spectralink

Spectralink Site Survey Function in Handset

User Guide

14225120-IG, Edition 2.0
January 2018, Original document

Contact Information

US Location	UK Location	Denmark Location
+ 1 800-775-5330	+44 (0) 20 3769 9800	+45 75602850
Spectralink Corporation 2560 55th Street Boulder, CO 80301 USA	Spectralink Europe UK 329 Bracknell, Doncastle Road Bracknell, Berkshire, RG12 8PE United Kingdom	Spectralink Europe ApS Bygholm Søpark 21 E Stuen 8700 Horsens Denmark
info@spectralink.com	infoemea@spectralink.com	infoemea@spectralink.com

Contents

14225120-IG, Edition 2.0
January 2018, Original document

Introduction

This guide is intended for qualified technicians who will deploy Spectralink IP-DECT/DECT Server Solutions. To qualify to deploy a IP-DECT/DECT Server Solution, you must have understood and completed the technical training successfully. This guide covers both 1G8 and 1G9 deployment.

Before You Begin

This guide assumes the following:

- You have a working knowledge of deployment in general
- You have completed the technical training

Related Documentation

For information about Server IP-DECT/DECT Server Solutions not covered by this manual, refer to the following documentation:

Subject	Documentation
Spectralink Handset	For more information about the handset, refer to the user guide available online at http://support.spectralink.com/products.
Synchronization and Deployment Guide	For more information about synchronization and deployment, refer to the guide available online at http://support.spectralink.com/products.
Spectralink IP-DECT/DECT Server	For more information about the server, refer to the guide available online at http://support.spectralink.com/products.
Spectralink Technical News	Newsletter that describes software changes, bug fixes, outstanding issues, and hardware compatibility considerations for new software releases. To subscribe, go to www.spectralink.com.
Spectralink DECT Training material	

Terminology and Acronyms

The table below refers to common terms and acronyms that are related to the Spectralink IP-DECT/DECT solutions.

Term	Definition
Deployment	The act of locating the mounting location and installing base stations and repeaters. System performance is dependant on the deployment made - and, therefore, the survey performed.
Handover	A process initiated by the handset in which the speech channel carrying an active conversation is passed from one base station to another.
Erlang	The erlang is a dimensionless unit that is used in telephony as a measure of offered load or carried load on service-providing elements such as telephone circuits or telephone switching equipment.
LED	Light Emitting Diode
LI-Ion	Lithium-Ion
Ni-MH	Nickel -Metal Hydride
Q Value	Signal Quality Factor value. An expression of the bit failure rate in the communication between the handset and a base station. The value has a max. of 64, equal to no bit errors measured.
LAN synchronization	Method for synchronizing IP base stations over LAN
Synchronization Over the Air (OTA)	Method for synchronizing IP base stations over Air (radio)
SUOTA	Software Update Over The Air
RF	Radio Frequency
RSSI Value	Radio Signal Strength Indication value. A relative expression for the signal strength of a base station as measured by the handset at a given location.
Site survey	A site survey comprises the act of locating the best places for base stations by measuring RSSI levels with DECT handsets. Complete survey consists of measuring with multiple base stations, combining RSSI and Q value reading in real surroundings.

Term	Definition
Speech channel	A speech channel is used to carry communication between the handset and the base station or repeater.
AC	Authentication Code
ARI no.	Access Rights Identity - Serial number of the (missing or bad snippet).
CLI	Command Line Interface
dB	Decibels (deciBells)
DECT	Digital Enhanced Cordless Telecommunications
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
e.i.r.p.	Equivalent Isotropic Radiated Power
GAP	Generic Access Profile
HW PCS	Hardware Product Change Status - Hardware edition
IP	Internet Protocol
IPEI	International Portable Equipment Identity - Serial number of the handset - SN
IWU	Inter Working Unit
Spectralink IP-DECT Server	Spectralink IP-DECT Server400/6500
Spectralink DECT Server	Spectralink DECT Server2500/8000
LAN	Local Area Network
MAC	Media Access Control - hardware address of a device connected to a network
MTU	Maximum Translation Unit
MWI	Message Waiting Indication
NIC	Network Interface Card
NTP	Network Time Protocol
PBX	Private Branch eXchange
PCS	Product Change Status (Edition)
PoE	Power over Ethernet

Term	Definition
PP	Portable Parts - wireless handset
RSSI	Received Signal Strength Indicator
RTP	Real-time Transport Protocol
SIP	Session Initiated Protocol
SW PCS	Software Product Change Status - Software edition
TFTP	Trivial File Transfer Protocol
UDP	User Datagram Protocol
VoIP	Voice over Internet Protocol
WLAN	Wireless Local Area Network
WRFP	Wireless Radio Fixed Part - Wireless Repeater

About the Survey Function

This section only describes the survey function in the handset (Spectralink Handset 7522/7532/7622/7642/7722/7742). For more information about the handset, see the relevant Handset User Guide. For more information about synchronization and deployment, see Synchronization and Deployment Guide.

