spectralink

Spectralink 84-Series Wireless Telephone

Microsoft Skype for Business

Interoperability Guide

(Formerly Lync Server 2013)

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Warranty

The *Product Warranty and Software License and Warranty* and other support documents are available at http://support.spectralink.com.

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Contents

Chapter 1: About This Guide

This interoperability guide is intended for administrators deploying one or more Spectralink devices with Microsoft® Skype for Business. Administrators having no or little familiarity with Spectralink devices and provisioning methods will need to reference the *Spectralink 84-Series Deployment Guide* for additional information.

Microsoft® Skype for Business compatibility

> **Note: What is Skype for Business?**
>
> Microsoft has re-branded its software products formerly sold under the Lync name to Skype for Business. In this document, the names are used interchangeably.

Microsoft® Lync 2013 and 2010 compatibility

> **Note: Compatibility with earlier Microsoft products**
>
> This document also covers Lync Server 2013. For Spectralink's purposes, the branding changes do not materially affect the way the software functions. This document does not cover the configuration for Lync Server 2010. Please see the Specific Documents section for more information.

Microsoft Certification

Spectralink software release 4.6.x is certified by Microsoft as fully interoperable with the Microsoft Lync Server 2013. Later releases are built on the 4.6.x software code.

Spectralink software release 4.12.x has passed certification testing and is fully interoperable with the Microsoft Lync Server 2013.

Later Spectralink software releases maintain parallel code between the Microsoft products and the generic Spectralink SIP releases.

Product Support

Spectralink wants you to have a successful installation. If you have questions please contact the Customer Support Hotline at 1-800-775-5330.

The hotline is open Monday through Friday, 6 a.m. to 6 p.m. Mountain time.

For Technical Support: mailto:technicalsupport@spectralink.com

For Knowledge Base: http://support.spectralink.com

For Return Material Authorization: mailto:nalarma@spectralink.com

Spectralink References

All Spectralink documents are available at http://support.spectralink.com.

To go to a specific product page:

Select the Product Category and Product Type from the dropdown lists and then select the product from the next page. All resources for that particular product are displayed by default under the All tab. Documents, downloads and other resources are sorted by the date they were created so the most recently created resource is at the top of the list. You can further sort the list by the tabs across the top of the list to find exactly what you are looking for. Click the title to open the link.

Specific Documents

Spectralink 84-Series Interoperability Guide for Microsoft Lync Server 2010 covers the interoperability of Spectralink 84-Series handsets with the Microsoft Lync Server 2010.

The *Spectralink 84-Series Wireless Telephone Administration Guide* provides a comprehensive list of every parameter available on Spectralink 84-Series Wireless Telephones.

The *Spectralink 84-Series Deployment Guide* covers the provisioning and deployment of Spectralink 84-Series handsets. This interoperability Guide is an extension of that document and covers the variations you can expect in a Lync telephony server installation.

The *Web Configuration Utility User Guide* is used for troubleshooting in certain isolated cases as explained in the text.

For more detailed information on wireless LAN layout, network infrastructure, QoS, security and subnets, please see the *Best Practices Guide to Network Design Considerations for Spectralink Wireless Telephones.* This document identifies issues and solutions based on Spectralink's extensive experience in enterprise-class Wi-Fi telephony. It provides recommendations for ensuring that a network environment is adequately optimized for use with Spectralink Wireless Telephones.

The *Spectralink 84-Series User Guide* offers comprehensive instructions on using each of the features deployed on the handsets.

Conventions Used In This Document

Icons

Icons indicate extra information about nearby text.

Note

The Note icon highlights information of interest or important information that will help you be successful in accomplishing a procedure or understanding a concept.

Tip

The Tip icon highlights information that may be valuable or helpful for users to know, such as special techniques, shortcut methods, or information that will make user tasks easier to perform.

Admin Tip

This tip advises the administrator of a smarter, more productive or alternative method of performing an administrator-level task or procedure.

Troubleshooting

This element can be used in any type of document and is typically used to highlight information to help you solve a relevant problem you may encounter, or to point to other relevant troubleshooting reference information.

Typography

A few typographic conventions, listed next, are used in this guide to distinguish types of in-text information.

Convention	Description
Bold	Highlights interface items such as menus, soft keys, file names, and directories. Also used to represent menu selections and text entry to the handset.
Italics	Used to emphasize text, to show example values or inputs, and to show titles of reference documents available from the Spectralink Support Web site and other reference sites.
<u>Underlined blue</u>	Used for URL links to external Web pages or documents. If you click on text in this style, you will be linked to an external document or Web page.
Bright orange text	Used for cross references to other sections within this document. If you click on text in this style, you will be taken to another part of this document.
`Fixed-width-font`	Used for code fragments and parameter names.

This guide also uses a few writing conventions to distinguish conditional information.

Convention	Description
<MACaddress>	Indicates that you must enter information specific to your installation, handset, or network. For example, when you see *<MACaddress>*, enter your handset's 12-digit MAC address. If you see *<installed-directory>*, enter the path to your installation directory.
>	Indicates that you need to select an item from a menu. For example, **Settings> Basic** indicates that you need to select **Basic** from the **Settings** menu.

Chapter 2: Features and Configurations

In order to run Lync code with Spectralink 84-Series handsets, you must use Spectralink software 4.6.x or later.

> **Note: What is a Lync-enabled handset**
>
> Spectralink 84-Series handsets manufactured after June 2013 are noted as either "With Lync" or "Without Lync" on the label to indicate which software code is supported. Lync-enabled handsets are those marked "With Lync".

You must deploy both a Lync-enabled 84-Series handset and a Microsoft SfB or Lync Server 2013 in order to realize the SfB / Lync features listed below. (SfB = Skype for Business)

Supported Features with 84-Series & Lync 2013

	Supported Features
BASIC	Basic calling: make and receive calls.
	Hold and Resume
	Speaker and Mute
	Speed dial
	Do not disturb
	Call waiting
	Caller ID
	Voicemail
	Message waiting indication
	E911 calls
	Call history
	Lync Contacts w/presence
	Corporate Directory w/presence
	Transfer: blind and consultative
	Forward: busy, no answer, and manual
	Conference: 3-way
	Distinctive ring
INTERMEDIATE	Federated Calls
	Response Group
	Team Call
	Codec: G.711, G.729, G.722.1
	IM and Presence
	Up to four simultaneous calls per single registration
	Private line
	Exchange calendar integration
	Simultaneous ringing

ADVANCED	Supported Features
	Remote Worker
	User Profiles
	OAI
	SAFE worker
	Paging
	PTT
	XML (Web) API applications
	PIN authentication

ADMINISTRATIVE	Supported Features
	Media Traversal STUN/TURN/ICE Authentication TLS/NTLM
	Miscellaneous: Device Logging Call Admission Control In-band provisioning Branch office resiliency

⚠️ **Caution: Unsupported features**

Not every SfB or Microsoft Lync Server 2013 feature is supported by the Spectralink 84-Series integration. Unsupported features may not be present at all or may not work as desired. Unless listed as supported above, it is suggested to consider the feature unsupported. Unsupported features include:

- Music on hold

- PBX-based features

- Per Line Authentication

- SIP URL calls

- Camp-on ("automatic callback")

- Busy lamp field

- Call Park

Supported Call Server/Feature Configuration

You must have Spectralink software release 4.6.x or later and a Lync-enabled handset to support the feature set offered by Microsoft SfB / Lync 2013.

In a typical Microsoft SfB / Lync scenario, Microsoft servers are used for both telephony and IM/Calendar integration. Some installations may use a different telephony server such as an Avaya Communication Manager. This way they can benefit from the Microsoft IM/Calendar/Exchange integration and the telephony functionality of the other SIP call-server. The different deployment scenarios can be confusing and the following explanations should help.

Supported Lync configurations

Supported configurations assume that you are using Spectralink software 4.6.x or later and a Lync-enabled handset. Non-Lync 84-Series handsets do not support SfB / Lync telephony, IM, Calendar or Exchange integration no matter what server is deployed. Three supported scenarios are described plus one that is not supported.

Scenario:	1	2	3	4
Telephony server used:	Other	Other	Lync 2010/2013	Lync + Other
Lync Features available?	No	Yes	Yes	Not supported

In scenario 1, no SfB / Lync server is deployed. The system is using a legacy SIP server (e.g. Avaya). In this scenario no SfB / Lync features are available but a Lync handset provides all the standard telephony capabilities a Spectralink 84-series provides with that call server.

In scenario 2, a legacy SIP server is used (e.g. Avaya). Additionally, Microsoft software features (IM, calendar, Exchange) are integrated and are available for implementation on the Lync-enabled 84-Series handsets.

In scenario 3, a SfB / Lync Server (2010 or 2013) is used for both telephony and feature integration. In this scenario all the features explained in the relevant *Lync Interoperability Guide* are available to the 84-Series handsets.

In scenario 4, a legacy SIP server and SfB / Lync server are both deployed with the intent that both provide telephony to an 84-Series handset. Due to technical difficulties with Microsoft SfB / Lync integration assuming complete control of the 84-Series handset this scenario is not supported.

Identifying Lync-enabled 84-Series Handsets

A Lync-enabled handset supports SfB / Lync telephony, IM, calendaring, and Exchange. A handset without Lync support does not support any SfB / Lync functionality including IM,

calendaring, and exchange. Handsets cannot be upgraded from non-Lync to Lync-enabled in the field. If customers are unsure if Lync capability will ever be needed, we recommend the purchase of Lync-enabled handsets. Handsets purchased without Lync capability will not run Lync software releases, e.g. 4.6.x.

