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Avaya Solution & Interoperability Test Lab

Application Notes for Empirix OneSight Voice Quality with Avaya Aura® Communication Manager 5.2.1 – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Empirix OneSight Voice Quality to interoperate with Avaya Aura® Communication Manager 5.2.1. Empirix OneSight Voice Quality is a voice quality monitoring and management solution. In the compliance testing, Empirix OneSight Voice Quality used the H.323 station interface from Avaya Aura® Communication Manager to provide voice quality monitoring.

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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Solution & Interoperability Test Lab Application Notes
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1. Introduction

These Application Notes describe the configuration steps required for Empirix OneSight Voice Quality to interoperate with Avaya Aura® Communication Manager 5.2.1. Empirix OneSight Voice Quality is a voice quality monitoring and management solution. In the compliance testing, Empirix OneSight Voice Quality used the H.323 station interface from Avaya Aura® Communication Manager to provide voice quality monitoring.

The Empirix OneSight Voice Quality solution consists of the Empirix OneSight server, and two or more Empirix Voice Quality (VQ) Probe clients. Each VQ Probe client registers with Avaya Aura® Communication Manager as a H.323 station. Scripts are launched on the OneSight server to initiate bi-directional calls between the VQ Probe clients. A preconfigured prompt is played from one VQ Probe client to the other, with the receiving client comparing the received audio with the original and producing voice quality scores to send to the OneSight server. The resultant scores from both clients are monitored and reported by the OneSight server.

1.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing focused on verifying the proper analysis and reporting of voice quality by Empirix OneSight Voice Quality. The scenarios included registration, G.711 and G.729 audio codec with and without media shuffling, and injection of VoIP impairments such as packet delay, jitter, and loss.

The serviceability testing focused on verifying the ability of Empirix OneSight Voice Quality to recover from adverse conditions, such as disconnecting/reconnecting the Ethernet cable to the OneSight server, and to each of the VQ Probe clients.

1.2. Support

Technical support on Empirix OneSight Voice Quality can be obtained through the following:

- **Phone:** (866) 367-4749
- **Email:** support@empirix.com
- **Web:** http://esupport.empirix.com

2. Reference Configuration

The configuration used for the compliance testing is shown below. The Packet Storm was used as a tool to inject VoIP impairments, such as packet delay, jitter, and loss, into the network for calls between the two Empirix VQ Probe clients.
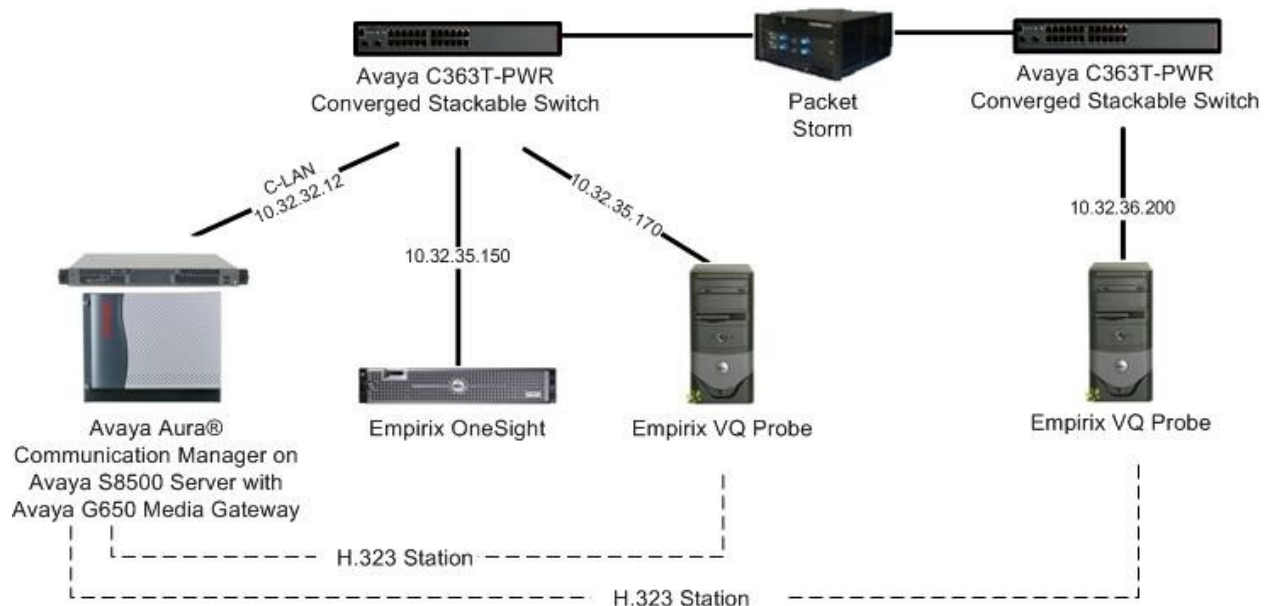
3. Equipment and Software Validated