The survey function in the handset can be used for DECT installation and deployment and for troubleshooting on existing DECT deployments.

Note:

Entering survey function requires a PIN code.

The handset do not need to be subscribed to a system to perform site survey.

The handset as a site survey tool is only to be used by trained technicians. Working knowledge of deployment in general is required.

The survey function provides the following options:

- Site Survey - measurements of base stations
- Other DECT - view other DECT base stations (RPN)
- Other Systems - view other DECT systems (ARI)
- One Base - lock handset to one base station
- Handover - check handover between two base stations
- Sync Chain - verify sync chain (handset act as base station)
- Free Channels - live view of all 120 (60) in the air

Note:

Using the survey function, the battery lifetime is reduced relative to a standard handset because:

- The handset scans faster than a handset in normal operating mode.
- The DECT radio is active for a long time in asynchronous mode.

Entering the Site Survey Function

To Enter Survey Mode

Note:

Entering survey mode requires a 4-digit PIN code.

The PIN code is the last 4 digits in the IPEI of the handset.

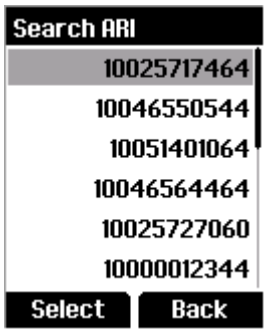
You can find information about IPEI in the Status menu under **General information**.

1. Press **Menu** to enter main menu.
2. Scroll to **Status**, and press **Select**.
3. Scroll to **Survey**, and press **Select**.
4. Enter a 4-digit PIN code, and press **Select**.

   Pressing **Select** will activate the ARI code selection.

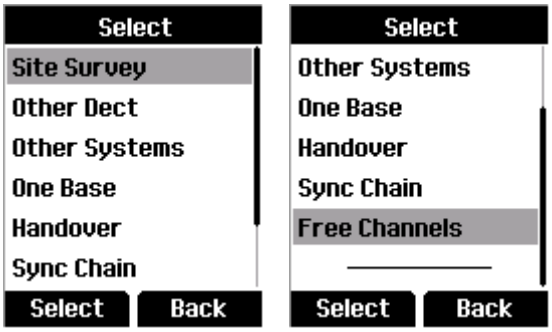
   The handset will show the ARI code of the DECT system you are connected to (if any).

5. Do one of the following:
   - Press **Select** if you want to make this ARI code active for the rest of the survey session and activate the **Survey** function, where you can select between the different options.
   - Press **Search** if you want to search for all active ARIs that can be detected from the handset.



Scroll to the relevant ARI, and press **Select** to make this ARI code active for the rest of the survey session and activate the **Survey** function, where you can select between the different options.

6. Scroll to the relevant option, and press **Select**.



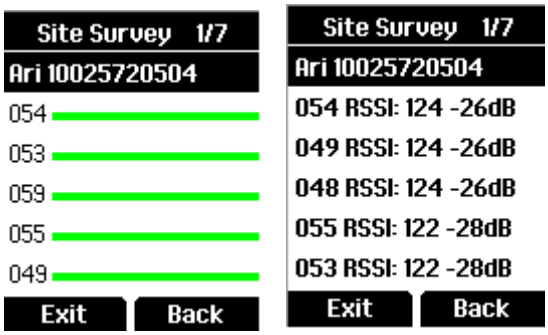
The survey function contains the following options:

- Site Survey
- Other DECT
- Other Systems
- One Base
- Handover
- Sync Chain
- Free Channels

Site Survey

The Site Survey option uses the selected ARI code of the system to survey. The different base stations (RFP) will appear with their decimal numbers, as they are programmed in the DECT Server.

Site Survey can be displayed in two modes; graphical mode and text mode. The same information is shown in both modes.



You can toggle between the two modes by pressing the **left or right side of the navigation key**.

In both graphical mode and text mode, the number of base stations within range of the handset is shown in the top bar. In the above example, indicated by 1/7, the handset can detect 7 base stations. 1 - 5 base stations is shown. The first is the one with the highest RSSI value. The selected ARI code is also shown. A maximum of 100 base stations can be shown in the visible list. If the relevant base station is not shown in the display, it is possible to scroll in the list by pressing the **top and bottom of the navigation key**.

