



Intelepeer SIP Trunking: Connecting Cisco Unified Communications Manager 9.1 via the Cisco Unified Border Element 10.0 using SIP TLS

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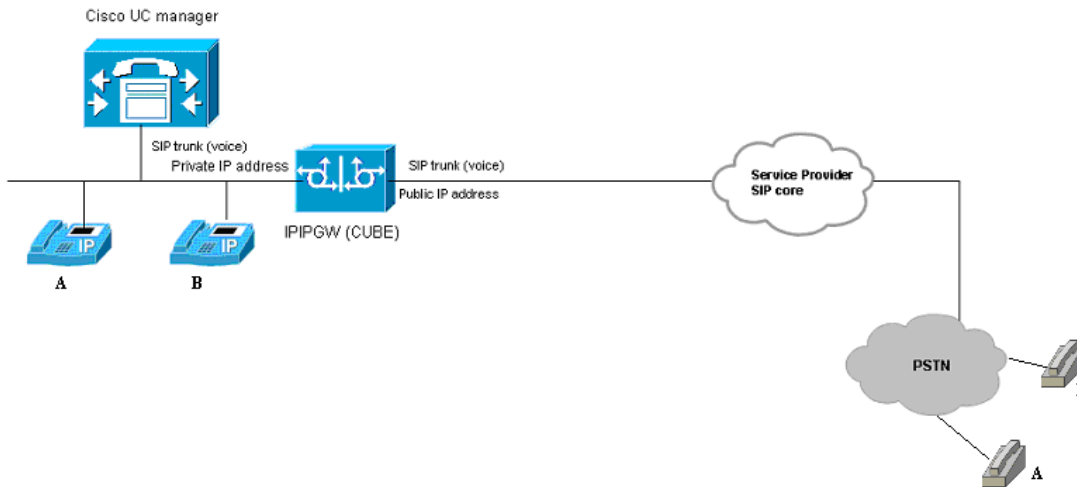
Introduction

Service Providers today, such as Intelepeer, are offering alternative methods to connect to the PSTN via their IP network. Most of these services utilize SIP as the primary signaling method and a centralized IP to TDM gateway to provide on-net and off-net services. Intelepeer Sip trunking is a SP offering that allows connection to the PSTN and may offer the end customer a viable alternative to traditional PSTN connectivity via either Analog or T1 lines. A demarcation device between these services and customer owned services is recommended. The Cisco Unified Border Element provides demarcation, security, interworking and session management services.

- This application note describes how to configure a Cisco Unified Communications Manager (CUCM) 9.1 with a Cisco Unified Border Element (CUBE) for connectivity to Intelepeer SIP trunk service. The deployment model covered in this application note is CPE Cube to PSTN. This document does not address 911 emergency outbound calls. For 911 feature service details contact Intelepeer, directly.
- Testing was performed in accordance to Service provider test plan and all features were verified. Key features verified are:
 - Basic Calls
 - Basic Calls with Calling Name and Number as allowed or restricted
 - DTMF Relay
 - Call Conference (Intra-site, PSTN)
 - Call Transfer (Blind, Attended, Early Attended)
 - Hold and Resume
 - Voice Mail
 - T.38 FAX G3/SG3
 - Simultaneous Calls
 - Auto Attendant
 - International calls
 - G.711 FAX G3/SG3
 - Call Forwarding - Find Me (Unconditional, Busy, No Reply)
 - Codec negotiation
 - Dial Plans
- The Cisco Unified Border Element configuration detailed in this document is based on a lab environment with a simple dial-plan used to ensure proper interoperability between Intelepeer network and Cisco Unified Communications. The configuration described in this document details the important commands to have enabled for interoperability to be successful and care must be taken, by the network administrator deploying CUBE, to ensure these commands are set per each dial-peer requiring interoperating to Intelepeer SIP network.
- This application note does not cover the use of Calling Search Spaces (CSS) or Partitions on Cisco Unified Communications Manager. To understand and learn how to apply CSS and Partitions refer to the cisco.com link below:
http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/admin/6_0_1/ccmsys/a03ptcss.html

Network Topology

Figure 1. Basic Call Setup



System Components

Hardware Components

- Cisco IP Phones. This solution was tested with 7965 and 7941 phones, but any Cisco IP Phone model Supporting RFC2833 can be used.
- Canon MF4500w Series FAX machine for Fax testing.
- Cisco CISCO3945-CHASSIS (revision 1.0) with C3900-SPE250/K9 with 1787904K/309248 bytes of memory. Processor board ID FTX1541A032.
- 4 Gigabit Ethernet interfaces. 1 Virtual Private Network (VPN) Module. 4 Voice FXS interfaces.

Software Requirements

- Cisco Unified Call Manager with version: 9.1.1.20000-5.
- System Bootstrap, Version 15.1(1r) T4, RELEASE SOFTWARE (fc1). This solution was tested with Cisco IOS image file is "flash:c3900e-universalk9-mz.SPA.154-1.T.bin"
- Cisco Unity Express is an integrated Cisco IOS software application that requires a separate UNITY feature license to implement voicemail and other messaging features. This solution was tested with Cisco Unity Express version



Features

Features Supported

- Basic Calls
- Basic Calls with Calling Name and Number as allowed or restricted
- DTMF Relay
- Call Conference (Intra-site, PSTN)
- Call Transfer (Blind, Attended, Early Attended)
- Hold and Resume
- Voice Mail
- T.38 FAX G3/SG3
- Simultaneous Calls
- Auto Attendant
- International calls
- G.711 FAX G3/SG3
- Call Forwarding - Find Me (Unconditional, Busy, No Reply)
- Codec negotiation
- Dial Plans
- PRACK with SDP early-media cut-through

Features Not Supported

NIL



Caveats

NIL

Configuration

Configuring Cisco Unified Border Element (CUBE)

Cisco IOS Software, C3900e Software (C3900e-UNIVERSALK9-M), Version 15.4(1)T, RELEASE SOFTWARE (fc2)

Technical Support: <http://www.cisco.com/techsupport>

Copyright (c) 1986-2013 by Cisco Systems, Inc.

Compiled Fri 22-Nov-13 18:44 by prod_rel_team

ROM: System Bootstrap, Version 15.1(1r)T4, RELEASE SOFTWARE (fc1)

mediasense_cube uptime is 1 week, 4 days, 10 hours, 22 minutes
System returned to ROM by power-on
System restarted at 22:00:12 UTC Wed Feb 12 2014
System image file is "flash:c3900e-universalk9-mz.SPA.154-1.T.bin"
Last reload type: Normal Reload
Last reload reason: power-on

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

Cisco CISCO3945-CHASSIS (revision 1.0) with C3900-SPE250/K9 with 1787904K/309248K bytes of memory.

