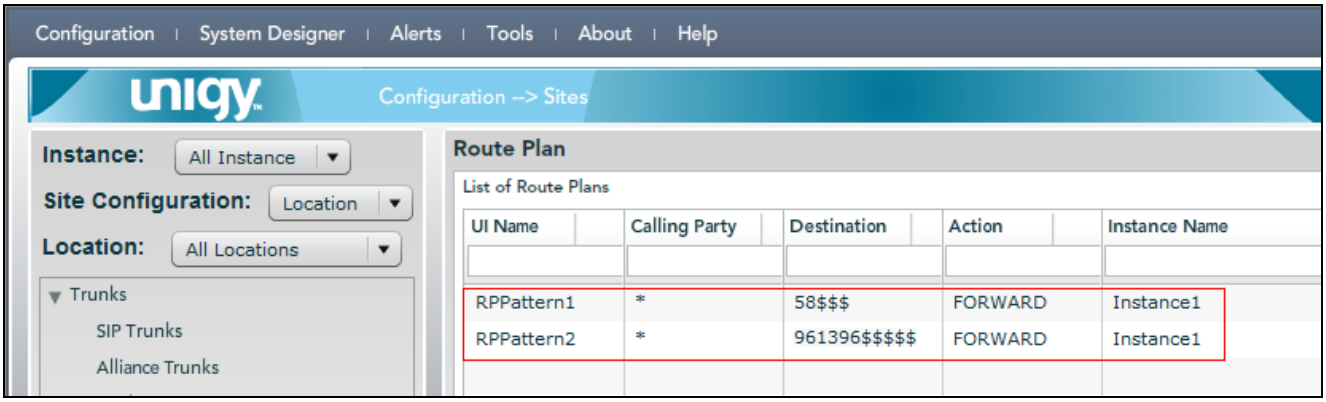
The screen is updated with three panes again, as shown below. In the right pane, select the route list from **Section 6.4** and drag into the **Route List** sub-section in the middle pane, as shown below. Click on **Save** to complete the configuration**.**



Repeat this section to add another route plan for the PSTN. During compliance testing, two route plans were created as shown below.



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7. Configure IPC Media Gateway

This section provides the procedures for configuring IPC Media Gateway. The procedures include the following areas:

- Launch gateway web interface.
- Administer trunk settings.

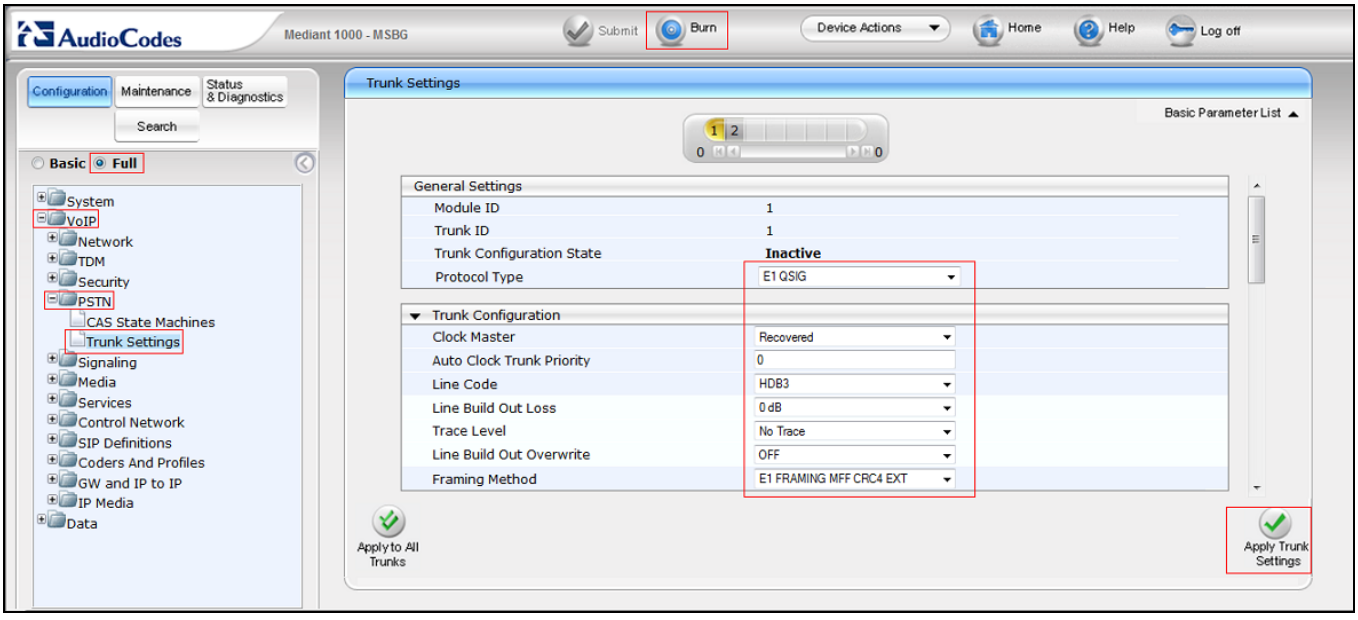
The configuration of the Media Gateway is typically performed by IPC installation technicians. The procedural steps are presented in these Application Notes for informational purposes. Note that IPC resells the AudioCodes Mediant 1000 MSBG as part of their solution.