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

Equipment	Software
Avaya Aura® Communication Manager on Avaya S8500 Server	5.2.1 (R015x.02.1.016.4-18433)
Avaya G650 Media Gateway • TN799DP C-LAN Circuit Pack	HW01 FW038
Empirix OneSight on Windows 2003 Server with Service Pack 2 • Database Server • Profile Voice Quality - Basic	7.3 SR1 Build Number 2135 Microsoft SQL Server 2005 7/8/10 10:49
Empirix VQ Probe	1.1.483

4. Configure Avaya Aura® Communication Manager

This section provides the procedures for configuring Avaya Aura® Communication Manager. The procedures include the following areas:

- Verify Communication Manager license
- Administer IP network region
- Administer IP codec set
- Administer H.323 stations

4.1. Verify Communication Manager License

Log into the System Access Terminal (SAT) to verify that the Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the "display system-parameters customer-options" command. Navigate to **Page 2**, and verify that there is sufficient remaining capacity for IP stations by comparing the **Maximum Concurrently Registered IP Stations** field value with the corresponding value in the **USED** column.

The license file installed on the system controls the maximum permitted. If there is insufficient capacity, contact an authorized Avaya sales representative to make the appropriate changes.

```
change system-parameters customer-options                      Page   2 of  11
                            OPTIONAL FEATURES

IP PORT CAPACITIES                                              USED
                     Maximum Administered H.323 Trunks: 100    6
          Maximum Concurrently Registered IP Stations: 18000  4
              Maximum Administered Remote Office Trunks: 8000   0
Maximum Concurrently Registered Remote Office Stations: 18000 0
              Maximum Concurrently Registered IP eCons: 10     0
  Max Concur Registered Unauthenticated H.323 Stations: 10     0
                  Maximum Video Capable H.323 Stations: 100    0
                  Maximum Video Capable IP Softphones: 100     0
                      Maximum Administered SIP Trunks: 100     10
   Maximum Administered Ad-hoc Video Conferencing Ports: 0      0
   Maximum Number of DS1 Boards with Echo Cancellation: 0      0
```

4.2. Administer IP Network Region

Use the "change ip-network-region n" command, where "n" is the existing network region number to be used for integration with Empirix.

Enter "yes" for **Intra-region IP-IP Direct Audio** and **Inter-region IP-IP Direct Audio**, as shown below. Make a note of the **Codec Set** number.

```
change ip-network-region 1                                    Page   1 of  20
                              IP NETWORK REGION
  Region: 1
Location:          Authoritative Domain: mproom18.com
    Name: Main
MEDIA PARAMETERS                  Intra-region IP-IP Direct Audio: yes
     Codec Set: 1                 Inter-region IP-IP Direct Audio: yes
   UDP Port Min: 2048                        IP Audio Hairpinning? y
   UDP Port Max: 65535
DIFFSERV/TOS PARAMETERS
 Call Control PHB Value: 46
       Audio PHB Value: 46
       Video PHB Value: 26
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 6
       Audio 802.1p Priority: 6
       Video 802.1p Priority: 5     AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                   RSVP Enabled? n
  H.323 Link Bounce Recovery? n
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
           Keep-Alive Count: 5
```

4.3. Administer IP Codec Set

Use the "change ip-codec-set n" command, where "n" is the existing codec set number used by the IP network region from **Section 4.2**. Enter the desired audio codec in the **Audio Codec** field, in this case "G.711MU". The compliance testing included the G.711MU and G.729 audio codec.

```
change ip-codec-set 1                                         Page   1 of   2

                        IP Codec Set

    Codec Set: 1

    Audio          Silence      Frames    Packet
    Codec          Suppression  Per Pkt   Size(ms)
 1: G.711MU            n           2         20
 2:
 3:
 4:
 5:
```

4.4. Administer H.323 Stations

Use the "add station n" command, where "n" is an available extension number. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Type:** "H.323"
- **Name:** A descriptive name.
- **Security Code:** A desired four digits security code.
- **DTMF over IP:** "in-band"