Processor board ID FTX1541A032

4 Gigabit Ethernet interfaces

1 Virtual Private Network (VPN) Module

4 Voice FXS interfaces

DRAM configuration is 72 bits wide with parity enabled.

256K bytes of non-volatile configuration memory.

500472K bytes of ATA System CompactFlash 0 (Read/Write)

License Info:

License UDI:



Enter the base 64 encoded CA certificate.
End with a blank line or the word "quit" on a line by itself

```
-----BEGIN CERTIFICATE-----
MIIDgzCCAmugAwIBAgIQMmFgzydo4Z9D11loAm3UEzANBgkqhkiG9w0BAQUFADBUMRUwEwYKCCZlmiZPyLQGQBGRYFbG9jYWwHTAbBgoJkiaJk/IsZAEZFg1seW5jbGFi
a20yMDEzMDEzMRwwGgYDVQDEzNseW5jbGFia20yMDEzLURDLUNBMB4XDTEzMDExNDIx
NTIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIz
GwYKCCZlmiZPyLQGQBGRYNbnHluY2xhYmttMjAxMzEzMDExNDIzMDExNDIzMDExNDIz
MjAxMzEzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDExNDIzMDEx
ekGwExUA/7e9rNsxZQzKkEhRgB4oCBB1tPenvuDJwrxtazF4+qRVC03+2wmsrXon
/p+Wch9VPrKd6afTorb52Q35ugGCOzzkxehYi6Vxep4Q9E4lKmk1TVlBExSq/eUs
06MjzP4upQU4+k7hg3Zb2NqNT752d/Wvf7kVF8ctP09vkyRVE/W1qyd0FPM4jT71
/zptPRvk0xox9hrULHtO4BcGU9YHyXZfclKaL/iQHJRjgC0nz6S0CO+7AqGR
eWn9EPJ06TBD4/vSPlusYk4Ei9I2VXvS4vBtecvq/P3OqHt/7Dd6NBaFwLqnJ0T9
n9ev0tyWaj/dVokCAwEAaANRME8CwYDVR0PBAQDAgGGA8GA1UdEwEB/wQFMAMB
A8wHQYDVR0OBBYEFef2I3+c29hHg4X4eXQj8a3ALaQ6MBAGCSGAQQBgicVAQQD
AgEAMAOGCSqGSIb3DQEBBQUAA4IBAQCf1TW6uy85pUBdwbL+9Wl1zWgdrTVK56Vj
5FHGCcJyx0f/o+2n8WsfRf5KY635GeYAHs2XtQWM8CnGz3diB7G8GsXffMxzp1rU
Pq7TuSpG+CtvHeYkewEitPZYElAE52XPY71GjRgESbxqOxoKHOiMajFl3y+yj13U2
```

```
ih/sULDydad1DAT1QqP+n7p2VMlg8vRnrveJMW1FIwMtDVfxyqH9aOyxYcrZlaC
s88pgpRpsGLTrkYHvsbiiJkKu3kDRu/8Q1KDbWtuz2Y1nX+TA4sEnEjZ2l7ary61
eleSqXwCNNXG6BeiQ9s/5Vw1F3BIH9IS/afAoc8u77nnVgXkLzsr
```

-----END CERTIFICATE-----

quit

Certificate has the following attributes:

Fingerprint MD5: 4AE95DDB F3C127C1 5E96BBF8 F240FAF4
Fingerprint SHA1: 2A1D9421 9ADB61E5 F5101D54 FA498B95 4E3A0D6B

% Do you accept this certificate? [yes/no]: yes

Trustpoint CA certificate accepted.

% **Certificate successfully imported**

```
cube(config)# crypto pki import tekvlabsCA certificate2
```

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

```
-----BEGIN CERTIFICATE-----
MIIFMDCCBBigAwIBAgIQKQfirwAAAAAADjANBgkqhkiG9w0BAQUFADBUMRUwEwYK
CZlmiZPyLQGQBGRYFbG9jYWwHTAbBgoJkiaJk/IsZAEZFg1seW5jbGFi20yMDEz
MRwwGgYDVQDEzNseW5jbGFia20yMDEzLURDLUNBMB4XDTEzMDExNDIxMDExNDIz
DTE1MDEyOTE4MjQ1MVoWZlEhMB8GA1UEAxMY3ViZS5seW5jbGFi20yMDEzLmxv
Y2FsMIIlJANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAIMQ2E8N95B0f3OZ9
gIKlwAwL6D5iX+u54VxnVAVm+H5RWhACFlp7Cmnq1t1Q29U81NQwkREuCWEMtelu
K0xTjF92MfZTA7lrHwb/SayXOQWmE+iwOOokfryZ/+dFdCOBXGn0f5OiQgRjCjg
y/2XAc+6iV1c8KvdcZx9yovRFxu57Wfd374X8klitQzvmu+H1jhaUKbPtWTSvfMgp
SQ30YVJ+LozXNjVTH6yx+jp170/xVE2VAzoSkrD8LIMZtdQX5C23FpelQn/Lutt
32mkXi72gaKEaH0jx3obnyay1CoxSPsz+xjIEoqfVBWxhk/byqIpAnoEX2oNZC+r
S5aRKwIDAQABo4ICMzCCAi8wDgYDVR0PAQH/BAQDAgWgMBOGA1UdDgQWBBSvjDFo
Tye8yVwiwAjaPnlQ8YmkTAFbGNVHSMEGDAWgBRH9iN/nNvYR40F+HI0l/GtwC2k
OjCB1AYDVR0fBIHMIIHJMIHGoIHDoIHAHoG9bGRhcDovLy9DjTj1seW5jbGFi20y
MDEzLURDLUNBLENOPWRjLENOPUNEUCxDtj1QdWJsaWMIMjBLZXkIMjBTZXJ2aWNl
cyxDtj1TZXJ2aWNlcyxDtj1Db25maWd1cmF0aW9uLERDPWx5bmnNsYwJrbTlWMTMs
REM9bG9jYWw/2VydGlmawWnhdGV5ZS5yZ2F0aW9uTGldD9iYXNIP29iamVjdENs
YXNzPWNSTERpc3RyaWJ1dG1vblBvaW50MIHNBgggrBgEFBQcBAQSBwDCBvTCBugYI
KwYBBQUHMAKGga1sZGFwOi8vL0NOPWx5bmnNsYwJrbTlWMTMtREmTQ0EsQ049QU1B
LENOPVB1YmtpYUyYUyMEtleSUyMFNlcnZpY2VzLENOPVNIcnZpY2VzLENOPUNvbmZp
Z3VyYXRpb24sREM9bHluY2xhYmttMjAxMzEzMDExNDIzMDExNDIzMDExNDIzMDEx
P2Jhc2U/b2JqZWNOQ2xhc3M9Y2VydGlmawWnhdG1vbkF1dGhvcml0eTAhBgkrBgEE
AY13FAIEFB4S4FAcAZQBIAFMAZQBIAHYAZQBIBMBMGAIUdJQQMMMAoGCCGAQUFBwMB
MAOGCSqGSIb3DQEBBQUAA4IBAQC526KjKm1hgN+KPka3+ByagQCRY0FNDxXbtWr
CCDSFNgd5UzF8c4btu7zbZQ0JpdH0/BFOTY1PVEEQEE9TcY//8AJYs+cPSFedGzx
8LWgaUV16HWnoibAxJCSsgOxXq4IUweaZmLEwFmQ5xnIADPy/vrmYjC7vkeiO+S
```