Manufacturing date	Support SfB / Lync?
Prior to June 2013	Yes
June 2013 and later	2 handset variations: Lync-enabled: supports Lync non-Lync: does not support Lync

Tip

All 84-Series handsets manufactured before June 2013 support SfB / Lync.

In June of 2013, Spectralink introduced new handset variations that do not support SfB / Lync. These new "non-Lync" versions of the 8440/41/52/53 do not support any SfB / Lync capability. New product ID's were released to identify non-Lync handsets. The Product ID for the Lync enabled handsets did not change. For example, a customer who bought a blue 8440 handset with product ID 2200-37149-001 in May 2012 can still deploy it in a SfB / Lync environment as the product ID for that Lync enabled handset has not changed and that handset is Lync-enabled due to its pre-June 2013 manufacturing date.

84-Series Product IDs with Microsoft Lync Support

Model	
8440:	2200-36149-001, 2200-36150-001 2200-37174-101, 2200-37175-101
8441:	2200-37290-001, 2200-37290-101
8450:	2200-37152-001, 2200-37153-001 2200-37176-101, 2200-37177-101
8452:	2200-37172-001, 2200-37173-001 2200-37198-101, 2200-37199-101
8453:	2200-37294-001, 2200-37294-101

Label example

To help understand if your 84-Series handset supports SfB / Lync, look at the manufacturing date on the label in the battery compartment. ALL 84-Series handsets produced before June 2013 support SfB / Lync. For handsets built during or after June 2013, check the label text. The product ID and the "with Lync" or "without Lync" text on the label will confirm whether or not the handset is Lync-enabled.

Chapter 3: Getting Started

Several scenarios exist for implementing Spectralink 84-Series handsets with Microsoft SfB / Lync 2013.

- Brand new installations that are also deploying Spectralink-84 Series for the first time,

- Installations with the 84-Series handsets already deployed that are upgrading from a third-party call server to a Microsoft SfB / Lync Server,

- Installations with the 84-Series handsets already deployed that are upgrading a Microsoft Lync Server 2010 to a Microsoft SfB / Lync 2013.

> ⚠️ **Caution**
>
> You must ensure that your handsets are Lync-enabled in order to successfully deploy them in a SfB / Lync environment. Contact customer support if you have questions about handset compatibility.

New Installations

Follow these general steps to set up your telephony system to work with the Spectralink 84-Series handsets:

1   Configure system settings for QoS and SfB / Lync and 84-Series interoperability requirements.

2   Configure handset users on the SfB / Lync server.

3   Configure central provisioning server parameters for Lync. The "Base Profile" parameter is located in the site.cfg file in the Config templates provided with the Spectralink 4.6.x release.

> 🔑 **Admin Tip**
>
> When deploying User Profiles, the Lync "Base Profile" configuration cannot be used. See the configuration parameters included in the configuration templates for Spectralink software 4.2.0 and above.

4   When individual handsets are powered up, they are prompted to sign into the Lync server with network credentials. Once validated, the handsets become operational.

This document will cover steps 3 and 4. Steps 1 and 2 are covered in Microsoft SfB / Lync 2013 documentation from Microsoft.

Upgrading to a Microsoft SfB / Lync 2013 Server

In a facility that is currently running any telephony server other than the Microsoft SfB / Lync 2013 telephony server, similar steps to a new installation need to be followed.

Note

Ensure you are running Lync-enabled 84-Series handsets. Contact customer support if you have any questions about what type of handset you have.

For a smooth transition, restore the handsets to factory default settings and perform a full re-configuration. See the *Spectralink 84-Series Deployment Guide* for complete upgrade instructions.

Upgrading from a Lync Server 2010 to a Microsoft SfB / Lync 2013 Server

You must have Spectralink software release 4.6.x or above and the appropriate .cfg files to support the feature set offered by Microsoft SfB / Lync 2013.

If you are running UCS 4.0.1: the Microsoft Lync Server 2010 became available with Polycom UCS 4.0.1. That code version did not use a "Base Profile"; instead the required parameters had to be individually configured in the central provisioning server files. The upgrade to Spectralink software 4.6.x or above requires editing of the central provisioning files (usually the site.cfg file) to use the "Base Profile". These revised parameters are provided in the site.cfg template in the Config files that come with Spectralink software 4.2.0 and above.

Note

If you are currently running a software version earlier than 4.2.0, please contact customer support for additional directions.

If you are using Spectralink 4.2.0 or Spectralink 4.4.0 with a Lync Server 2010, you will already have configured a "Base Profile". See the *Spectralink 84-Series Deployment Guide* for complete upgrade instructions. Upgrading to Spectralink software 4.6.x or above is seamless and no special provisions need to be made, but there are a couple of things to be aware of:

Edit line 1 label:

The "Label" for line 1 (which is displayed on the phone) is not overwritten during the upgrade. Therefore if a different label is desired you must delete the existing label either before the upgrade or later. If later, the handset will pick up the new label when it re-registers. Use either of the following methods to pick up the Microsoft SfB / Lync 2013 label. On each handset:

- Manually delete the label for line 1 via **Settings> Advanced Settings> Administration Settings> Line Configuration> Line 1**

- Restore the handsets to factory defaults before the upgrade. The label information will be retrieved from the Microsoft SfB / Lync 2013 server during registration.

Chapter 4: System Requirements

> **Note: Lync used interchangeably with Skype for Business (SfB)**
>
> To avoid confusion, we are continuing to use "Lync" interchangeably with "Skype for Business" in the following chapters.

Quality of Service (QoS) is a primary consideration when deploying Spectralink 84-Series Wireless Handsets. Voice has different attributes and performance requirements than wireless data applications making VoIP WLAN pre-deployment planning necessary.

A Wi-Fi handset requires a continuous, reliable connection as the user moves throughout the coverage area of the facility. In addition, voice applications have a low tolerance for network errors, packet retries and packet delays. Whereas data applications are able to accept frequent packet delays and retransmissions, wireless voice quality will deteriorate with just a few hundred milliseconds of delay or a very small percentage of lost packets. Additionally, data applications are typically bursty in terms of bandwidth utilization; whereas voice conversations use a consistent and a relatively small amount of network bandwidth throughout the length of a conversation.

Setting DSCP values for QoS

Differentiated Services Code Point (DSCP) settings are a method of classifying network traffic to provide quality of service by prioritizing network traffic appropriately. The Spectralink 84-Series handsets use common DSCP values for QoS as follows:

Traffic Type	DSCP Value
Voice	46
Control	40
Other	0

DSCP values may be set or changed by adding these parameters to the site.cfg or other appropriate .cfg file:

Parameter	Permitted Values	Default
qos.ip.rtp.dscp[1]	0 to 63	Null

Specify the DSCP of packets. If a value is entered, this parameter will overrule the other `qos.ip.rtp.*` parameters. The default value is Null, so the other `qos.ip.rtp.*` parameters will be used as described in the *Spectralink 84-Series Wireless Telephone Administration Guide*.

Parameter	Permitted Values	Default
qos.ip.callControl.dscp[1]	**0 to 63**	**Null**
Specify the DSCP of packets. If a value is entered, this parameter will overrule the other `qos.ip.callControl.*` parameters. The default value is Null, so the other `qos.ip.callControl.*` parameters will be used as described in the *Spectralink 84-Series Wireless Telephone Administration Guide*.		

[1] Change causes phone to restart or reboot.

SfB / Lync Clients

Of necessity, communication occurs between wired and wireless SfB / Lync clients. When packets are sent *from* the wired client to a wireless device on the other end, those packets are not prioritized if not tagged properly by the sender. By default, clients other than the Spectralink 84-Series handsets do not use DSCP tagging for voice and control network traffic. Therefore, each client of interest to any given deployment will need to be configured to use DSCP tagging to guarantee enterprise grade voice quality and reliability.

A common client is the PC-based client, which has the executable name of *communicator.exe*, but shows up as *Microsoft Lync* in the menu bar. The only type of traffic of concern with a SfB / Lync client other than the Spectralink 84-Series handset is audio traffic since there is not a significant amount of peer-to-peer call control traffic.