Note that Empirix OneSight Voice Quality only supports four digits security codes.

```
add station 65771                                              Page   1 of   4
                               STATION

Extension: 65771                        Lock Messages? n            BCC: 0
     Type: H.323                        Security Code: 5771          TN: 1
     Port: IP                         Coverage Path 1:              COR: 1
     Name: Empirix VQProbe1           Coverage Path 2:              COS: 1
                                      Hunt-to Station:            Tests? y
STATION OPTIONS
                                         Time of Day Lock Table:
              Loss Group: 19          Message Waiting Indicator: none

                                         Authentication Required? y


         Survivable COR: internal
  Survivable Trunk Dest? y
           DTMF over IP: in-band
                                                     IP Video? N
```

Repeat the "add station n" command to add the desired number of H.323 stations. In the compliance testing, two H.323 stations were created as shown below.

```
list station 65771 count 5

                           STATIONS

Ext/         Port/   Name/                    Room/        Cv1/ COR/   Cable/
 Hunt-to     Type       Surv GK NN     Move    Data Ext    Cv2  COS TN Jack

65771        S00010  Empirix VQProbe 1                      1
             H.323                      no                  1    1
65772        S00016  Empirix VQProbe 2                      1
             H.323                      no                  1    1
```

5. Configure Empirix OneSight Voice Quality

This section provides the procedures for configuring Empirix OneSight Voice Quality. The procedures include the following areas:

- Launch web interface
- Administer VQ Probes
- Administer monitor group
- Administer monitor

5.1. Launch Web Interface

Access the OneSight web interface by using the URL "http://ip-address:8080" in an Internet browser window, where "ip-address" is the IP address of the OneSight server. Log in using the appropriate credentials.