² insert the content of **CA.cer** file generated on section 3.2



```
KlmEo/cZjD1oIHOLzs4UYUs0nBVqKPW4fqAXpCDJ+n3j7IUAdWikwd3OTrA7GgT/  
cp3PHDS0vmKIOLS8zBVdvLRjgbtmsMatp+V52qmBqYHCV1fw4MtaUNFqDwFxyzbB  
6O6YsDS036zDVFJgJmf0KSIMoCS886lEXoXPkJSxSrIIGXR3  
-----END CERTIFICATE-----
```

```
quit  
% Router Certificate successfully imported
```

Partner Certificate import :

```
crypto pki trustpoint intelepeerCA  
enrollment terminal pem  
revocation-check none
```

Create trust point first, from the saved path(partner certificate) import to the cube by the following way :

```
cube(config)#crypto pki import intelepeerCA pem url ftp:ip-details/iPeerRootCA password 123456  
% Importing CA certificate...
```

```
Address or name of remote host [10.85.0.50]?  
Source filename [iPeerRootCA.ca]? iPeerRootCA.pem  
Reading file from ftp://cisco@10.85.0.50/iPeerRootCA.pem  
Loading iPeerRootCA.pem !  
[OK - 2484/4096 bytes]
```

```
% Importing private General Purpose key PEM file...  
Address or name of remote host [10.85.0.50]?  
Source filename [iPeerRootCA.pem.prv]? iPeerRootCA.pem.prv
```

Once the above steps are completed, the partner certificate will be installed successfully.

```
cube(config)#  
cube(config)# sip-ua  
cube(config-sip-ua)# crypto signaling remote-addr 68.68.123.103 255.255.255.255 trustpoint intelepeerCA  
cube(config-sip-ua)# exit
```

```
cube(config)# dial-peer voice 11 voip  
cube(config-dial-peer)# session transport tcp  
cube(config-dial-peer)# voice-class codec 1  
cube(config-dial-peer)#
```

```
cube(config-dial-peer)# dial-peer voice 16 voip  
cube(config-dial-peer)# session transport tcp tls  
cube(config-dial-peer)# voice-class codec 1  
cube(config-dial-peer)# SRTP  
cube(config)# dial-peer voice 12 voip  
cube(config-dial-peer)# session transport tcp  
cube(config-dial-peer)# voice-class codec 1  
cube(config-dial-peer)#
```

```
cube(config-dial-peer)# dial-peer voice 13 voip  
cube(config-dial-peer)# session transport tcp tls  
cube(config-dial-peer)# voice-class codec 1  
cube(config-dial-peer)# srtp
```

```
cube(config)# sccp ccm 10.70.18.2 identifier 1 version 7.0+  
cube(config)# sccp ccm group 1  
cube(config-sccp-ccm)# associate ccm 1 prio  
cube(config-sccp-ccm)# associate ccm 1 priority 1
```




```
cube(config-sccp-ccm)# associate profile 2 register SCCPTLS
cube(config-sccp-ccm)# exit
```

```
cube(config)# dspfarm profile 1 transcode universal security
cube(config-dspfarm-profile)# trustpoint intelepeerCA
cube(config-dspfarm-profile)# maximum sessions 4
cube(config-dspfarm-profile)# no codec g711alaw
cube(config-dspfarm-profile)# no codec g729ar8
cube(config-dspfarm-profile)# no codec g729abr8
cube(config-dspfarm-profile)# associate application sccp
cube(config-dspfarm-profile)# no shutdown
cube(config-dspfarm-profile)# exit
```

```
cube(config)#telephony-service
cube(config-telephony)#sdspfarm tag 1 SCCPTLS
cube(config-telephony)#secure-signaling trustpoint intelepeerCA
cube(config-telephony)#no shut
cube(config-telephony)#exit
```

```
cube(config)#no sccp
cube(config)#sccp
```