7.1. Launch Gateway Web Interface

Access the Media Gateway web interface by using the URL "http://ip-address" in an Internet browser window, where "ip-address" is the IP address of the Media Gateway. Log in (not shown) using the appropriate credentials.

7.2. Administer Trunk Settings

The screen as shown below is displayed. Select the radio button for **Full** in the left pane, and select **VoIP → PSTN Settings → Trunk Settings**, to display the **Trunk Settings** screen. During compliance testing the values shown below were selected from the drop down menu.



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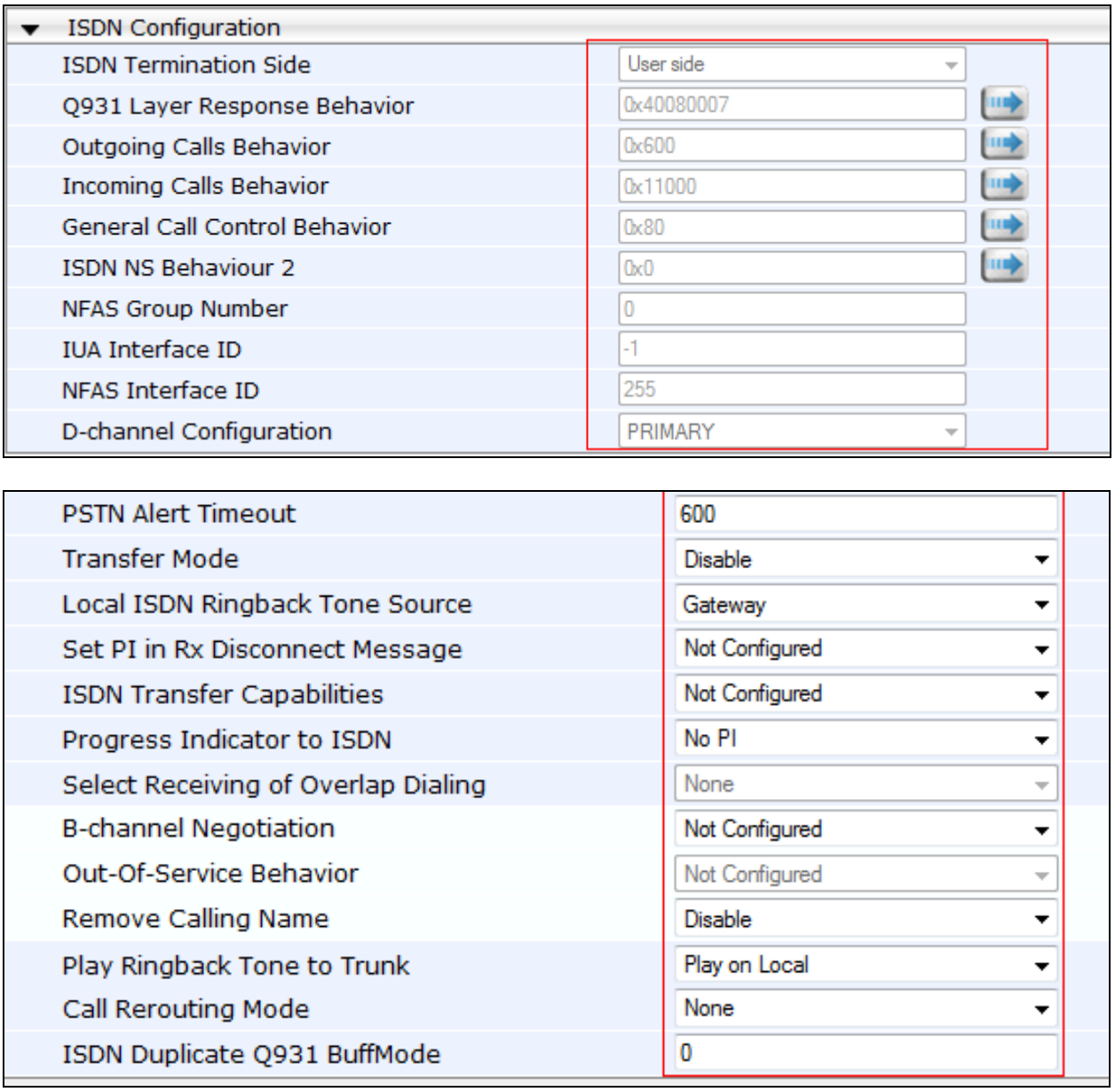