In the subsequent screen, select **Configure** from the top menu.
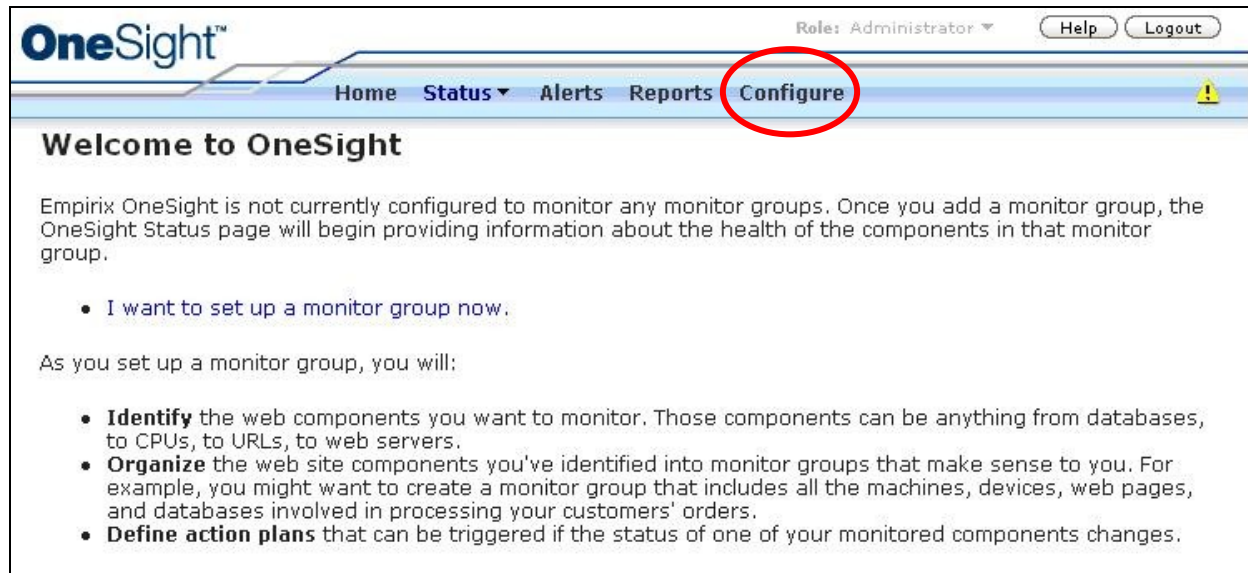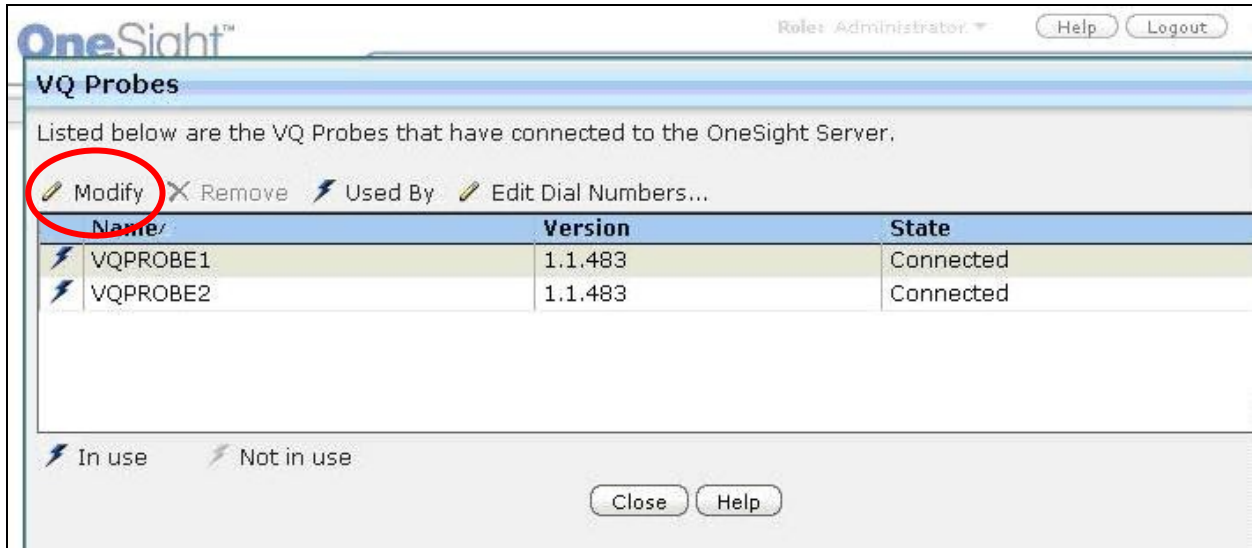
The **Configuring OneSight** screen is displayed. Select **Monitoring Environment > VQ Probes** from the left pane.
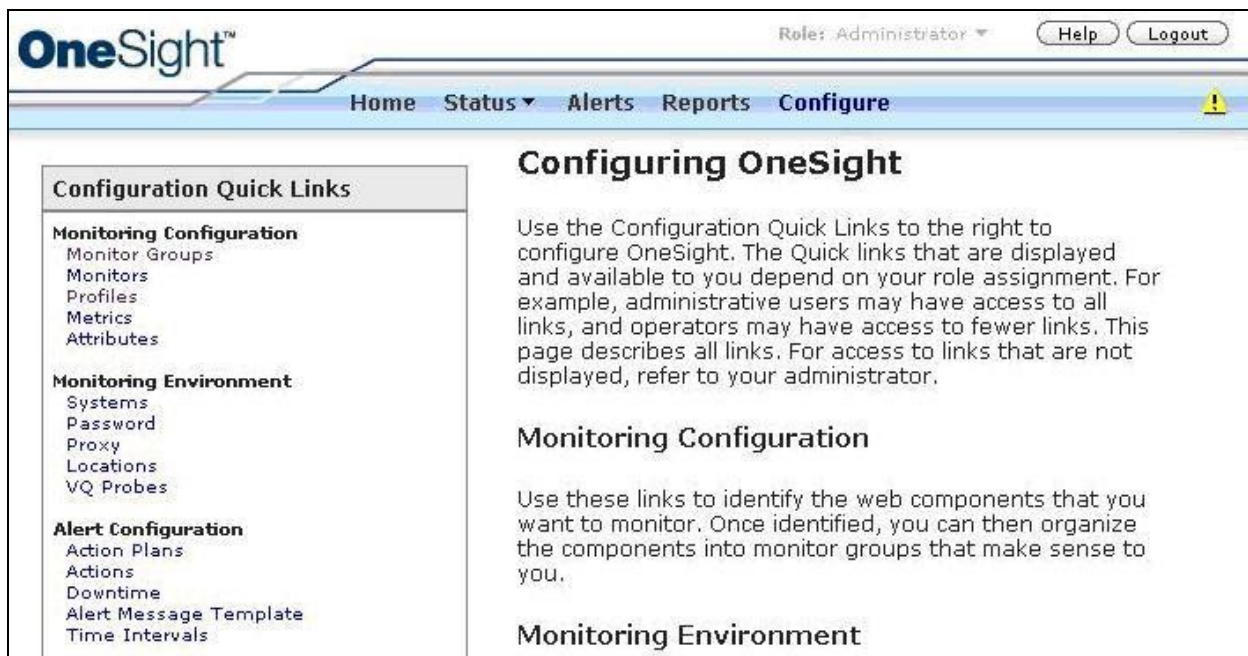
5.2. Administer VQ Probes