CUBE RUNNING CONFIGURATION.

```
cube#show running-config
```

```
Building configuration...
```

```
Current configuration : 24124 bytes
!
! Last configuration change at 22:15:39 UTC Fri Feb 14 2014 by administrator
! NVRAM config last updated at 22:08:44 UTC Fri Feb 14 2014 by administrator
!
version 15.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mediasense_cube
!
boot-start-marker
boot system flash:c3900e-universalk9-mz.SPA.154-1.T.bin
boot system flash c3900e-universalk9-mz.SPA.153-3.M.bin
boot-end-marker
!
aqm-register-fnf
!
logging buffered 51200 warnings
enable secret 5 $1$lbTj$25nxZBh5UBjnxOrx9aRvn/
!
no aaa new-model
!
!
!
```



```
ip domain name tekvizionlabs.com
ip name-server 10.85.0.12
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
crypto pki trustpoint tekvlabsCA
enrollment terminal
serial-number
fqdn cube.tekvizionlabs.com
subject-name CN=cube.tekvizionlabs.com
revocation-check none
rsakeypair tekvLabsKey
!
crypto pki trustpoint intelepeerCA
enrollment terminal pem
revocation-check none
!
crypto pki trustpoint intelepeerCRL
revocation-check none
!
!
crypto pki certificate chain tekvlabsCA
certificate 422D3C83000000000058
30820530 30820418 A0030201 02020A42 2D3C8300 00000000 58300D06 092A8648
86F70D01 01050500 30543113 3011060A 09922689 93F22C64 01191603 636F6D31
1D301B06 0A099226 8993F22C 64011916 0D74656B 76697A69 6F6E6C61 6273311E
301C0603 55040313 1574656B 76697A69 6F6E6C61 62732D44 4330312D 4341301E
170D3133 30383135 32323238 30355A17 0D313530 38313532 32323830 355A3021
311F301D 06035504 03131663 7562652E 74656B76 697A696F 6E6C6162 732E636F
6D308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201 0A028201
0100C233 866BC01B 5B861E94 2E048C51 4A6F5059 184E8BC1 00D2E0F7 36F10542
3E3496AE 68911635 9C2A83C3 C21262EC E32578C9 9E355320 A0160A71 BB863E16
0A2E95EB BFEF47EA 356BEA95 6C1817AD 1109DC0A 98E44460 81F203E2 56C8EE09
7A58DD8A 281C8DA1 3247E7A9 C3ED262A 87602E2F 104D6C47 A4133F0F 4902DD07
CB8B8499 2E451844 4536DA99 962DB06C CC502E7E 1ED9F13E B2CD939F 8E0E7BB4
5068E5F2 A09FBEFF 1253B1EF 720E0D48 3E7905E3 5C581676 F58C11CB 8D62A1FC
68C4C46C 6B513058 E6E219A6 5B255542 1F110431 E414E470 108EB659 BDBE2588
9ACAA925 C1F3E624 6E8003E1 76FCA2F9 4C1D590A 716FC227 37202277 E6419B3A
150B0203 010001A3 82023530 82023130 0E060355 1D0F0101 FF040403 0205A030
1D060355 1D0E0416 0414D24F 267D2618 96A50F45 951B81D2 B0587682 F7F6301F
0603551D 23041830 168014A4 C4A09BB6 E94357E6 417AED87 0B711392 76D23D30
81D60603 551D1F04 81CE3081 CB3081C8 A081C5A0 81C28681 BF6C6461 703A2F2F
2F434E3D 74656B76 697A696F 6E6C6162 732D4443 30312D43 412C434E 3D646330
312C434E 3D434450 2C434E3D 5075626C 69632532 304B6579 25323053 65727669
6365732C 434E3D53 65727669 6365732C 434E3D43 6F6E6669 67757261 74696F6E
2C44433D 74656B76 697A696F 6E6C6162 732C4443 3D636F6D 3F636572 74696669
63617465 5265766F 63617469 6F6E4C69 73743F62 6173653F 6F626A65 6374436C
6173733D 63524C44 69737472 69627574 696F6E50 6F696E74 3081CD06 082B0601
05050701 010481C0 3081BD30 81BA0608 2B060105 05073002 8681AD6C 6461703A
2F2F2F43 4E3D7465 6B76697A 696F6E6C 6162732D 44433031 2D43412C 434E3D41
49412C43 4E3D5075 626C6963 2532304B 65792532 30536572 76696365 732C434E
3D536572 76696365 732C434E 3D436F6E 66696775 72617469 6F6E2C44 433D7465
6B76697A 696F6E6C 6162732C 44433D63 6F6D3F63 41436572 74696669 63617465
3F626173 653F6F62 6A656374 436C6173 733D6365 72746966 69636174 696F6E41
7574686F 72697479 30210609 2B060104 01823714 0204141E 12005700 65006200
53006500 72007600 65007230 13060355 1D25040C 300A0608 2B060105 05070301
300D0609 2A864886 F70D0101 05050003 82010100 94C0E854 F88E5D6C 9201B4BA
```



```
C516E0E2 48D7E643 5DDAE332 7167279F 2D4F521C OCA9FC32 6649305F 0D516A5B
256DE331 0D1AD8C7 57F30B09 6D71E88B 62AF96D9 380C6662 5FC3B1D0 79FB9EA6
2558BE2A 90DD36B9 524F3300 EED12C8B 2723A198 079D700B 263B5292 477D4551
9A489DD3 6F26D34C 07AC359A 92108E23 F4B08C96 184A2034 428A5C10 2959C82C
093E7850 67AD51CD B3A9342C AA38CA9F 468CBFFD 6500E9C4 6D78EEB5 3BD01CF9
505737DB E629CCF6 07DB6481 9AD42603 3B84AB24 CF6615E5 F06E643E EC3D4923
C373A9DE 2EC61D09 5A68324C 1780F427 F847F19E 2589622F 85504F51 8218BEF8
9A4E6099 96D8C7F6 44B260D7 F36E837C 6BA50851
```

quit

```
certificate ca 537922D613E09AB84A1B351D230F2907
```

```
30820383 3082026B A0030201 02021053 7922D613 E09AB84A 1B351D23 0F290730
0D06092A 864886F7 0D010105 05003054 31133011 060A0992 268993F2 2C640119
1603636F 6D311D30 1B060A09 92268993 F22C6401 19160D74 656B7669 7A696F6E
6C616273 311E301C 06035504 03131574 656B7669 7A696F6E 6C616273 2D444330
312D4341 301E170D 31313036 32333230 35333230 5A170D31 36303632 33323130
3332305A 30543113 3011060A 09922689 93F22C64 01191603 636F6D31 1D301B06
0A099226 8993F22C 64011916 0D74656B 76697A69 6F6E6C61 6273311E 301C0603
55040313 1574656B 76697A69 6F6E6C61 62732D44 4330312D 43413082 0122300D
06092A86 4886F70D 01010105 00038201 0F003082 010A0282 010100C4 OCA65BAF
08C7D6DB 3DDD8826 96B5806E BB5B549C 3619DA81 EE303B3A 7C8D45E3 8853363F
D67CD550 0FC0D4AC 346118CA 960984F1 D936B83D AEC5EE8E A864F48F BB847D59
4381DACD E2FDA6AA B3FDB5AB C276C7FA 85CDFA7B 85D1113B 781757EC 1728E78E
F6C9BC5D DBD18E72 296627F3 ACB8F74C EADCBA80 82C8DDF0 750649F2 88CA3745
E3D762D5 F2C419A2 D605ACC1 BE28E1D2 2DD4B60C 83D13B30 B47AC474 0D51E28B
C4DFB36E 29AE2F93 C0D98D01 9051474F A2960198 248E535D 39BCEA9A 993735A7
98961118 3BBB1BC9 8950107F 6F888AEA 46154BC1 24B99D15 446E3DF9 1662436B
D5D43A53 B13A08C4 8DE61E5D B37CA1C9 1534869D F75854B3 F6A4E302 03010001
A351304F 300B0603 551D0F04 04030201 86300F06 03551D13 0101FF04 05300301
01FF301D 0603551D 0E041604 14A4C4A0 9BB6E943 57E6417A ED870B71 139276D2
3D301006 092B0601 04018237 15010403 02010030 0D06092A 864886F7 0D010105
05000382 01010053 998E6BF0 0C94B646 0B979B91 F26BC7AE F1D1DA61 3529C764
5257E4F4 2C630AF9 DC2F1C0D 9350A476 1E38657E 03150C5B 73043741 4CD255E8
00C9C9E1 9BAFED72 23438C07 E9665DD9 08971672 812A3F8A D280BD1A B127EA9B
B654AC01 AEA5477E E0530437 1CBCF7E4 6AAD455C 89E72D3E AAC6A7EB 07689F6C
2AD9DEAD A2557CF1 92E47FC1 BA54D96D 3D5504E5 E48475CB 54D92405 6FE5CAD2
A3E5D702 E610B9F6 59C3BFF8 25C10CC1 5DAEF612 CB7EB0BE 56546096 D82328AC
9A324FF4 72DAB37E 7B541BE8 84CC399A 7657412F 3AB4EBC0 D114533D 3CD9B50B
F1667858 AFEAB8FE 929546F5 CAC0D953 F1C02EF5 3059E69F 73B1CBC1 94F9CEEF
F8970D04 D5125E
```