The list is sorted according to the RSSI value.

In graphical mode, the base stations RSSI values have been translated to colour indicators showing the RSSI value. This enables the user to easily see if the base stations transmitted signal is received within value limits (indicated with green colour) or not (indicated with red colour if RSSI value is lower than 80). The length of the line is given by the RSSI value.

In text mode, the base stations RSSI values are also shown as dBm values. For more information, see "Relationship between RSSI and dBm Values" on page 20.

Other DECT

Note:

The number of other/foreign DECT systems present in the area of the handset is useful information e.g. when investigating whether a DECT system is being disturbed by another DECT system.

The handset searches for all other DECT systems in the area, showing the number of base stations with an ARI code different from the selected ARI code. Base stations are divided into two groups; one with high RSSI values and one with low RSSI values.

- High RSSI value is the number of base stations that could interfere with the current DECT system.
- Low RSSI value is the number of base stations that will not cause a problem for your DECT system.

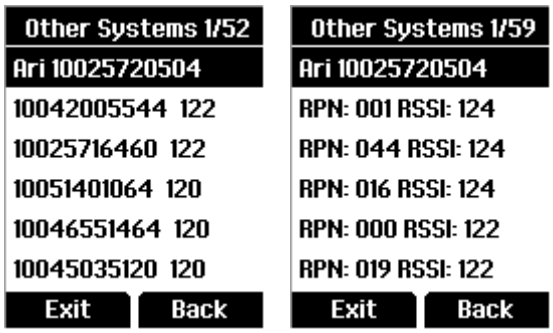
Note:

A DECT system is defined as having a high RSSI value if it is above 75.

Other Systems

The Other Systems option is used to indicate how many other foreign DECT base stations are present in the area of the DECT handset.

The Other Systems list can be displayed in two modes; ARI mode and RPN mode. ARI mode shows ARI of the foreign DECT system. RPN mode shows the RPN of the base station. The RSSI values are also shown. The system list is sorted according to the RSSI value.



You can toggle between the two modes by pressing the **left or right side of the navigation key**.

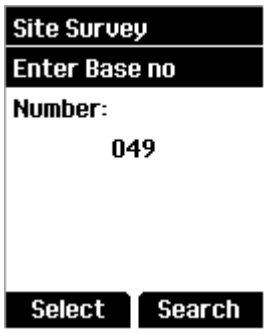
In both ARI mode and RPN mode, the number of foreign base stations within range of the handset is shown in the top bar. In the above example, indicated by 1/59, the handset can detect 59 foreign base stations that do not belong to the Spectralink DECT system. The selected ARI code is also shown. If the relevant RPN/ARI is not shown in the display, it is possible to scroll in the list by pressing the **top and bottom of the navigation key**.

One Base

The One Base option can be used to lock the handset to one base station (RPN). The handset will only show this one base station. The base station will appear with its decimal numbers, as it is programmed on the DECT Server.

Note:

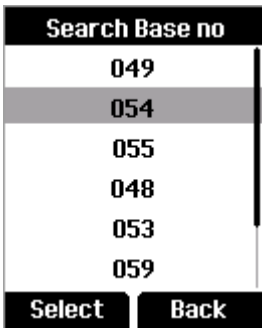
The One Base option is useful when checking the coverage of just one base station without seeing other base stations.



The handset displays the RPN of the base station that it is currently connected to.

You now have two options:

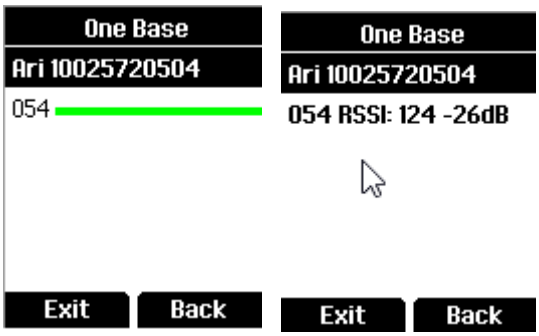
- If pressing **Select**, the handset goes into the One Base view.
- If pressing **Search**, the handset starts searching for base stations (RPN's).



All base station numbers (RPN's) within the range of the handset on the selected DECT system will be shown.

  - Press the **top or bottom of the navigation key** to scroll to the RPN number, that you want to view.

- Press **Select** to activate the One Base view. Only the selected base station appears in the list.



The One Base list can be displayed in two modes; graphical mode and text mode. You can toggle between the two modes by pressing the **left or right side of the navigation key**.