For Windows Vista, Windows 7 and Windows Server 2008, networking features have been introduced that can be used to prioritize traffic. The tool is called Group Policy Editor (gpedit.msc) and the Policy-based QoS feature it lends access to, found in "Local Computer Policy/Computer Configuration/Windows Settings/Policy-based QoS".
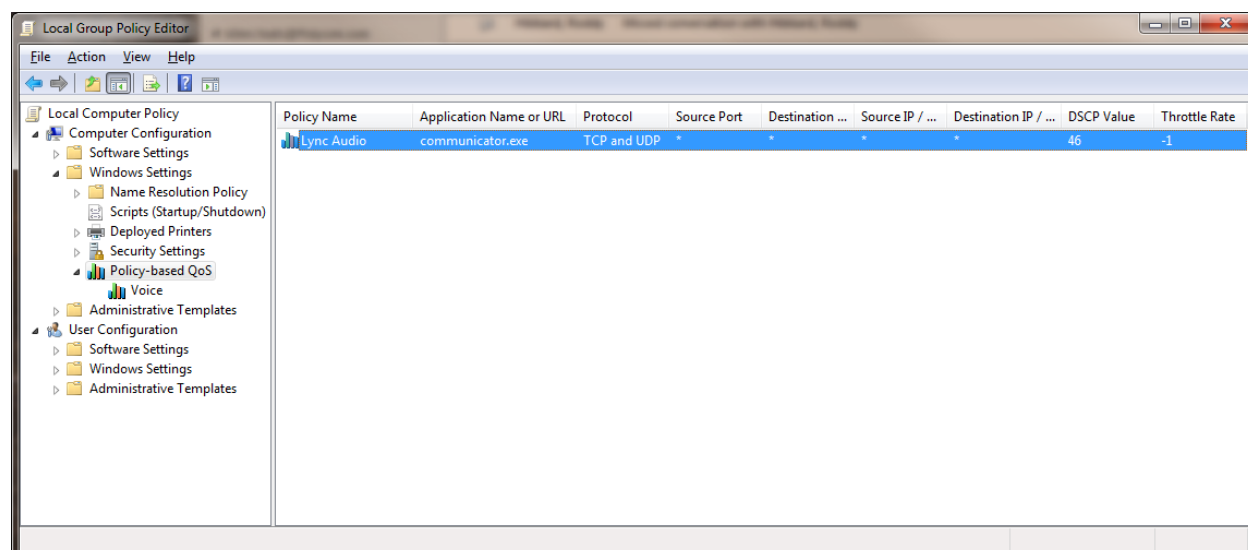
Policy Name:	Lync Audio
Application Name or URL:	communicator.exe

Protocol:	TCP and UDP
Source Port:	*
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Lync Server 2013

There are many potential sources of audio in a SfB / Lync topology. By default, many of these sources won't tag audio traffic appropriately to be classified as voice by access points. Each source will need to be configured manually capitalizing on the Group Policies features of the Windows Operating System.

The primary audio sources that need to be configured are:

- Edge Server
- Conferencing Server
- Mediation Server
- Voice Mail Server

Other services providing audio are:

- Response Group Application
- Conference Announcement Service
- UCMA Applications

Edge Server Configuration

The edge server (or edge server pool) is responsible for relaying audio between the internet and an organization's internal network and is typically run on a server separate from other servers that provide a Lync role. A Policy-based QoS rule needs to be created for incoming and outgoing audio traffic. The following two tables show an example of what needs to be configured. The actual port and IP address details will change depending on the deployment. The server (or edge server pool) must be rebooted in order for the changes to take effect.

Policy Name:	Lync A/V port 443
Application Name or URL:	*
Protocol:	TCP
Source Port:	443
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Policy Name:	Lync A/V port 3478
Application Name or URL:	*
Protocol:	UDP
Source Port:	3478
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Lync Server Control Traffic Configuration

The Lync Server (or Lync Server Pool) is responsible for SIP control traffic to/from the Spectralink 84-Series handsets. Tagging control traffic with a DSCP value of 40 allows this traffic to be prioritized above best effort and background traffic, like FTP sessions.

A Policy-based QoS rule needs to be created for outgoing control traffic. The following table shows an example of what needs to be configured. The actual port details will change depending on the deployment. The server (or Lync Server Pool) must be rebooted in order for the changes to take effect.

Policy Name:	Lync Control Traffic
Application Name or URL:	*
Protocol:	TCP and UDP
Source Port:	5060:5061
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	172.29.4.0/24
DSCP Value:	40
Throttle Rate:	*

Conferencing Server Configuration

The conferencing server role may be served by the same physical server as the Lync Server and be implemented as a pool of servers. The conferencing server is responsible for relaying audio to clients when the conference is initiated and managed using Lync, such as when a deskset starts the conference, not a Spectralink 84-Series handset.

Note: Spectralink 84-Series handset initiated conferences

The Spectralink 84-Series handset uses telephony rather than server resources to initiate and manage conference calls. The configuration outlined here only pertains to conferences initiated on the Lync telephony server.

A Policy-based QoS rule needs to be created for outgoing audio traffic. The following table shows an example of what needs to be configured. The actual port details will change

depending on the deployment. The server(s) must be rebooted in order for the changes to take effect.

Policy Name:	Conferencing Audio
Application Name or URL:	AVMCUSvc.exe
Protocol:	TCP and UDP
Source Port:	49152:57500
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

The conferencing announcement, as well as response group audio and UCMA audio, is sourced from another executable. The following table shows how this executable can be configured to properly tag traffic for prioritization. The actual port range may vary depending on a site's topology plan.

Policy Name:	Resp Grp, Conf Anncmnt, and UCMA App Audio
Application Name or URL:	OcsAppServerHost.exe
Protocol:	TCP and UDP
Source Port:	49152:57500
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Mediation Server Configuration

The mediation server is responsible for relaying audio between POTS and Lync clients.

A Policy-based QoS rule needs to be created for outgoing audio traffic. The following table shows an example of what needs to be configured. The actual port details will change depending on the deployment. The server needs to be rebooted in order for the changes to take effect or the *Lync Server Mediation* service can be restarted.

Policy Name:	Mediation Server Audio
Application Name or URL:	MediationServerSvc.exe
Protocol:	TCP and UDP
Source Port:	49152:57500
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Voice Mail Configuration

The Exchange server is responsible for relaying the voice mail announcement audio. A Policy-based QoS rule needs to be created for outgoing audio traffic. The following table shows an example of what needs to be configured. The actual port details will change depending on the deployment. The server needs to be rebooted in order for the changes to take effect.

Policy Name:	Conferencing Audio
Application Name or URL:	UMWorkerProcess.exe
Protocol:	TCP and UDP
Source Port:	*
Destination Port:	*
Source IP / Prefix Length:	*
Destination IP / Prefix Length:	*
DSCP Value:	46
Throttle Rate:	*

Caveats

- OCS 2007 clients don't use specific ports for audio, so it isn't possible to differentiate between traffic types with this client.
- Port ranges and server addresses need to be designed so the features of the Group Policy Editor can distinguish between traffic types.

DHCP Server Options

If you are provisioning handsets from within an enterprise, verify that Dynamic Host Configuration Protocol (DHCP) Option 43 is set for your Lync Phone Edition devices.

Entering the URL of the certificate server for option 43 establishes the setting for the certificate. Once the certificate is downloaded to the phone, option 120 is used to locate a valid Lync server.

DHCP Option 43

A number of sub-options are categorized under option 43 and are used for provisioning new devices over Ethernet. The second option is used to allow the phone to locate a Lync SIP registrar to sign-in to. Although not mandatory, the user experience is enhanced if the sign-in experience is streamlined.

As previously mentioned Option 43 is not really a single option but a number of sub-options which tell the phone where to locate the Certificate Provisioning service on the Lync server.

When reassembled into a single value these sub-components build a complete URL as Option 43 to the DHCP client.

The DHCP option 43 data format is defined in section 8.4 of RFC 2132.

Option Number	Option Name	ASCII Value (example)
001	UCIdentifier	MS-UC-Client
002	URLScheme	https
003	WebServerFQDN	lync.slnk.local
004	WebServerPort	443
005	CertProvRelPath	/CertProv/CertProvisioningService.svc

DHCP Option 120

Once the certificate is downloaded to the phone then a valid Lync registrar server needs to be located. The value of Option 120 will be the FQDN of the SfB / Lync server which will handle authentication requests from the phones. This must be a SfB / Lync 2013 server. Earlier versions are not supported.

Option Number	Option Name	ASCII Value (example)
120	UCSipServer	lync.slnk.local

Also see Microsoft references:

- Obtaining Values of DHCP Options by Using DHCPUtil.exe

- Setting Up DHCP for Devices.

Security Certificates for Remote Workers

If you are setting up remote workers outside of an enterprise, you need to install a security certificate, either on the central provisioning server or on your Microsoft Edge Server. You will need to ensure that the signing certificate authority (CA) that issued this certificate is listed on the Spectralink *Trusted Certificate Authority List* available in the *Spectralink 84-Series Wireless Telephone Administration Guide.*

User Certificate Renewal Process

User Certificate renewal is an automatic process that begins at login and generally takes less than a minute. You may experience a small period of no service (less than 1 second) during the renewal process. The process itself uses the following logic:

1 The handset will start the renewal process (send the first renewal request) at the lower of:

   ○ ¼ of the total certificate duration remaining, or

   ○ 30 days before certificate expiry.

2 Microsoft specifies that the renewal attempts 'back off", that is gradiently extends the amount of time between requests. Spectralink uses the following backoff method:

   a First renewal attempt after a failed renewal will be 10 minutes later.

    b   The next renewal attempt will be at 20 minutes, then 30, et cetera, with a maximum backoff of 60 minutes and will continue to try every 60 minutes until the certificate expires.

3   If the phone powers up with an expired certificate, its behavior will depend on the Lync credentials used to log in:

- ○   If it has full credentials (not PIN Authentication) then it will log in and obtain a new certificate via Microsoft's NTLM.
- ○   If PIN Authentication is used, the extension and PIN must be re-entered, as these are not cached. Then it will log in and obtain a new certificate via TLS-DSK.

> ⚠️ **Caution: What if the certificate server is not available?**
>
> Certificates are stored on a SfB / Lync server. If for some reason the server is not available or certificates have been disabled somehow, the phones will not be able to renew certificates and may fail to register as their certificates expire.

The behavior of pre-release 4.12 code is similar to the above, but there are slight differences, depending on the code version.

DNS for Automatic Discovery

Setup or verify domain name system (DNS) service (SRV) records to allow the devices to automatically discover SfB / Lync Server.

See these two Microsoft references for information on creating and verifying DNS SRV records:

- Technical requirements for mobility in Lync Server 2013
- Required DNS Records for Automatic Client Sign-In.