quit

```
crypto pki certificate chain intepeerCA
```

```
certificate ca 00B76D9BC9CB06C863
```

```
308206FD 308204E5 A0030201 02020900 B76D9BC9 CB06C863 300D0609 2A864886
F70D0101 05050030 81A5310B 30090603 55040613 02555331 0B300906 03550408
1302434F 310F300D 06035504 07130644 656E7665 72311330 11060355 040A130A
496E7465 6C655065 65723114 30120603 55040B13 0B456E67 696E6565 72696E67
3121301F 06035504 03131849 6E74656C 65506565 72205543 53495020 526F6F74
20434131 2A302806 092A8648 86F70D01 0901161B 646C2D75 6E697861 646D696E
40696E74 656C6570 6565722E 636F6D30 1E170D31 32313130 31313734 3534365A
170D3232 31303330 31373435 34365A30 81A5310B 30090603 55040613 02555331
0B300906 03550408 1302434F 310F300D 06035504 07130644 656E7665 72311330
11060355 040A130A 496E7465 6C655065 65723114 30120603 55040B13 0B456E67
696E6565 72696E67 3121301F 06035504 03131849 6E74656C 65506565 72205543
53495020 526F6F74 20434131 2A302806 092A8648 86F70D01 0901161B 646C2D75
6E697861 646D696E 40696E74 656C6570 6565722E 636F6D30 82022230 0D06092A
864886F7 0D010101 0500382 020F0030 82020A02 82020100 F364F68D D73AF745
0EF22B45 CE9BD585 6B055C2B A806D224 3A5458BB 7D0B2DA0 73097D5F 3D4856B3
5E656D31 2FB9022D 845639B8 8D18EBCC 798EBB48 6969BB12 0A57ED04 CBDBBC2D
3D10DD16 B5383F39 25774C94 24450258 F618D3A4 474C050F 3BD35D05 8721E7A3
```