In graphical mode, the base station RSSI value has been translated to a colour indicator showing the RSSI value. This enables the user to easily see if the base station transmitted signal is received within value limits (indicated with green colour) or not (indicated with red colour if RSSI value is lower than 80). The length of the line is given by the RSSI value.

In text mode, the RPN number in decimal and the signal strength in RSSI value and dBm value is shown. For more information, see "Relationship between RSSI and dBm Values" on page 20.

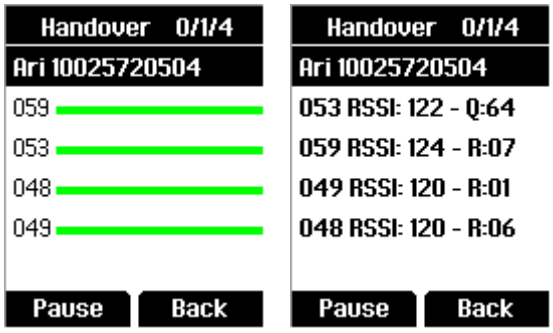
Handover

The Handover option can be used to check handovers in an already installed system or when surveying a new DECT system. Using the Handover option, the handset will measure if it is possible to make a connection handover to the surrounding base stations from the current location of the handset.

Note:

In handover mode, it is possible to inspect the base stations/repeaters from the selected DECT system in the surrounding area. If the handset is subscribed to the active ARI, it is possible to make and receive calls in this mode.

Handover can be displayed in two modes; graphical mode and text mode.



You can toggle between the two modes by pressing the **left or right side of the navigation key**.

In both graphical mode and text mode, the top bar will show the ARI code of the base station that the handset currently is locked to.

In graphical mode, the handset will only display green colour bars when two base stations are within acceptable sync levels. Therefore, a red indication can also be acceptable in rare instances where only one base station is available.

The RSSI value between green and red colour is set to 70.

On the locked base station, the bar is green when the RSSI value is above 70 and the quality is above 61. On all the other base stations, the bar is green if the RSSI value is above 70.

Active slot and its neighbor slots cannot be seen by the scanner. Some active bases can hide in these slots.

Note:

If there are more base stations with green bars (RSSI > 70), then it is possible to make handover between these base stations.

In text mode, the base station information will show the RPN number in decimal and the Q value (quality) of the connection to the base stations. The range of the Q value goes from 64 (good) to 52 (poor). The lines below show information about base stations that the handset also can detect on the DECT system. These base stations are indicated by RPN number (in decimal), and their R-value. R-values from - 20 to + 20 are good. The R-value is the offset that the different base stations have to the locked base station. The R-value is an indication of the phase shift of the base stations in the air.

The offset can vary depending on the used sync mode (LAN sync or radio sync). Using radio synchronization (Over The Air) could give the highest values, depending on the differences in numbers of base stations in the sync chains (how many jumps your base stations are apart).

Note:

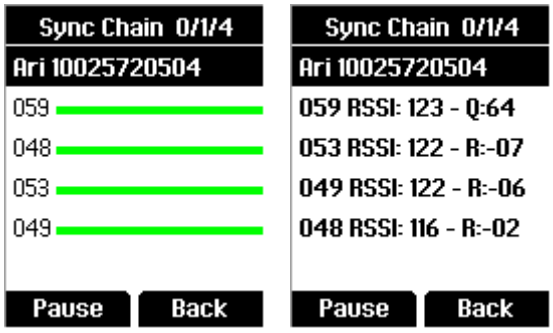
R-values ranging from - 20 to + 20 are good. If your R-values are outside this range, you can experience issues with handovers.

In a call it is possible to force a connection handover by pressing the **#** key.

Sync Chain

The Sync Chain option is used when checking an already installed sync chain or when enabling a new sync chain. The handset should be considered as a base station. The position of the handset should match the placement of the base station. The handset will measure if it can obtain stable sync to the surrounding base stations from the current location of the handset.

Sync chain can be displayed in two modes; graphical mode and text mode. You can toggle between the two modes by pressing the **left or right side of the navigation key**.



You can toggle between the two modes by pressing the **left or right side of the navigation key**.

In both graphical mode and text mode the top bar will show the ARI code of the base station that the handset currently is locked to.

In graphical mode, the handset will only display green colour bars when two base stations are within acceptable sync levels. Therefore, a red indication can also be acceptable in rare instances where only one base station is available.

The RSSI value is green when > 80 and red when < 80.

On the locked base station, the bar is green when the RSSI value is above 80 and the quality is above 61. On all the other base stations, the bar is green if the RSSI value is above 80.