Chapter 5: Handset Configuration

Starting with Spectralink Software version 4.2.0.x, configuration file templates include the parameters required for full interoperability with the SfB / Lync telephony server. In most cases, Spectralink 84-Series handsets can use the Lync "Base Profile" which is a group of parameters that are already configured and bundled into this one profile. See Appendix A for the parameters that are included in the Lync Base Profile.

If you are deploying User Profiles, the Lync Base Profile cannot be used because some parameters belong in the site-wide configuration and others in the per-user configuration. The configuration templates that accompany the Spectralink 4.2.0 and later software contain exact parameters and directions for both situations.

If you use the Base Profile for the SfB / Lync telephony server, you may not need to configure a per-phone .cfg file for each handset as telephony registration information is handled automatically by the SfB / Lync telephony server. If you are currently using the per-phone files to configure features such as PTT and applications, you can move those features to the site.cfg, a feature.cfg, or a group.cfg file instead.

Understanding SfB / Lync Parameters in the site.cfg File

The SfB / Lync telephony parameters appear only in the configuration files that accompany the Lync version of the software. The SfB / Lync telephony server parameters are located in the site.cfg file.

Configuration template -- site.cfg

```
<LyncTelephony>
    <!-- Starting with UCS 4.1.0, the "base profile" feature allows setting up Lync telephony -->
    <!-- by changing the base profile rather than by setting each telephony setting -->
    <!-- to its Lync compatible value. -->
    <!-- DHCP option 43 must point to the certificate server.  If this cannot be done, -->
    <!-- refer to the Deployment Guide for manual certificate installation -->
    <!-- When using Lync telephony, IM and presence are automatically enabled. -->

    <LyncBaseProfile
        device.baseProfile.set="1"
        device.baseProfile="Lync" >
        <!-- device.set="1"  only needed if previous device.set in syslog is not used -->
    </LyncBaseProfile>
```

The SfB / Lync parameter values in the template should not be changed. If you are upgrading from Polycom UCS 4.0.1 or 4.0.2, delete any previously-configured Lync parameters and replace them with the Base Profile as shown above.

Eliminating the per-Phone .cfg File

Telephony registration parameters are typically set in the per-phone .cfg file. The configuration templates provided with Spectralink software 4.6.x or above specifically do not place any other types of parameters in these per-phone files. Because the SfB / Lync telephony server manages all aspects of the registration, these per-phone .cfg files are no longer needed unless you want to automatically sign in a handset (or if you are deploying phone-specific features). For auto signin you will need to configure user credential parameters in each per-phone .cfg file.

> **Admin Tip: Where to put feature parameters without a per-phone file?**
>
> If you are currently using the per-phone files to configure features such as PTT and applications, you can move those features to the site.cfg, a feature.cfg, or a group.cfg file instead. This way you can eliminate the need for a separate file for each handset and simplify your deployment.

The master configuration file – either the MACaddress.cfg or 000000000000.cfg file – in the configuration templates includes the per-phone .cfg file as the first item in the CONFIG_FILES string. This per-phone .cfg file should be deleted if you are deploying a SfB / Lync telephony server and have no other need of the per-phone files.

Signing into Lync

Microsoft provides three ways to sign into Lync: PIN authentication and Login Credentials (with and without auto sign-in). Parameters for these methods are included in the Base Profile. You must set the parameters for the sign-in method in the config files as described here.

Sign in Methods

How you want your users to sign into Lync also determines what configuration settings you will need to use. See How to sign into or out of Lync. There are three sign in methods:

- PIN authentication (supported on 4.7.x and later). The user enters a PIN and extension on the handset.

  This method can be used for any deployment scenario.

  Note that IM and presence work with PIN auth, but email and calendar do not. You must use Login credentials in order to provide Microsoft Exchange features with your SfB / Lync deployment.

- Simple Sign In (SSI): The user enters Login credentials on the handset (domain, username, password).

  This method can be used in any scenario. SSI provides access to Microsoft Exchange features.

  The user must enter a lot of information and this is prone to mistakes and requires extra administrative support.

- Simple Sign In (SSI) with automatic signin: Credentials are configured in a per-user or per handset configuration file by the administrator. With this method, the user does not need to enter SfB / Lync credentials and signin is automatically authorized.

  When a single handset and extension is assigned to a single user, the credentials can be configured for each handset in the per-handset config files. It is easier for the user but less secure as anyone can use the handset since it is always signed in.

  When user profiles are configured, user SfB / Lync credentials can be configured in the login.cfg file for each user. It is easier for the user as they are already logged into the phone with their user profile and do not need to additionally sign into Lync.

  SSI provides access to Microsoft Exchange features.

See the *Spectralink 84-Series Deployment Guide* and *Spectralink 84-Series Administration Guide* for complete instructions about setting parameters and using the .cfg files.

Using PIN Authentication

PIN authentication is an alternate sign in method that Spectralink has incorporated into Release 4.7 which is built upon Microsoft-certified Release 4.6. PIN authentication allows you to require a PIN and extension number for sign in rather than Login credentials. Note that IM and presence work with PIN auth, but email and calendar do not. You must use Login credentials in order to provide Microsoft Exchange features with your SfB / Lync deployment.

When PIN authentication is configured, the user will be prompted for the PIN and extension number when signing in.

> ⚠️ **Caution: PIN authentication and public networks**
>
> Logging in using PIN authentication requires accessing the web server in a private network. PIN authentication will not succeed in a public network. However, if the phone is logged in on a private network and moved to a public network without logging out, it will function.

Using Login Credentials

Login Credentials require that the user enter a sign in address, domain, username and password in order to access SfB / Lync telephony or Microsoft Exchange features. Login

credentials may be configured in a per-phone or per-user configuration file to automatically sign in a user.

When you use the Base Profile for Lync, both LoginCredentials and PinCredentials are automatically enabled. If you want to use one, disable the other. See the examples below.

Sign in parameters

The configuration file templates provided for the different SfB / Lync scenarios include the following parameters. Use them to configure your SfB / Lync deployment as shown in the examples.

Parameters to set the sign in method

Parameter	Permitted Values	Default
reg.x.auth.useLoginCredentials	**0 or 1**	**1**
Setting this parameter to "1" enables the Sign In menu option **Sign in: Credentials.** If set to "0" the menu option does not appear and you may use auto signin as described below.		
reg.x.auth.usePinCredentials	**0 or 1**	**1**
Setting this parameter to "1" enables the Sign In menu option **Sign in: PIN & Ext.**. If set to "0" the menu option does not appear and you may use auto signin with LoginCredentials as described below. You cannot use auto signin with PIN authentication.		

Parameters to use with LoginCredentials for automatic signin.

The following parameters should only be used if BOTH useLoginCredentials and usePinCredentials are set to 0. If either are set to 1, auto signin is not allowed. The device-specific settings should be added to the device-specific configuration file.

Parameter	Permitted Values	Default
reg.x.auth.domain	**string**	**Null**
The domain of the authorization server that is used to check the user names and passwords.		
reg.x.address	**string address**	**Null**
The user part (for example, *1002*) or the user and the host part (for example, *1002@Spectralink.com*) of the registration SIP URI or the H.323 ID/extension.		
reg.x.auth.password	**string**	**Null**
The password to be used for authentication challenges for this registration. If the password is non-Null, it will overrule the password entered into the Authentication submenu on the Settings menu of the handset.		
reg.x.auth.userId	**string**	**Null**
User ID to be used for authentication challenges for this registration. If the User ID is non-Null, it will overrule the user parameter entered into the Authentication submenu on the Settings menu of the handset.		

Sign in config file templates

Flat deployment

Flat deployment uses the Lync Base Profile which is set in the site.cfg file. It is set to enable both LoginCredentials and PIN authentication. Normally only one method is enabled. Enable the one you want to use in the site.cfg file and disable the other one.

Flat deployment site.cfg template example

```
<!--When using the Base Profile, Lync signin enables menus for both LoginCredentials and-->
<!--PIN authentication.-->
<!--If you want to offer just one of these options, the other one must be disabled.-->
<!--Usually only one option is used in a facility, but both are enabled by default.-->
<!--Set the LyncSignIn option(s) you want to deploy to 1.-->
<!--If you want to deploy automatic signin, use the [MACaddress-ext].cfg file to configure-->
<!--the settings and delete the LyncSignIn section from this file.-->

<LyncSignIn
    reg.1.auth.useLoginCredentials="0"
    reg.1.auth.usePinCredentials="0">
</LyncSignIn>

</LyncTelephony>
```

Alternately, you can enable automatic sign in by disabling both methods that require the user to sign in with credentials and configuring log in credentials in the MACaddress-ext.cfg file. If choosing this option, delete the parameters in the LyncSignIn section in the site.cfg template.