Click **Stop Trunk** (not shown), followed by the arrow next to **Q931 Layer Response Behavior** seen under **ISDN Configuration**.

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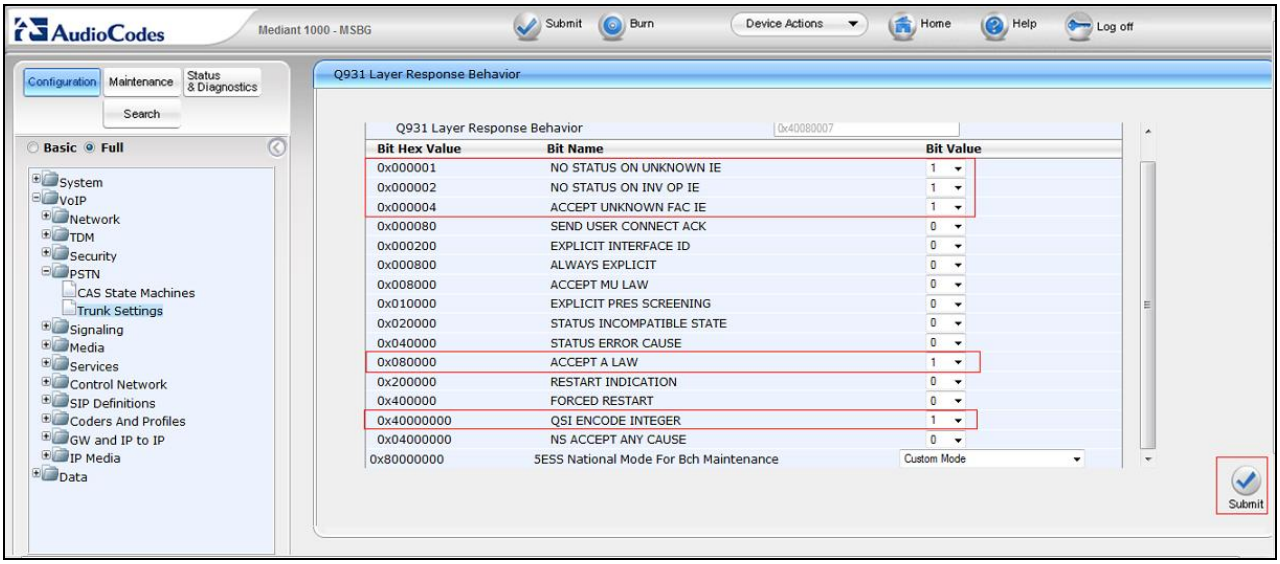
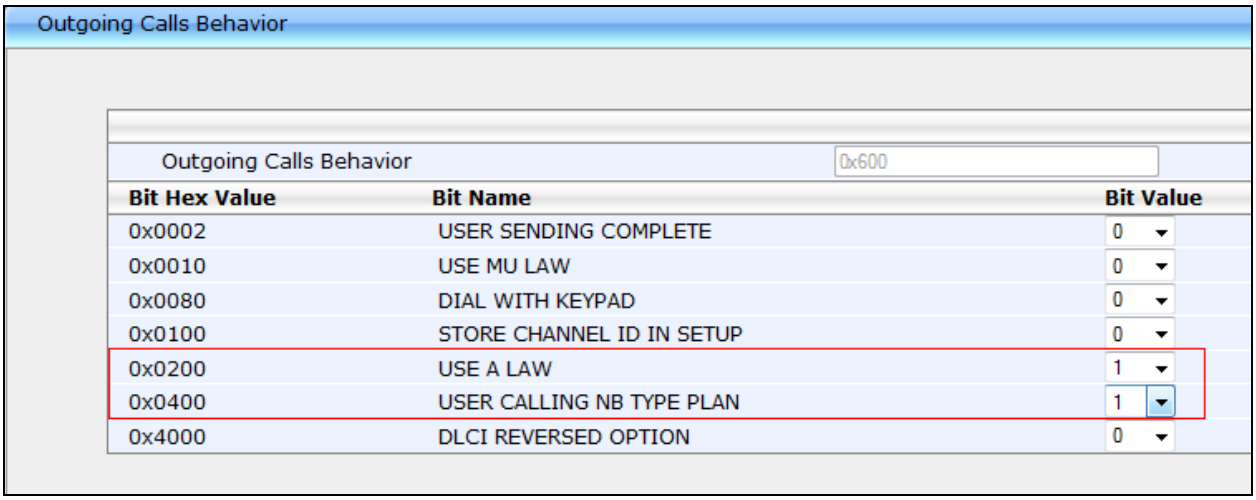
Q931 Layer Response Behavior screen shown below is displayed. Enable the corresponding bits for the following values and click on **Submit**.