Active slot and its neighbor slots cannot be seen by the scanner. Some active bases can hide in these slots.

In text mode, it is possible to see the signal quality of the base station that the handset is locked to and the signal phase of the other base stations. The R-value information can be used as a kind of measurement of the distance to the transmitting base station.

Note:

R-values from - 20 to + 20 are good. Base stations with R-values between - 20 to + 20 are good candidates for connection handover.

In connected state it is possible to force a connection handover by pressing the **#** key.

Free Channels

The Free Channels option is used for checking the systems performance and how many and which channels are in use or free. The 120 channels (only 60 channels in North America) are displayed in the handset, and colours indicate the low/medium/high RSSI value for each channel.

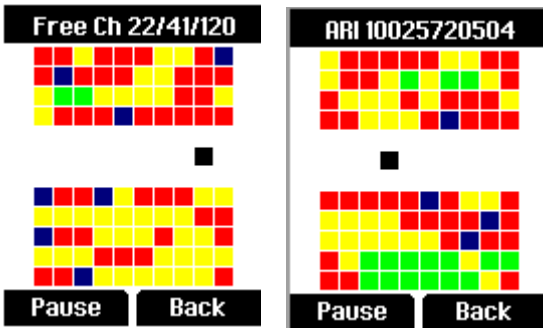
This gives the user an indication of interference from other airborne systems that can have an influence on the installed DECT system.

The handset is locked to the selected system and makes a scanning for 1 DECT channel at a time. The scanning takes max. 50 ms for 1 channel.

Free Channels is displayed in free channels mode. You can toggle between Free-Ch and the ARI code of the system that the handset is locked to by pressing **left or right side of the navigation key**. Free-CH shows green/free and yellow/usable channels of the total 120 channels (60 channels in North America). In the example below there are 22 green channels free and 41 yellow channels usable out of 120 channels.

Note:

The Free Channels indication will update in realtime! You will be able to see a complete overview of all 120 channels (60 channels in North America) in the AIR realtime using Spectralink DECT handsets (Spectralink Handset 7522/7532/7622/7642/7722/7742).



Note:

If a foreign system is interfering with your DECT system, you can see the red blocks filling up complete row from top to bottom and not moving, this would be an indication to that e.g. a mobile system is interfering in your frequency range:

- EMEA, Australia & New Zealand: 1G8: 1880 – 1900 MHz
- South America: 1G9: 1910 – 1930 MHz
- USA & Canada: 1G9: 1920 – 1930 MHz (DECT 6.0)

Description of Free Channels Display

- Free channels display all slots and frequencies.
- The x-axis is the frequency from 0 to 9.
- The y-axis is the slot number from 11 to 0.
- Upper left corner is frequency 0 and slot 0.

Description of Free Channels Colours

Colours - Other Channels

- Green: Free channels, RSSI value under 70 (- 80 dBm).
- Yellow: Usable channels, RSSI value between 70 (- 80 dBm) and 85 (- 65 dBm).
- Red: Occupied channel, RSSI value over 85 (- 65 dBm).

Colours - DECT System's Own Channels

- Dark blue: Very good own base, RSSI value over 85 (- 65 dBm).
- Blue: Usable own base, RSSI value between 85 (- 65 dBm) and 70 (- 80 dBm).
- Gray: Weak own base, RSSI value under 70 (- 80 dBm).
- White: Dummy slot which cannot be scanned.
- Black: Current dummy bearer

DECT Deployment and RSSI/dBm Value Limits

	Site Survey	One Base	Handover	Sync Chain	Free Channels
Green	> 79 RSSI/ - 71 dBm	> 79 RSSI/ - 71 dBm	> 70 RSSI/ - 80 dBm	> 80 RSSI/ - 70 dBm	< 70 RSSI/ - 80 dBm
Yellow	-	-	-	-	70 RSSI/- 80 dBM and 85 RSSI/- 65 dBm
Red	< 80 RSSI/ - 70 dBm	< 80 RSSI/ - 70 dBm	< 70 RSSI/ - 80 dBm	< 80 RSSI/ - 70 dBm	> 85 RSSI /- 65 dBm

Relationship between RSSI and dBm Values

You can convert to/from RSSI and dBm values using the formulas below.

Conversion of RSSI to dBm values	Conversion of dBm to RSSI values
RSSI = dBm + 150 Example with dBm = - 90: - 90 + 150 = 60 RSSI	dBm = - (150 - RSSI) Example with RSSI = 60: - (150 - 60) = - 90 dBm