27847B84 3E961442 61B6CD82 CFDEB72E 4FE65021 3DF61544 D7E45834 AF2241C9
E0BFA318 3465587D 8B9B3B2F AC695AFD E867B252 A8587726 03D49212 BC35C793
50D73448 4B6AED78 3182046B 51491C6C A45C37DE B09F3FA8 78D475C3 AC791E5B
74B2AF47 D023262D DD05EDC7 8C2A19BD EF1A63D7 932DE90D 3026B75F 32449E92
53DBF68E BB8A7ED3 219108F2 FB3F5351 F5DEF5DC 6EE4C8FF 4B8014FE 3A0AC28D
5C97B0D8 EEF4E8E7 0ACA92B5 C212439B C714E52B 821C4945 C2E37C3C 9D970557
210F7385 136D7509 E962AEB2 A40DAC19 7BD36527 70E2EE01 5B1A85B0 E5C63A1F
4E475A25 76927B3A B5A96ADD FA2628C6 62784552 DB143969 45CDEE72 053DD47A
61D6865D 8A8B8CCF 4930F4B1 22B3E22D 93932401 D51D2EAC A679B156 40E44E86
D6B525B2 A8701E2A EAD2C56B 629973C4 D8784647 42E9BB46 4DD08730 20662424
41D1DB63 108FB611 1F90CD2D 93B9C1B1 97146EF3 A09B8192 BF360115 BA5CC869
EA3EF7A6 EFB7FDE3 0302FC6D F64852E8 E29DF5FB 1D545DAB 262982F6 19D281D6
BD3862D5 17E698E8 EEC44DA1 A0A62C3A 12EB063D CE494D69 02030100 01A38201
2C308201 28301D06 03551D0E 04160414 9654D741 B6901882 2CDE3EA8 11FA265A
7D98494A 3081DA06 03551D23 0481D230 81CF8014 9654D741 B6901882 2CDE3EA8
11FA265A 7D98494A A181ABA4 81A83081 A5310B30 09060355 04061302 5553310B
30090603 55040813 02434F31 0F300D06 03550407 13064465 6E766572 31133011
06035504 0A130A49 6E74656C 65506565 72311430 12060355 040B130B 456E6769
6E656572 696E6731 21301F06 03550403 1318496E 74656C65 50656572 20554353
49502052 6F6F7420 4341312A 30280609 2A864886 F70D0109 01161B64 6C2D756E
69786164 6D696E40 696E7465 6C657065 65722E63 6F6D8209 00B76D9B C9CB06C8
63300F06 03551D13 0101FF04 05300301 01FF3009 0603551D 12040230 00300E06
03551D0F 0101FF04 04030201 06300D06 092A8648 86F70D01 01050500 03820201
00466914 A5AC2C80 CB9232E3 13520CF0 60625E6A EA945ACC ADC78107 834C113C
7D8DD239 DFA871D8 9EB7FFB1 9218E879 2E6FD814 47C6926E E3AD2689 1ED2A3A2
0607DAE2 03B6D405 664C3979 B1B4BF9B 122B39B0 F3075312 0EDD5C5C 2A279CE3
0FED6546 53919E9D CD7E8543 A393E148 56DBEAAF 723F0ABB C9841B07 27335830
A4377380 245F338B 43B78C7F 14251F6F E5520CB8 4F1DE41E B2F9BD8E EC3E5EFA
698A9348 BAACCAE5 03206E51 5AAA3901 6981CD62 E5CAC562 1ECA34EE A63A5E29
A3047245 4A1E865D 976B78AD E318913A 0BC81B20 B083CBD8 3BB47872 6B240425
A6ECE0FF 4F5C0EF3 27F8828E CEEFCC34 C4B12D50 BCD94AF7 93706945 8F9D2110
9038A1CA C7102EEF AB09ED2E 4679111C FFC2DC3F F35C2B6F 9F924FF9 54334A90
F428B5E4 AEF0484E 5828F7F2 67765A12 0F3C851F 8EB67F74 A9AC6E9A 733EA123
DA2E7AAB 9FD5C730 EBB034D4 B86632E4 099F6E13 338880B2 83463162 A3D02835
39279ED0 34B4F7EB 50557B22 68C01698 F544A27A 0F9DF2E7 741CE2A5 1D169134
82369F48 DF5082FC C72E31E7 CBE75C04 ADB93FA7 08D5F22A 4AED5177 84347D5D
5EED7529 01ABA555 68D61277 BBD70E83 EFEA44F0 F3BC8261 6A5C5BC9 FFEC439F
4EF5D652 EE5A8A06 6F0E1298 1C518929 F8A289A0 CE7AB080 5D2611C6 48BF8AA3
1357E934 F3FE5FFE 7F8A490B 63887056 C605FD7F A60F8284 E0F4548F 5FD6C562 5F

```
quit
crypto pki certificate chain intepeerCRL
voice-card 0
dsp services dspfarm
!
voice rtp send-recv
!
voice service voip
ip address trusted list
ipv4 0.0.0.0 0.0.0.0
address-hiding
mode border-element
allow-connections sip to sip
fax protocol pass-through g711ulaw
sip
rellxx disable
asserted-id pai
!
```



```
voice class codec 1
  codec preference 1 g711ulaw
  codec preference 2 g711alaw
!

description $ETH-LAN$$ETH-SW-LAUNCH$$INTF-INFO-GE 0/0$
ip address 97.79.185.146 255.255.255.128
duplex full
speed 100
!
interface GigabitEthernet0/1
ip address 10.70.10.15 255.255.255.0
duplex full
speed auto
!
interface GigabitEthernet0/2
no ip address
shutdown
duplex auto
speed auto
!
interface GigabitEthernet0/3
no ip address
shutdown
duplex auto
speed auto
!
ip forward-protocol nd
!
ip http server
ip http authentication local
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip route 0.0.0.0 0.0.0.0 97.79.185.129
ip route 10.0.0.0 255.0.0.0 GigabitEthernet0/1
ip route 10.64.0.0 255.255.0.0 10.70.10.1
ip route 10.70.2.0 255.255.255.0 10.70.10.1
ip route 10.70.78.0 255.255.255.0 10.70.10.1
ip route 10.71.2.0 255.255.255.0 10.70.10.1
ip route 68.68.122.0 255.255.255.0 GigabitEthernet0/0
ip route 68.68.123.0 255.255.255.0 GigabitEthernet0/0
ip route 172.16.31.0 255.255.255.0 10.70.10.1

nls resp-timeout 1
cpd cr-id 1
!
!
control-plane
!
voice-port 0/2/0
no comfort-noise
description To Dell7 97.79.185.183 laptop for fax testing - MCrane
station-id name dell7_fax
station-id number 1112223333
caller-id enable
!
```



```
voice-port 0/2/1
!
voice-port 0/2/2
!
voice-port 0/2/3
!
no mgcp package-capability res-package
no mgcp timer receive-rtcp
mgcp behavior rsip-range tgcp-only
mgcp behavior comedia-role none
mgcp behavior comedia-check-media-src disable
mgcp behavior comedia-sdp-force disable
!
mgcp profile default
!
sccp local GigabitEthernet0/1
sccp ccm 10.70.18.2 identifier 1 priority 1 version 7.0 trustpoint tekvlabsCA

sccp ccm group 1
associate ccm 1 priority 1
associate profile 1 register sccptls
!
dspfarm profile 1 transcode universal security
trustpoint tekvlabsCA
codec g711ulaw
codec g711alaw
codec g729r8
maximum sessions 4
associate application SCCP

dial-peer voice 11 voip
description CUCM to intelepeer
preference 1
no modem passthrough
session protocol sipv2
session transport tcp
incoming called-number 121424259..
voice-class codec 1
dtmf-relay rtp-nte
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
no vad
!
dial-peer voice 12 voip
description intelepeer to CUCM
preference 1
destination-pattern 72072910..
session protocol sipv2
session target ipv4:10.70.18.2:5060
session transport tcp
voice-class codec 1
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
no vad
!
```



```
dial-peer voice 13 voip
description from intelepeer to CUCM
huntstop
session protocol sipv2
session transport tcp tls
incoming called-number 72072910..
voice-class codec 1
dtmf-relay rtp-nte
srtp
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
no vad
```

```
dial-peer voice 16 voip
description CUCM to Intelepeer
preference 1
destination-pattern 121424259..
no modem passthrough
session protocol sipv2
session target sip-server
session transport tcp tls
voice-class codec 1
dtmf-relay rtp-nte
srtp
no fax-relay sg3-to-g3
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
no vad
```

```
sip-ua
retry invite 2
retry bye 2
retry cancel 2
retry register 10
```

```
sip-server dns:dal01tpr43-1.ucsip.intelepeer.com:5061
crypto signaling remote-addr 68.68.123.103 255.255.255.255 trustpoint intelepeerCA
```

```
telephony-service
secure-signaling trustpoint intelepeerCA
sdsfarm units 3
sdsfarm transcode sessions 10
sdsfarm tag 1 sccptls
max-ephones 25
max-dn 30
ip source-address 10.70.10.15 port 2000
max-conferences 8 gain -6
transfer-system full-consult
```



Acronyms

Acronym	Definitions
SIP	Session Initiation Protocol
MGCP	Media Gateway Control Protocol
SCCP	Skinny Client Control Protocol
CUCM	Cisco Unified Communications Manager
CUBE	Cisco Unified Border Element