Flat deployment MACaddress-ext.cfg template example: Auto signin

```
<!--LYNC AUTOMATIC SIGN IN-->
<!--Lync automatic signin is available with LoginCredentials.-->
<!--The user does not need to enter the credentials and is not prompted to do so.-->
<!--This is convenient for the user but may not be desirable if it presents a -->
<!--security risk for the facility.-->
<!--Set both signin parameters to 0 and configure the credential parameters-->
<!--to automatically sign in the user.-->
<!--Automatic sign in is not available with PIN authorization. -->
<!--Delete the other LyncSignIn parameters in the site.cfg file.-->
<!--DELETE THIS SECTION IF YOU ARE NOT DEPLOYING LYNC AUTO SIGNIN.-->
 <LyncAutoSignIn
    reg.1.auth.useLoginCredentials="0"
    reg.1.auth.usePinCredentials="0"
    reg.1.auth.domain="domain"
    reg.1.address="address"
    reg.1.auth.password="password"
    reg.1.auth.userId="userid">
 </LyncAutoSignIn>
```

User Profiles deployment

With User Profiles, the Lync Base Profile must be "divided" so that part of it activates prior to User Profile login and the rest of it activates after User Profile login. Therefore you will see Lync parameters that comprise the Base Profile in each of the site and login files. You must set the sign in method in the login.cfg file for each user profile. The template offers all sign in methods. Choose the one you want and delete the others. Note: If you select the automatic signin option, set the **softkey.feature.simplifiedSignIn** parameter in the site.cfg file to zero so that sign-in options do not appear on the Features flyout menu.

User Profiles login.cfg template example

```
<!--LYNC CREDENTIALS SIGN IN-->
<!--LoginCredentials and PIN authentication signin methods are available.-->
<!--If you want to offer just one of these options, the other one must be disabled.-->
<!--Usually only one option is used in a facility.-->
<!--Set the LyncSignIn option(s) you want to deploy to 1.-->
<!--DELETE THE LYNC AUTOMATIC SIGN IN SECTION BELOW IF REQUIRING CREDENTIALS-->

<LyncSignIn
    reg.1.auth.useLoginCredentials="0"
    reg.1.auth.usePinCredentials="0">
</LyncSignIn>

<!--or you could configure each user's LoginCredentials so signing in is not required...-->

<!--LYNC AUTOMATIC SIGN IN-->
<!--Lync automatic signin is available with LoginCredentials.-->
<!--The user does not need to enter the credentials and is not prompted to do so.-->
<!--This is convenient for the user but may not be desirable if it presents a -->
<!--security risk for the facility.-->
<!--Set both signin parameters to 0 and configure the credential parameters-->
<!--to automatically sign in the user.-->
<!--Automatic sign in is not available with PIN authorization. -->
<!--Delete the other LyncSignIn parameters.-->
    <LyncAutoSignIn
    reg.1.auth.useLoginCredentials="0"
    reg.1.auth.usePinCredentials="0"
    reg.1.auth.domain="domain"
    reg.1.address="address"
    reg.1.auth.password="password"
    reg.1.auth.userId="userid">
    </LyncAutoSignIn>

</LyncTelephony>
```

Group deployment

Generally the group scenario follows the Flat deployment scenario for SfB / Lync configuration. Refer to Flat deployment section above for information. If you are deploying auto signin, the <identity>.cfg file is used instead of the MACaddress-ext.cfg file.

How to sign into or out of Lync

Once you have set the handset Base Profile to Lync, you can sign in or out of the handset.

> **Caution: Signing in as a different user**
>
> To sign in as a different user, you must first sign out as the existing user then sign in as the new user. If you do not do this, credentials will not function correctly. Follow the directions below for the sign out and sign in procedures.

Unless automatic signin has been configured, you must sign in to Lync to use your handset. The Lync Sign In screen displays the first time your handset connects to the network. You must enter all the information this first time. You will remain signed in, even when you power cycle the handset, until you sign out.

To sign into Lync:

1 Navigate to **Settings> Features> Microsoft Lync> SignIn**. Alternately you may use the **Features** softkey to view your signin options.

   You will have one or both signin options: PIN & Extension and/or Credentials.

   a **Sign in: PIN & Ext.**

   » PIN   as set in the SfB / Lync server and provided by the administrator.

   » Extension   as set in the SfB / Lync server and provided by the administrator.

   b **Sign in: Credentials**

   » Sign In Address   This is your Lync SIP URI address, not the user name for the Active Directory account. For example, username@domain.com.

   » Domain   By default, use the NetBIOS domain name. If that does not work, try the DNS domain name (for example, domain.com).

   » User   user name

   » Password   password

2 After completing the required fields, press the **SignIn** soft key. If successful, your line icon will show as registered. Note that completing the signin can take many seconds. Be patient.

> **Troubleshooting: My sign-in credentials don't work**
>
> Be careful entering the password as too many attempts with an incorrect password may cause your account to be locked.

To sign out of Lync:

- Press the **Features** softkey and select the **Signout** option from the menu

- Navigate to **Settings> Features> Microsoft Lync> SignOut**.

Note that sign out options are not available if auto signin is deployed.

Once you've signed out, your line shows as unregistered, your presence status is offline, and you will be unable to use your handset.

> **Note**
>
> Once you sign out of Microsoft Lync on your handset, call lists are deleted.

> **Admin Tip: Branch Office Resiliency**
>
> Branch Office Resiliency environments and cases require that the phone achieve registration with the Main Office site and remain connected for at least ten minutes before an outage occurs in order for the phone to remain registered to the Branch Office Appliance. This timeframe allows the Branch office phones to obtain the correct User Certificate and complete the registration process using TLS-DSK.

How SfB / Lync Parameters Differ with User Profiles

User Profiles are typically deployed in facilities where several users need independent access to a single handset. Shift workers generally share handsets and User Profiles is an ideal way to keep track of usage and provide workers with custom options. The custom parameters set by the user are stored on the central provisioning server and become available once the user logs into the handset.

If you are deploying User Profiles, the log in requirement of User Profiles comes into conflict with the sign in requirement of the SfB / Lync telephony server when the parameters set in the Base Profile are used. Therefore, the configuration templates for User Profiles separate these parameters so that some are activated when the handset is turned on and others are activated after the user logs in.

The Lync telephony parameters should not be changed in either file as they are used after the user logs into the User Profile. The sign in method is established in the login file for each user profile, as discussed above.

User Profiles configuration template -- site.cfg

```xml
<LyncTelephony>
  <!-- Starting with UCS 4.1.0, the "base profile" feature allows to set up Lync telephony by -->
  <!-- changing the base profile rather than by setting each telephony setting to its Lync -->
  <!-- compatible value. Unfortunately, for technical reasons, the base profile mechanism-->
  <!-- can't be used in the user profile scenario, and values need to be set individually-->
  <!-- both in the site.cfg and the login.cfg files. Do NOT modify the values in the Lync-->
  <!-- block below. They have been preset for Lync compatibility-->
  <!-- DHCP option 43 must point to the certificate server.  If this cannot be done, refer to the -->
  <!-- Deployment Guide for manual certificate installation -->
  <LyncBaseProfile
    call.enableOnNotRegistered="0"
    callLists.logConsultationCalls="1"
    dialplan.applyToDirectoryDial="1"
    dialplan.1.applyToForward="1"
    feature.messaging.enabled="1"
    feature.presence.enabled="1"
    roaming_buddies.reg="1"
    sec.srtp.holdWithNewKey="0"
    sec.srtp.key.lifetime="2^31"
    sec.srtp.mki.enabled="1"
    sec.srtp.mki.length="1"
    sec.srtp.mki.startSessionAtOne="1"
    sec.srtp.resumeWithNewKey="0"
    sec.TLS.profileSelection.SIP="ApplicationProfile1"
    softkey.feature.simplifiedSignIn="1"
    tcpIpApp.ice.mode="MSOCS"
    tcpIpApp.keepalive.tcp.sip.tls.enable="1"
    voice.audioProfile.G7221.24kbps.payloadType="112"
    voice.codecPref.G7221.24kbps="5"
    voice.codecPref.G7221.32kbps="0"
    voIpProt.SIP.allowTransferOnProceeding="0"
    voIpProt.SIP.IM.autoAnswerDelay="40"
    voIpProt.SIP.serverFeatureControl.cf="1"
    voIpProt.SIP.serverFeatureControl.dnd="1"
    voIpProt.SIP.serverFeatureControl.localProcessing.cf="0"
    voIpProt.SIP.serverFeatureControl.localProcessing.dnd="0"
    voIpProt.SIP.header.diversion.enable="1"
    voIpProt.SIP.mtls.enable="0" />
  </LyncBaseProfile>

</LyncTelephony>
```

User Profiles configuration template -- login.cfg

```
<LyncTelephony>

  <!--LYNC LINE REGISTRATION-->
  <!-- The Lync line registration information below should generally not be changed,-->
  <!-- it has been preset for proper Lync operation. It must remain in the login.cfg file -->
  <!-- even though it is common to all users, so that it only takes effect after the user-->
  <!-- has logged into their user profile.-->
    <Lync
    reg.1.applyServerDigitMapLocally="1"
    reg.1.serverFeatureControl.signalingMethod="serviceMsForwardContact"
    reg.1.server.1.registerRetry.baseTimeout="10"
    reg.1.server.1.registerRetry.maxTimeout="180"
    reg.1.server.1.specialInterop="lync2013"
    reg.1.server.1.transport="TLS">
    </Lync>
```

The Lync line registration information in the User Profiles login.cfg file generally should not be changed. It has been preset for proper SfB / Lync operation. It must remain in the login.cfg file even though it is common to all users, so that it only takes effect after the user has logged into their profile.

SfB / Lync signin information is configured in the login file for each user profile. See sign in examples above.

Contacts, Corporate Directory and Presence

Under the **Contacts / Call Lists** menu is an option for SfB / Lync contacts called "Contacts". These are dynamically pushed from the SfB / Lync server and they are displayed in alphabetical order along with presence status.

Beginning with R5.4 the user can view contact cards when browsing through groups. Select the **Edit** softkey when browsing through **Contacts/Call Lists> SfB Contacts..>Groups**

The Global address book search is functional when user logs in with username and password.