The **VQ Probes** screen is displayed, and shows the two VQ Probes clients that were automatically connected to the server. Note that the hostname and IP address of the OneSight server was configured as part of the VQ Probes client installation, which allowed for the automatic connections. In the screen shown below, "VQPROBE1" and "VQPROBE2" are the name of the VQ Probes clients, which were also configured as part of the client installation.
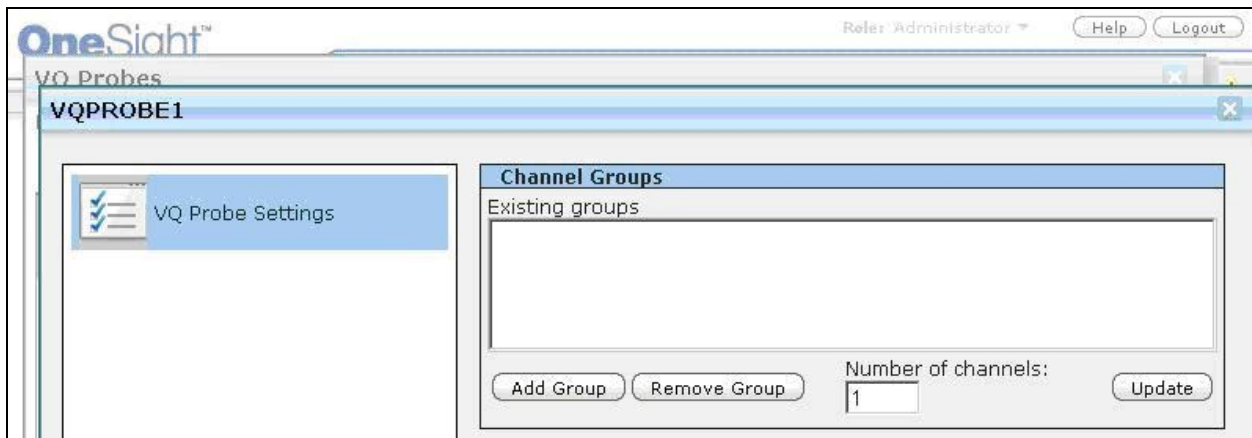
Select the first client entry, and click **Modify**.

The **VQPROBE1** screen is displayed, Click **Add Group**.

The **VQPROBE1** screen is updated with one channel showing in the left pane. Click on **Channel 1** in the left pane, to display additional parameters in the right pane. Configure the parameters as shown in the screenshot below, and retain the default values in the remaining fields.

- **IP Address:** The applicable local IP address of the VQ Probe client PC.
- **Extension:** A station extension number from **Section 4.4**.
- **Codec:** The audio codec from **Section 4.3**.
- **Interpacket Delay:** The audio codec packet size from **Section 4.3**.
- **PBX:** The CLAN IP address for station registration from **Section 2**.
- **Security Code:** The station security code from **Section 4.4**.

Repeat this section to configure all connected VQ Probes.

5.3. Administer Monitor Group

From the **Configuring OneSight** screen shown in **Section 5.1**, select **Monitoring Configuration > Monitor Groups** from the left pane to display the **Monitor Groups** screen. Click **Add** to create a new monitor group.