Important Information

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Test Results


Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
1.0	CPE to PSTN: codec advertisement shall be g729 and g711ulaw, with g729 codec listed as the preferred codec		
1.1	Ringback heard on Caller phone	Pass	
1.2	Two-way voice path on call answer	Pass	
1.3	Incomplete call. When caller hangs-up before callee answers, callee phone stops ringing	Pass	
1.4	Call duration: 1 hour	Pass	
1.5	DTMF relay (both directions) (RFC2833)	Pass	
1.6	Callee disconnect; Caller disconnect automatically	Pass	
1.7	Caller disconnect; Callee disconnect automatically	Pass	

Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
2.0	PSTN to CPE: codec advertisement shall be g729 and g711ulaw, with g729 codec listed as the preferred codec		
2.1	Ringback heard on Caller phone	Pass	
2.2	Two-way voice path	Pass	
2.3	Incomplete call. When caller hangs-up before callee answers, callee phone stops ringing	Pass	
2.4	Call duration: 1 hour	Pass	
2.5	DTMF relay (both directions) (RFC2833)	Pass	
2.6	Callee disconnect; Caller disconnect automatically	Pass	
2.7	Caller disconnect; Callee disconnect automatically	Pass	

Note: Testing was conducted in TekVizion labs



 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
3.0	CPE to CPE (outbound to the PSTN and back) : codec advertisement shall be g729 and g711ulaw, with g729 codec listed as the preferred codec		
3.1	Ringback heard on Caller phone	Pass	
3.2	Two-way voice path	Pass	
3.3	Incomplete call. When caller hangs-up before callee answers, callee phone stops ringing	Pass	
3.4	Call duration: 1 hour	Pass	
3.5	DTMF relay (both directions) (RFC2833)	Pass	
3.6	Callee disconnect; Caller disconnect automatically	Pass	
3.7	Caller disconnect; Callee disconnect automatically	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling number restricted</i>
4.0	Calling number restriction		
4.1	CPE to PSTN: Set calling Number restricted	Pass	
4.2	CPE to another CPE: Set calling Number restricted	Pass	



Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
5.0	Telephone Number Support		
5.1	CPE to PSTN: CPE must translate phone extension to 10 DID calling number	Pass	
5.2	PSTN to CPE: CPE must translate 10 digits called number to phone extension.	Pass	
5.3	CPE to CPE: CPE must translate phone extension to 10 DID calling number	Pass	
5.4	CPE to CPE: CPE must translate 10 digits called number to phone extension.	Pass	
5.5	PSTN to CPE: CPE must translate 4 digits called number to phone extension.	Pass	
5.6	CPE to CPE: CPE must translate 4 digits called number to phone extension.	Pass	

Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name and connected name display</i>
6.0	Calling Name Presentation		
6.1	CPE to CPE: display name presentation allowed	Pass	

Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number update</i>
7.0	PSTN: Call Conference		
7.1	PSTN phone A to CPE phone A, CPE phone A conferences PSTN phone B	Pass	
7.2	CPE phone A to PSTN phone A, CPE phone A conferences PSTN phone B	Pass	
7.3	CPE phone A to CPE phone B, CPE phone A conferences PSTN phone B	Pass	




Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number update</i>
8.0	Intra-Site: Call Conference		
8.1	Phone A to Phone B. Phone A conferences Phone C at 2nd CPE site	Pass	
8.2	Phone A to 2 nd CPE Phone B. Phone A conferences PSTN Phone A to Phone A at 2nd CPE site. Phone A at 2 nd CPE conferences Phone B at Phone A site	Pass	
8.3	Phone A to PSTN. Phone A conferences 2 nd CPE Phone B	Pass	
8.4	Phone A at 2nd CPE site to Phone A. Phone A conferences Phone B	Pass	
8.5			

Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
9.0	Attended Call Transfer		
9.1	PSTN phone A to CPE phone A, CPE phone A transfers to PSTN phone B (does caller ID update on PSTN phone B?)	Pass	
9.2	CPE phone A to PSTN phone A, CPE phone A transfers to PSTN phone B (does caller ID update on PSTN phone B?)	Pass	
9.3	CPE Phone A to CPE Phone B. Phone A transfers to Phone A at 2nd CPE site	Pass	
9.4	CPE Phone A to CPE Phone B. CPE Phone A transfers to PSTN	Pass	
9.5	CPE Phone A to Phone A at 2nd CPE site. Phone A and 2 nd CPE transfers to Phone B at Phone A site	Pass	
9.6	CPE Phone A to PSTN. CPE Phone A transfers to CPE Phone B	Pass	
9.7	Phone A at 2nd CPE site to CPE Phone A. CPE Phone A transfers to Phone B	Pass	
9.8	PSTN to CPE Phone A. CPE Phone A transfers to CPE Phone B	Pass	


Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
10.0	Unattended Call Transfer		
10.1	PSTN phone A to CPE phone A, CPE phone A transfers to PSTN phone B	Pass	





	(does caller ID update on PSTN phone B?)		
10.2	CPE phone A to PSTN phone A, CPE phone A transfers to PSTN phone B (does caller ID update on PSTN phone B?)	Pass	
10.3	CPE Phone A to CPE Phone B. Phone A transfers to Phone A at 2nd CPE site	Pass	
10.4	CPE Phone A to CPE Phone B. CPE Phone A transfers to PSTN	Pass	
10.5	CPE Phone A to Phone A at 2nd CPE site. Phone A and 2 nd CPE transfers to Phone B at Phone A site	Pass	
10.6	CPE Phone A to PSTN. CPE Phone A transfers to CPE Phone B	Pass	
10.7	Phone A at 2nd CPE site to CPE Phone A. CPE Phone A transfers to Phone B	Pass	
10.8	PSTN to CPE Phone A. CPE Phone A transfers to CPE Phone B	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
11.0	Blind Call Transfer (applies if SIP blind transfer is supported)		
11.1	PSTN phone A to CPE phone A, CPE phone A transfers to PSTN phone B (does caller ID update on PSTN phone B?)	Pass	
11.2	CPE phone A to PSTN phone A, CPE phone A transfers to PSTN phone B (does caller ID update on PSTN phone B?)	Pass	
11.3	CPE Phone A to CPE Phone B. Phone A transfers to Phone A at 2nd CPE site	Pass	
11.4	CPE Phone A to CPE Phone B. CPE Phone A transfers to PSTN	Pass	
11.5	CPE Phone A to Phone A at 2nd CPE site. Phone A and 2 nd CPE transfers to Phone B at Phone A site	Pass	
11.6	CPE Phone A to PSTN. CPE Phone A transfers to CPE Phone B	Pass	
11.7	Phone A at 2nd CPE site to CPE Phone A. CPE Phone A transfers to Phone B	Pass	
11.8	PSTN to CPE Phone A. CPE Phone A transfers to CPE Phone B	Pass	