Beginning with release 4.14, presence status is available in the Corporate Directory, and if enabled, Corporate Directory presence will update after a slight delay as the phone queries the server for presence status. Information about configuring and implementing Corporate Directory can be found on the Spectralink Support website at http://support.spectralink.com/sites/default/files/resource_files/CS-14-19%20Corporate%20Directory%20Best%20Practices.pdf.

DND Can be Removed from Menus

The administrator can remove DND from all menus as of R5.2.

Parameter	Modification	Default
feature.dnd.enabled	**Added**	**1**

If 1 Do Not Disturb (DND) will appear on the phone menus and prompts.
If 0 Do Not Disturb (DND) will not appear on any menu or prompt.

Phone Lock

Phone lock is a security feature to prevent intentional, unauthorized activity. It is now available on Microsoft Skype for Business (Lync) protocol starting with R5.3.

A configurable parameter enables/disables SFB Pin Lock. If Phone Lock is enabled a PIN is requested at bootup or after a specified period of time. The PIN must be set up by the user the first time he uses the phone.

A new parameter will allow the phone to play a tone when it prompts for a new Pin Lock PIN.

Parameter Name	Permitted Values	Default
reg.x.auth.lyncPhoneLockTone	**0 or 1**	**1**

If reg.x.auth.lyncPhoneLockTone="0", lyncPhoneLockTone will not be played during PhoneLockPinEntry Menu.
If reg.x.auth.lyncPhoneLockTone="1", lyncPhoneLockTone will be true and whenever PhoneLockPinEntry Menu is displayed Misc tone will be played honoring the global ringer volume.
Admin can reset this variable, if user is not interested in playing the tone.

reg.x.auth.lyncPhoneLockPinEnable	**0 or 1**	**0**

If reg.x.auth.lyncPhoneLockPinEnable="0", SFB Pin Lock aka Phone Lock is disabled.
If reg.x.auth.lyncPhoneLockPinEnable="1", SFB Pin Lock aka Phone Lock is enabled.

Set up PIN   Locked state

Enter PIN   PIN entry timeout

The Phone Lock PIN is erased when the user signs out or the phone loses its registration. If Phone Lock is activated in the configuration files, then the PIN must be recreated whenever the registration is restored.

Quality of Experience (QoE)

QoE is a Microsoft Skype for Business user feedback feature starting with R5.3.

Two multiple choice questions will appear after call termination to collect user's experience about the last call. A report will be prepared with format "ms-cqf+xml" and set to SfB QoE server. A config parameter controls the frequency of menu popup (after x number of calls).

The report is sent as 'vq-rtcpxr+xml' format after each evaluated call is terminated.

Parameter Name	Permitted Values	Default
call.qoefeedback.frequency	**0 to 20**	**0**
Controls the frequency of menu popup. 0 will disable the feature.		

Question 1   Question 2

Far Mute

Far Mute is a Microsoft Skype for Business feature starting with R5.3.

When the host of a conference call mutes the entire audience, the members will see a popup "A presenter muted you" When the presenter unmutes the audience the members will see a popup "A presenter unmuted the audience" and can select their local UnMute softkey to be heard by the rest of the audience. The mute icon in the status bar will change accordingly.

To mute a single participant, select the participant's call cell and select the **FarMute** softkey. To mute the entire audience, tap the **Features** softkey and select **Mute audience**.
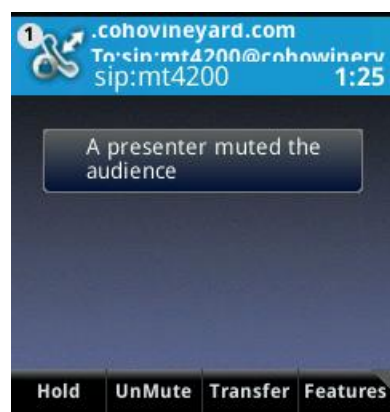
Audience is muted   Audience is unmuted

Notification to Reregister

Reregister notification is offered for installations that require more than the maximum of registrations allowed by Microsoft Skype for Business starting with R5.3.

When the maximum number of allowed registrations is reached and the phone loses registration, a continuous warning beep with vibrate will occur and a warning message will display. In silent mode, the phone will not beep and vibrate. The user can press OK to stop the notification. In silent mode, the phone will not beep and vibrate.

If the phone registered with Autologin, it must be restarted before calling can resume.
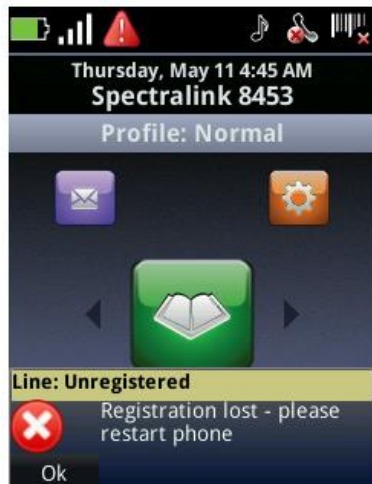
If the phone was registered as manual login, it must sign in to re-register before calling can resume.
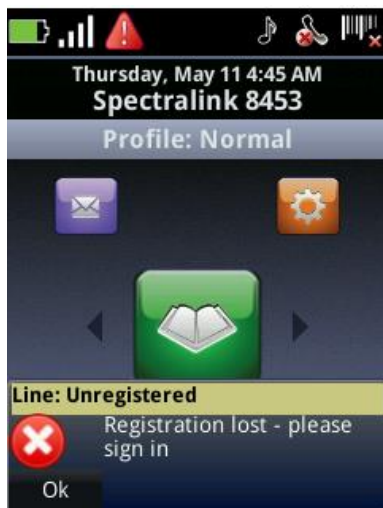
Logging Levels

Logging Level settings are available from the Admin menu at **Advanced Settings> Administrative Settings> Logging**.

Logging Level, Change, and Render Parameters

Parameter	Permitted Values	Default
log.level.change.xxx	**0 to 6**	**4**

Controls the logging detail level for individual modules. These are the input filters into the internal memory-based log system which produces the [MACaddress]-app.log file.

The most commonly-used values for xxx are listed below. Additional log modules can be found in the log.cfg file.

app1	push
brow	sip
cfg	so
dot1x	tickt
httpd	tls
ice	utilm
key	wlan
pps	wmgr

This parameter and the associated render level (see below) can be set for a single phone in the Admin menu at Advanced Settings> Administrative Settings> Logging.

Appendix A: Base Profile Parameters

The following table details the parameters used to set up your Spectralink handsets with SfB / Lync Server 2010/2013.

If you are upgrading from 4.0.1 or 4.0.2, you will have many of these parameters already configured in one or more .cfg files. We recommend that you remove from those files any parameters that appear here. Use the Base Profile instead of any of the parameters listed here.

If you need to override any of these parameters, first set the Base Profile to Lync and then set the individual parameters in the following rows. The previous examples about setting the signin method offers a demonstration of how to override a Base Profile setting. In the Flat and Group deployment templates, the Base Profile enables menus for both signin methods. The example template enables/disables the signin parameters according to which method you want to deploy. This gives you more control and visibility into what is being done in the config file.

Base Profile parameters

Parameter	Permitted Values	Default
call.enableOnNotRegistered	**0 or 1**	**0**
If 1, users can make calls when the handset is not registered. If 0, calls are not permitted without registration.		
callLists.logConsultationCalls	**0 or 1**	**1**
If '1', all consultation calls are logged. (Calls made to a third party when settings up a conference call (while the original party is on hold) are consultation calls.). If '0', consultation calls are not logged.		
dialplan.applyToDirectoryDial	**0 or 1**	**1**
If 0, the dial plan is not applied to numbers dialed from the directory or speed dial list. If 1, the dial plan is applied to numbers dialed from the directory or speed dial, including auto-call contact numbers.		
dialplan.1.applyToForward	**0 or 1**	**1**
If 0, the dial plan does not apply to forwarded calls. If 1, the dial plan applies to forwarded calls.		
feature.messaging.enabled	**0 or 1**	**1**
Enable instant messaging on the Spectralink 84-Series wireless handsets.		
feature.presence.enabled	**0 or 1**	**1**
Enable the presence feature to display the status of your contacts.		
reg.1.applyServerDigitMapLocally	**0 or 1**	**1**
When set to 1, dialplan normalization rules are downloaded from the SfB / Lync Server and processed on the handset. If 0, dialplan rules are processed by SfB / Lync Server.		
reg.1.auth.useLoginCredentials	**0 or 1**	**1**
Enables the Sign In option on the handset for user credentials. (simple sign in): **Sign in: Credentials**		

Parameter	Permitted Values	Default
reg.1.auth.usePinCredentials	**0 or 1**	**1**
Enables the Sign In option on the handset for PIN and extension credentials: **Sign in: PIN & Ext.**		
reg.1.serverFeatureControl.cf	**0 or 1**	**1**
If '0', server-based call forwarding is not enabled for this line. If '1', server based call forwarding is enabled for this line.		
reg.1.serverFeatureControl.localProcessing.cf	**0 or 1**	**0**
If set to '0' and reg.1.`serverFeatureControl.cf` is set to 1, the handset will not perform local Call Forward behavior. If set to 1, the handset will perform local Call Forward behavior on all calls received.		
reg.1.serverFeatureControl.signalingMethod	**string**	**serviceMsForwardContact**
Controls the method used to perform call forwarding requests to the server.		
reg.1.server.1.registerRetry.baseTimeOut	**10 to 120**	**10**
The base time period to wait before a registration retry. Used in conjunction with `reg.x.server.y.registerRetry.maxTimeOut` to determine how long to wait. The algorithm is defined in RFC 5626.		
reg.1.server.1.registerRetry.maxTimeout	**60 to 1800**	**180 seconds**
Sets the maximum period of time in seconds that the handset tries to register.		
reg.1.server.1.specialInterop	**standard, ocs2007r2, lcs2005, lync2010, lync2013, SkypeforBusiness**	**SkypeforBusiness**
Identifies the SIP signaling as Microsoft Skype for Business and enables Server features. Lync2010, lync2013 and SkypeforBusiness are virtually identical in the code so this default works for all 3 versions.		
reg.1.server.1.transport	**TLS**	**TLS**
The transport method the handset uses to communicate with the SIP server.		
roaming_buddies.reg	**0 or 1**	**1**
Set the line index number for the registered line for which you want to enable Presence and Instant Messaging.		
sec.srtp.holdWithNewKey	**0 or 1**	**0**
If 0, a new key is not provided when holding a call. If 1, a new key is provided when holding a call.		