The **Monitor Group Editor** screen is displayed next. Enter desired **Name** and **Description**, and click **Add New**.
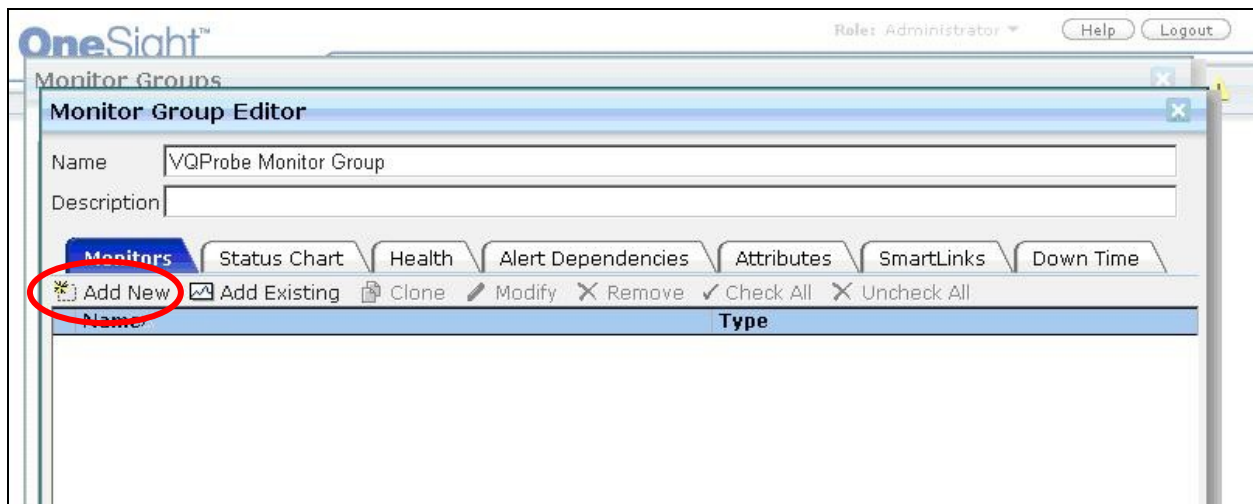
5.4. Administer Monitor

The **Add Monitor** screen is displayed. Select **Profiles > OneSight Voice Quality - Basic** from the left pane.

Select the **General** tab in the right pane. Select the appropriate **Originate Probe**, **Originate Extension**, **Answer Probe**, and **Answer Extension** as shown below, and the **Monitor Name** will be updated by the system accordingly. Set the desired interval between the samples in the **Sample Every** field.

6. General Test Approach and Test Results

The feature test cases were performed both automatically and manually. The Empirix OneSight server automatically launched the script for the bi-directional calls on a regular configurable interval. The Packet Storm was used to inject VoIP impairments into the network. The reported voice quality by the Empirix OneSight server was compared to the injected impairment by the Packet Storm.

The serviceability test cases were performed manually by disconnecting/reconnecting the Ethernet cables to the Empirix OneSight server, and to each of the VQ Probe clients.

All test cases were executed. The following were the observations on Empirix OneSight Voice Quality from the compliance testing.

- The OneSight server only supports four digits security codes for the emulated H.323 stations.

- Total received packets may differ slightly from the total transmitted packets due to packets being sent for audio silence.

- The injected delay and jitter impacted the average round trip time and not the PESQ score.

- When the injected delay is 100ms or more, then the samples may not always complete successfully.

- After a link recovery on the OneSight server, the first couple of reported samples will fail.

- After a link recovery on the VQ Probe client, a manual reboot of the client machine is required.

7. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Aura® Communication Manager and Empirix OneSight Voice Quality.

7.1. Verify Avaya Aura® Communication Manager

From the SAT interface, verify the registration of the H.323 stations by using the "list registered-ip-stations" command. Verify that all H.323 stations from **Section 4.4** are registered, as shown below.

```
list registered-ip-stations

                        REGISTERED IP STATIONS

Station Ext    Set Type/ Prod ID/   TCP Station IP Address/
or Orig Port   Net Rgn   Release    Skt Gatekeeper IP Address
------------- --------- ---------- --- ---------------------------------------
65771         H.323                y  10.32.36.200
              1         0.0000        10.32.32.12
65772         H.323                y  10.32.35.170
              1         0.0000        10.32.32.12
```

7.2. Verify Empirix OneSight Voice Quality

From the **Configuring OneSight** screen shown in **Section 5.1**, select **Status > General** from the top menu to display the monitors. Select **VQProbe Monitor Group**.

The **VQProbe Monitor Group** screen is displayed. Expand on **OneSight Voice Quality Transaction**, and verify that the reported voice quality values are appropriate for the last sample.

8. Conclusion

These Application Notes describe the configuration steps required Empirix OneSight Voice Quality to successfully interoperate with Avaya Aura® Communication Manager 5.2.1. All feature and serviceability test cases were completed.

9. Additional References

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

1. *Administrator Guide for Avaya Aura*^{TM} *Communication Manager*, Document 03-300509, Issue 5.0, Release 5.2, May 2009, available at http://support.avaya.com.

2. *Empirix OneSight Administrator Guide,* Version 7.3, available upon request from Empirix technical support.

3. *Empirix OneSight Operator Guide,* Version 7.3, available upon request from Empirix technical support.

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