 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
12.0	Call Hold and Resume		Comments: call on hold is always perform on the CPE side. Note as of today, multicast MoH is not supported with CUBE.
12.1	CPE calls to PSTN (unicast MoH is enabled). Was MoH heard?	Pass	
12.2	CPE calls to CPE (unicast MoH is enabled). Was MoH heard?	Pass	
12.3	PSTN calls to CPE (unicast MoH is enabled). Was MoH heard?	Pass	
12.4	CPE calls to PSTN (unicast MoH is disabled). Was ToH heard?	Pass	
12.5	CPE calls to CPE (unicast MoH is disabled). Was ToH heard?	Pass	
12.6	PSTN calls to CPE (unicast MoH is disabled). Was ToH heard??	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
13.0	Voice Mail (e.g. using Unity or Unity Connection)		
13.1	PSTN to CPE: leave voice mail	Pass	
13.2	PSTN to CPE: retrieve voice mail	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
14.0	PSTN Voice Mail (e.g. using mobile phone voicemail)		
14.1	CPE to PSTN (mobile VM): leave voice mail	Pass	
14.2	CPE to PSTN (mobile VM): retrieve voice mail	Pass	



Test Case Details

Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
15.0	Find Me (Call Forward Unconditionally)		
15.1	PSTN to CPE enabled call forward unconditionally feature	Pass	
15.2	CPE to CPE enabled call forward unconditionally feature	Pass	
15.3	PSTN to CPE phone A enabled call forward unconditionally feature to PSTN	Pass	
15.4	CPE to CPE phone A enabled call forward unconditionally feature to PSTN	Pass	


Test Case Details


Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
16.0	T.38 FAX G3: Priority codec - G.729		
16.1	CPE FAX to PSTN FAX - G3-G3	Pass	
16.2	CPE FAX to PSTN FAX - G3-SG3	Pass	
16.3	CPE FAX from PSTN FAX - G3-G3	Pass	
16.4	CPE FAX from PSTN FAX - SG3-G3	Pass	
16.5	CPE FAX to CPE FAX - G3-G3	Pass	
16.6	CPE FAX to CPE FAX - G3-SG3	Pass	


Test Case Details

Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
17.0	T.38 FAX SG3 (G.729 is offered first)		
17.1	CPE FAX to PSTN FAX - SG3-G3	Pass	
17.2	CPE FAX to PSTN FAX - SG3-SG3	Pass	
17.3	CPE FAX from PSTN FAX - G3-SG3	Pass	
17.4	CPE FAX from PSTN FAX -SG3-SG3	Pass	
17.5	CPE FAX to CPE FAX - SG3-G3	Pass	
17.6	CPE FAX to CPE FAX - SG3-SG3	Pass	



 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
18.0	Simultaneous Calls (Minimum 2)- Duration 90 secs		
18.1	CPE to PSTN gateway	Pass	
18.2	PSTN gateway inbound to CPE	Pass	
18.3	CPE to CPE	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
19.0	Auto Attendant (e.g. using Unity or Unity Connection AA services)		
19.1	PSTN to CPE: navigate AA menus	Pass	
19.2	PSTN to CPE: navigate AA menu to transfer to a user	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
20.0	CPE to PSTN gateway international call		
20.1	Ringback heard on Caller phone	Pass	
20.2	Two-way voice path on call answerl	Pass	
20.3	Incomplete call. When caller hangs-up before callee answers, callee phone stops ringing	Pass	
20.4	DTMF relay (both directions) (RFC2833)	Pass	
20.5	Callee disconnect; Caller disconnect automatically	Pass	
20.6	Caller disconnect; Callee disconnect automatically	Pass	





Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
21.0	G.711 FAX G3		
21.1	G3 CPE to PSTN FAX - G3-G3	Pass	
21.2	G3 CPE to PSTN FAX - G3-SG3	Pass	
21.3	G3 CPE from PSTN FAX - G3-G3	Pass	
21.4	G3 CPE from PSTN FAX - SG3-G3	Pass	
21.5	G3 CPE to CPE FAX - G3-G3	Pass	
21.6	G3 CPE to CPE FAX - G3-SG3	Pass	


Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
22.0	G.711 FAX SG3		
22.1	FAX SG3 to PSTN FAX - SG3-G3	Pass	
22.2	FAX SG3 to PSTN FAX - SG3-SG3	Pass	
22.3	FAX SG3 from PSTN FAX - G3-SG3	Pass	
22.4	FAX SG3 from PSTN FAX -SG3-SG3	Pass	
22.5	FAX SG3 to CPE FAX - SG3-G3	Pass	
22.6	FAX SG3 to CPE FAX - SG3-SG3	Pass	

Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
23.0	Find Me (Call Forward On Busy)		
23.1	PSTN to CPE phone A enabled Call Forward on Busy feature to phone B	Pass	
23.2	PSTN to CPE phone enabled Call Forward on Busy feature to PSTN	Pass	
23.3	CPE to CPE phone A enabled Call Forward on Busy feature to phone B	Pass	
23.4	CPE to CPE phone A enabled Call Forward on Busy feature to PSTN	Pass	



 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
24.0	Find Me (Call Forward No Reply)		
24.1	PSTN to CPE phone A enabled Call Forward No Reply feature to phone B	Pass	
24.2	PSTN to CPE phone A enabled Call Forward No Reply feature to PSTN	Pass	
24.3	CPE to CPE phone A enabled Call Forward No Reply feature to phone B	Pass	
24.4	CPE to CPE phone A enabled Call Forward No Reply feature to PSTN	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments:
25.0	Codec mid-call negotiation (without transcoder)		
25.1	PSTN calls CPE phone A (G729), phone A transfers to gateway (g711u). PSTN and CPE gateway negotiate codec and call is transferred.	Pass	
25.2	CPE phone A calls PSTN (G711), PSTN transfers call to CPE phone B (G729), calls set up between CPE phone A and CPE phone B	Pass	

 Test Case Details			
Test Case No.	Test Case	Pass / Fail	Comments: <i>Note calling name/number and connected name/number display</i>
27.0	PRACK with SDP (early-media cut-through with DTMF (RFC2833) navigation before 200OK) - call 800-864-8331 - United Airlines		
27.1	CPE phone A call 800 number, phone user navigates through AA to reach correct menu option.	Pass	



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