- **NO STATUS ON UNKNOWN IE**
- **NO STATUS ON INV OP IE**
- **ACCEPT UNKNOWN FAC IE**
- **ACCEPT A LAW**
- **QSI ENCODE INTEGER**



Click on the arrow next to **Outgoing Calls Behavior** seen under **ISDN Configuration**. **Outgoing Calls Behavior** screen shown below is displayed. Enable the corresponding bits for the following values and click on **Submit**.

- **USE A LAW**
- **USER CALLING NB TYPE PLAN**



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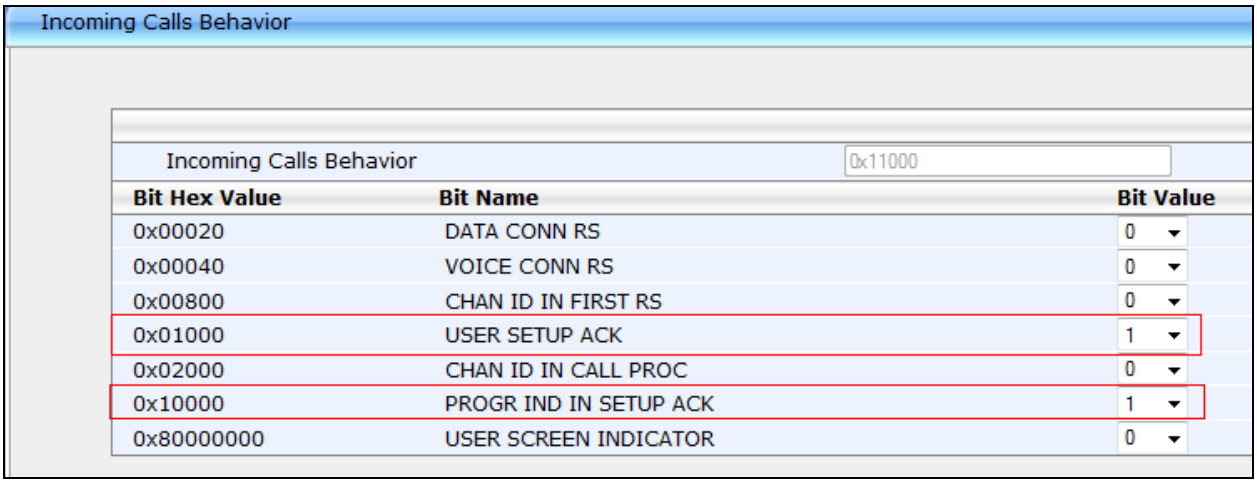
Click on the arrow next to **Incoming Calls Behavior** seen under **ISDN Configuration**. **Incoming Calls Behavior** screen shown below is displayed. Enable the corresponding bits for the following values and click on **Submit**.

- **USER SETUP ACK**
- **PROGR IND IN SETUP ACK**



Return to the **Trunk Settings** screen as shown in the beginning of **Section 7.2** above; click **Apply Trunk Settings**, followed by **Burn** to commit the changes (not shown).