Parameter	Permitted Values	Default
sec.srtp.key.lifetime	**0, positive integer minimum 1024 or power of 2 notation**	**2^31**

The lifetime of the master key used for the cryptographic parameter in SDP. The value specified is the number of SRTP packets. If 0, the master key lifetime is not set. If set to a valid value (at least 1024, or a power such as *2^10*), the master key lifetime is set. When the lifetime is set, a re-invite with a new key will be sent when the number of SRTP packets sent for an outgoing call exceeds half the value of the master key lifetime. *Note:* Setting this parameter to a non-zero value may affect the performance of the handset.

sec.srtp.mki.enabled	**0 or 1**	**1**

The master key identifier (MKI) is an optional parameter for the cryptographic parameter in the SDP that uniquely identifies the SRTP stream within an SRTP session. MKI is expressed as a pair of decimal numbers in the form: `|mki:mki_length|` where `mki` is the MKI value and `mki_length` its length in bytes. If 1, a four-byte MKI parameter is sent within the SDP message of the SIP INVITE / 200 OK. If 0, the MKI parameter is not sent.

sec.srtp.mki.length	**1 to 4**	**1**

The length of the master key identifier (MKI), in bytes. Microsoft Lync offers 1-byte MKIs.

sec.srtp.mki.startSessionAtOne	**0 or 1**	**1**

If set to 1, use an MKI value of 1 at the start of an SDP session. If set to 0, the MKI value will increment for each new crypto key.

sec.srtp.resumeWithNewKey	**0 or 1**	**0**

If 0, a key is not provided when resuming a call. If 1, a key is provided when resuming a call.

sec.TLS.profileSelection.SIP	**[see list]**	**ApplicationProfile1**

Set the TLS application profile used to store the CA certificate. Permitted values are:
- PlatformProfile1
- PlatformProfile2
- ApplicationProfile1
- ApplicationProfile2
- ApplicationProfile3
- ApplicationProfile4
- ApplicationProfile5
- ApplicationProfile6

softkey.feature.simplifiedSignIn	**0 or 1**	**1**

When set to 1 and LoginCredentials is enabled, the Features softkey menu displays the **Credentials** signin option. (SSI, Simple Sign In)

tcpIpApp.ice.mode		**MSOCS**

Specifies that ICE and TURN work with Microsoft SfB / Lync Server.

tcpIpApp.keepalive.tcp.sip.tls.enable		**1**

Set to '1' to enable keepalive packets and keep the TLS profile from timing out.

Parameter	Permitted Values	Default
voice.audioProfile.G7221.24kbps.payloadType	**0 to 127**	**112**
The payload type for the G.722.1 24kbps codec.		
voice.codecPref.G7221.24kbps	**0 to 27**	**5**
The priority of the G.722.1 24kbps codec. If 0 the codec is disabled. A value of 1 is the highest priority.		
voice.codecPref.G7221.32kbps	**0 to 27**	**0**
The priority of the G.722.1 32kbps codec. If 0 or Null, the codec is disabled. A value of 1 is the highest priority.		
voIpProt.SIP.IM.autoAnswerDelay	**0 to 40, seconds**	**40**
The time interval from receipt of the instant message invitation to automatically accepting the invitation.		
voIpProt.SIP.allowTransferOnProceeding	**0 or 1**	**0**
If set to '1', a transfer can be completed during the proceeding state of a consultation call. If set to '0', a transfer is not allowed during the proceeding state of a consultation call.		
voIpProt.SIP.serverFeatureControl.cf	**0 or 1**	**1**
If set to 1, server-based call forwarding is enabled. The call server has control of call forwarding. If set to 0, server-based call forwarding is not enabled.		
voIpProt.SIP.serverFeatureControl.dnd	**0 or 1**	**1**
If set to 1, server-based DND is enabled. The call server has control of DND. If set to 0, server-based DND is not enabled. This is the old behavior.		
voIpProt.SIP.serverFeatureControl.localProcessing.cf	**0 or 1**	**0**
If set to 0 and `voIpProt.SIP.serverFeatureControl.cf` is set to 1, the handset will not perform local Call Forward behavior. If set to 1, the handset will perform local Call Forward behavior on all calls received.		
voIpProt.SIP.serverFeatureControl.localProcessing.dnd	**0 or 1**	**0**
If set to 0 and `voIpProt.SIP.serverFeatureControl.dnd` is set to 1, the handset will not perform local DND call behavior. If set to 1, the handset will perform local DND call behavior on all calls received.		
voIpProt.SIP.header.diversion.enable	**0 or 1**	**1**
If set to 1, the diversion header is displayed if received. If set to 0, the diversion header is not displayed.		
voIpProt.SIP.mtls.enable	**0 or 1**	**0**
If 0, Mutual TLS is disabled. If 1, Mutual TLS is enabled. Used in conjunction with Microsoft Lync Server 2010/2013/SfB.		

Understanding In-Band Provisioning

This section describes in-band provisioning. A number of operating parameters are specified by the SfB / Lync server (such as how to recognize an emergency call). Those parameters are translated into Spectralink format before being used by the handset. For troubleshooting purposes, the parameters retrieved automatically from the SfB / Lync server can be dumped using the following procedure.

To view in-band provisioning parameters:

1   On your handset, go to **Menu> Settings> Advanced**, enter the password (default 456), and press **OK**.

2   Go to **Administration Settings> Upload Configuration**.

3   Scroll down and select **SIP**.

4   Press the **Upload** soft key.

The handset uploads MAC-upload-CallServer.cfg to your boot server. Open this file to view the in-band provisioning parameters.

Parameter	Permitted Values	Default
dialplan.1.e911dialmask		**This value depends on how the SfB / Lync Server is configured.**
dialplan.1.e911dialstring		**This value depends on how the SfB / Lync Server is configured.**
dialplan.1.originaldigitmap		**This value depends on how the SfB / Lync Server is configured.**
dialplan.routing.emergency.1.value		**This value depends on how the SfB / Lync Server is configured.**
msg.mwi.1.callBack		**This value depends on how the SfB / Lync Server is configured.**
msg.mwi.1.callBackMode		**This value depends on how the SfB / Lync Server is configured.**
reg.1.ice.turn.callAdmissionControl.enabled	**0**	

Parameter	Permitted Values	Default
reg.1.lisdisclaimer		**This value depends on how the SfB / Lync Server is configured.**
reg.x.srtp.enable		**1**
When set to '1', SRTP for incoming SIP calls is enabled for a given line 'x'. When set to '0', SRTP offered SIP calls are declined.		
reg.1.srtp.offer		**0**
If 1, the registration includes a secure media stream description along with the usual non-secure media description in the SDP of a SIP INVITE. This parameter applies to the registration initiating (offering) a phone call. If 0, no secure media stream is included in SDP of a SIP invite.		
reg.1.srtp.require	**0 or 1**	**0**
If '0', secure media streams are not required. If '1', the registration is only allowed to use secure media streams. Any offered SIP INVITEs must include a secure media description in the SDP or the call will be rejected. For outgoing calls, only a secure media stream description is included in the SDP of the SIP INVITE, meaning that the non-secure media description is not included. If this parameter set to 1, reg.x.srtp.offer will also be set to '1', regardless of the value in the configuration file.		
tcpIpApp.ice.turn.callAdmissionControl.enabled		**0**
tcpIpApp.ice.username		**This value depends on how the SfB / Lync Server is configured. This unique value is created for each registration and changes every eight minutes.**
tcpIpApp.ice.password		**This value depends on how the SfB / Lync Server is configured.**
tcpIpApp.ice.turn.server		**This value depends on how the SfB / Lync Server is configured.**
tcpIpApp.ice.turn.tcpPort		**443**
tcpIpApp.ice.turn.udpPort		**443**

Appendix B: Alternative Ways to Set the Base Profile

Setting the handset's Base Profile to Lync configures the handset with the necessary parameters and values required to register with SfB / Lync Server. You must be running Polycom 4.1.0 or Spectralink software 4.2.0/4.4/4.6 or above to register to SfB / Lync Server with the Base Profile. For details on the Base Profile parameters and values, see Appendix A.

The Base Profile is part of the configuration parameters in the site.cfg file provided with the Config templates for Spectralink software 4.2.0 and above. We recommend that you use a central provisioning server and the provided configuration templates to provision and maintain your system. However, some deployment situations require that you manually provision the Base Profile. Therefore, several options for setting it manually are provided in this Appendix.