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8. Verification Steps

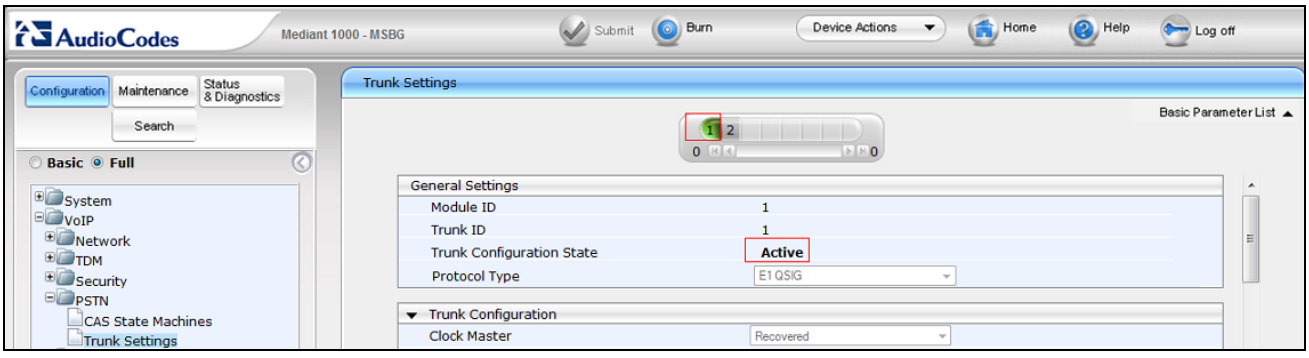
The following tests were conducted to verify the solution:

- Basic call features operate successfully between users on both systems.
- E1 connection in the Media Gateway is successfully established when the physical cable is disconnected and connected back.
- Login to the Avaya Communication Server 1000 using command line interface (not shown) and verify the status of the D-Channel and D-Channel loop in **LD 96** and **60** respectively. Screen below shows the D-Channel active and established and the loop enabled with the channels idle.

```
>ld 96
DCH000
.stat dch 5
DCH 005 : OPER       EST    ACTV  AUTO
 DES : QSIG_IPC
.****
OVL000
>ld 60
DTI000
.stat 10

PRI2 LOOP 10 - ENBL
REF CLK: DSBL
SERVICE RESTORE: YES
ALARM STATUS: ACCEPTABLE
CH 01 - IDLE TIE   VOD  *          CH 02 - IDLE TIE   VOD  *
CH 03 - IDLE TIE   VOD  *          CH 04 - IDLE TIE   VOD  *
CH 05 - IDLE TIE   VOD  *          CH 06 - IDLE TIE   VOD  *
CH 07 - IDLE TIE   VOD  *          CH 08 - IDLE TIE   VOD  *
CH 09 - IDLE TIE   VOD  *          CH 10 - IDLE TIE   VOD  *
CH 11 - IDLE TIE   VOD  *          CH 12 - IDLE TIE   VOD  *
CH 13 - IDLE TIE   VOD  *          CH 14 - IDLE TIE   VOD  *
CH 15 - IDLE TIE   VOD  *          CH 16 - IDLE TIE   VOD  *
CH 17 - IDLE TIE   VOD  *          CH 18 - IDLE TIE   VOD  *
CH 19 - IDLE TIE   VOD  *          CH 20 - IDLE TIE   VOD  *
CH 21 - IDLE TIE   VOD  *          CH 22 - IDLE TIE   VOD  *
CH 23 - IDLE TIE   VOD  *          CH 24 - IDLE TIE   VOD  *
CH 25 - IDLE TIE   VOD  *          CH 26 - IDLE TIE   VOD  *
CH 27 - IDLE TIE   VOD  *          CH 28 - IDLE TIE   VOD  *
CH 29 - IDLE TIE   VOD  *          CH 30 - IDLE TIE   VOD  *
CH 31 - DCH 5
.
```

- From the Media Gateway web interface, select **VoIP → PSTN Settings →Trunk Settings** to display the **Trunk Settings** screen as shown below. Toward the top of the screen, click the applicable trunk port from **Section 6.2**, in this case **1**. Verify that the **Trunk Configuration State** is **Active**.



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9. Conclusion

These Application Notes describe the configuration steps required for IPC Unigy to successfully interoperate with Avaya Communication Server 1000 7.5 using QSIG trunks. The entire executed test cases passed and met the objectives outlined in **Section 2** and the observations noted in **Section 2.2**.

10. Additional References

This section references the product documentation relevant to these Application Notes.

1. *Software Input Output Reference — Administration Avaya Communication Server 1000 7.5 NN43001-611, Standard 05.13 September 2012* available at http://support.avaya.com.

2. *Unigy System Configuration*, upon request to IPC Support.

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