There are two different ways to manually set the Base Profile.

During initial boot cycle:
- Using the multi-key combo (MKC) during bootup (This is the fastest method.)
- From the handset boot Setup menu

From the handset Home screen:
- Using the handset menu system
- Using the multi-key combo (MKC) shortcut

Note

These two alternative methods require you to manually set the Base Profile on each handset. Only using the central provisioning server relieves you of the requirement of manually handling each handset to set the Base Profile parameter.

Setting the Base Profile During Bootup

This section shows you two ways to set the Base Profile to Lync during initial handset bootup: from the Setup menu and using multi-key combo keys (MKC) during bootup.

To set the Base Profile to Lync using MKC during bootup:

1   Power cycle the handset.

2   A few seconds into the initial device bootup cycle, the handset displays the message *Starting Application, press Cancel to interrupt* and a Cancel soft key. Press the **Cancel** soft key.

The handset displays three soft keys: Start, Setup, About.

3   Press and hold the key combination 1,4,9 to display the Admin password entry screen.

4   Enter the Admin password (default 456) and press the **Ok** softkey.

The Base Profile menu displays.

5   Press the **Edit** soft key, use the **Nav** keys to scroll through the options to **Lync**, and press the **Ok** softkey and then the **Exit** softkey**.**

The handset offers three options: Exit without Saving, Save & Reboot, and Resume Setup. Select **Save & Reboot** to confirm the selection.

The handset reboots and displays the Lync Server Sign In screen.

**To set the Base Profile to Lync from the handset boot Setup menu:**

1   Power cycle the handset.

2   A few seconds into the reboot cycle, the handset displays the message *Starting Application, press Cancel to interrupt* and a Cancel soft key. Press the **Cancel** soft key.

The handset displays three soft keys: Start, Setup, About.

3   Press the **Setup** soft key, enter the password (default 456), and press the **Ok** softkey.

4   Use the **Nav** keys to scroll to the Base Profile option and select the **Edit** soft key.

5   Using the **Nav** keys, select the **Lync** option and then press the **Ok** softkey and then the **Exit** softkey.

6   The handset offers three options: Exit without Saving, Save & Reboot, and Resume Setup. Select **Save & Reboot** to confirm the selection.

The handset reboots and displays the Lync Server Sign In screen.

Setting the Base Profile from the Home Screen

This section shows you how to set the Base Profile to Lync using the handset menu system when the handset is at the Home screen.

To set the Base Profile to Lync using the multi-key combo shortcut:

1   Navigate to the **Home** screen.

2   Press and hold the key combination **1, 4, 9** on the keypad for about 3 seconds.

    Pressing and holding the MKC keys causes the Base Profile Password menu to display.

3   Enter the password (default 456) and press **OK**.

4   In the *Base Profile* menu, select **Lync**.
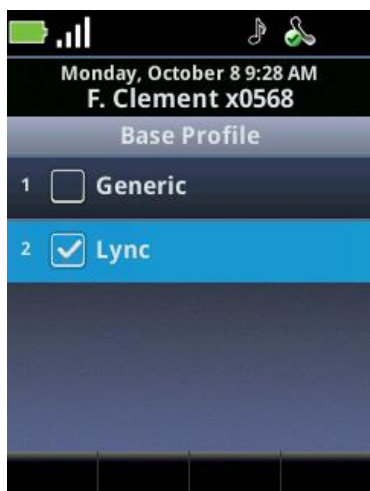
        The handset automatically reboots and displays the Lync Server Sign In screen.

>
>
> **Troubleshooting: Rebooting the Phone**
>
> If the handset does not reboot, you can manually restart by powering off/on the handset. You can also manually reboot the handset: Press the **Menu/Home** key> **Settings> Advanced**, enter the password (default 456), press Enter, and choose **Reboot Phone**. When the handset completes the reboot cycle, the Lync Server Sign In screen displays.

To set the Base Profile to Lync using the handset menu system:

1   Navigate to **Home> Settings> Advanced**.

2   Enter the Admin password (default is 456).

3   Select **Administration Settings> Network Configuration**.

4   Scroll to Base Profile and press **OK**.

5   Scroll to the **Lync** option and press **OK**.

6   Press the **Back** key and select the **Save Config** option.

    The handset automatically restarts and displays the Lync Server Sign In screen.

Appendix C: How the 84-Series Phone Processes the SfB / Lync Dial Plan

Admin Tip: Which software version?

This information applies to R4.11.0 and later.

The Spectralink 84-Series phone was developed to use the dial plan format specified in RFC 3435 (see the *Spectralink 84-Series Wireless Telephone Administration Guide* for more info). However, SfB / Lync uses its own format. Therefore, the SfB / Lync format is read by the phone at initialization and then the phone converts it to the phone format so it can be used.

The conversion of the dial plan from SfB / Lync format to phone format happens in several steps. One of the steps includes SfB / Lync sending an emergency dial string and mask. The phone uses this information to construct an emergency dial plan. The phone adds the emergency dial plan to the main dial plan.

The phone code uses an internal buffer for all of this – it can handle up to 10,000 characters.

Steps the phone uses to convert the SfB / Lync dial plan format

1   The phone receives the dial plan from SfB / Lync and produces one long string of characters composed of rules.

The phone takes each Pattern, Translation, and IsInternalExtension from the SfB / Lync plan and concatenates them together with '@' characters to produce a rule. The IsInternalExtension is represented by 0 or 1. If any rule pattern is missing the starting carot ("^") or the ending dollar sign ("$"), these are added.

The rule sequence is `pattern@translation@IsInternalExtension`

Example

SfB / Lync rule:

```
Description         : Lisbon 8047x & 8063x
Pattern             : ^((8047[0-9])|(8063[0-9]))$
Translation         : +3512131$1
Name                : Lisbon 5 digit 2
IsInternalExtension : True
```

Becomes this string:

```
^((8047[0-9])|(8063[0-9]))$@+3512131$1@1
```

Each rule is added to the previous by separating the rules with a pipe character ("|").

```
rule-1|rule-2|rule-3|…
```

If any rule would make the string longer than the 10,000 character limit, it and any subsequent rules are not added. Processing continues without the rule(s) that pushed the string beyond the 10,000 character limit. The phone writes the concatenated string to an internal config item `dialplan.1.originaldigitmap`. Internal config items of this type cannot be set by the administrator.

This configuration item can be checked by exporting the config using the Utilities menu in the Web Configuration Utility, see *Web Configuration Utility User Guide*.

2   The phone adds the Emergency dial plan to the end of the regular dial plan.

The code gets the Emergency String and Mask from SfB / Lync and produces a string of characters composed of rules. These rules are added to the end of the SfB / Lync dial plan if they fit within the 10,000 character limit.

3   The phone pre-processes the dial plan to remove alternate notation.

If any rule pattern has alternate notation in it like (a|b|c) which means "a or b or c", this has to be removed before it can be converted to the phone format. The pre-processing routine allows up to 30 alternate sections inside the alternate notation. It also allows you to put another set of parentheses around each section like this ((a)|(b)|(c)). Each alternate section can be up to 32 characters long. Any rule that does not follow these guidelines will be dropped.

The code removes the alternate notation by duplicating the rule over and over, using each alternate in a separate rule. This increases the length of the dial string. If the length of the pre-processed data does not fit into the dial plan (if the dial plan string is now longer than 10,000 characters) the rule will be dropped.

Example

If a rule is this (from the example above with the embedded parentheses removed):

```
^(8047[0-9]|8063[0-9])$@+3512131$1@1
```

It gets turned into this:

```
^(8047[0-9])$@+3512131$1@1|^(8063[0-9])$@+3512131$1@1
```

4   The phone converts the pre-processed string to phone format.

Converting from the pre-processsed format to the phone format may also increase the size of the string. Refer to Section 2.1.5 of RFC 3435 for more information about the phone format. If the new string is longer than 10,000 characters, the string is truncated and any rules that don't fit are dropped. This string is now written out to config item `dialplan.1.digitmap`.

This configuration item can be checked by exporting the config using the Utilities menu in the Web Configuration Utility, see *Web Configuration Utility User Guide*.

How to check the resulting phone format for a given SfB / Lync format string

The phone produces config items that can be viewed in an export of the phone's configuration files.

1   **dialplan.1.originaldigitmap** – This is the SfB / Lync dial plan that is output from Step 1 above. This config item is produced by the phone. It is not configurable by an administrator or available as a parameter in the config files.

   dialplan.1.originaldigitmap, is the dial plan in SfB / Lync format before any pre-processing.

2   **dialplan.1.digitmap** – This is the phone format the phone is using.

   dialplan.1.digitmap, is the value of the final phone format string created from the **dialplan.1.originaldigitmap** item. This string will also show the converted items for the emergency dial plan.

These configuration items can be checked by exporting the config using the Utilities menu in the Web Configuration Utility, see *Web Configuration Utility User Guide*.

Log messages from the phone for dial plan processing.

Whenever any rule is truncated or dropped, the phone will log an error message. These are output at level 4 so they will be seen at normal log levels and they all include the string "DIALPLANERROR". However, for debugging, the log levels can be set to 2 for pps and 3 for utilm. Here are the config items to do this.

```
log.level.change.pps="2"
log.level.change.utilm="3"
```

Using these levels will cause the phone to output both the input and output values for the pre-processor and conversion routines.

****END OF DOCUMENT****