Chapter 6

Monitoring and Testing the Link

The WinLink™ 1000 Manager software enables you to monitor the link, as well as perform Loopback tests. It also provides a handy Link calculator utility for calculating the expected performance of the wireless link and the possible RF and antenna configurations for a specific link range.

Retrieving Link Information (Get Link Information)

The Get Link Information feature collects and writes all link and Manager information (from both sides) into a comprehensive file. The file can be used for diagnostics and should be sent to technical support to speed up assistance.

The following table lists link and system information that can be monitored.

Table 6-1: Get Link Information Data and Description

Data	**Description**
System Data	General information about the system
Link Information	Information about the link properties
Event Log	List of recent system events
Site Configuration	Data about the site parameters
Active Alarms	List of active alarms
Performance Monitor	Network performance data over defined time periods
Monitor	Detailed event data record

❋ **To get link information**

1. On the **Help** menu, choose **Link Information**.

The Get Link Information dialog box appears:

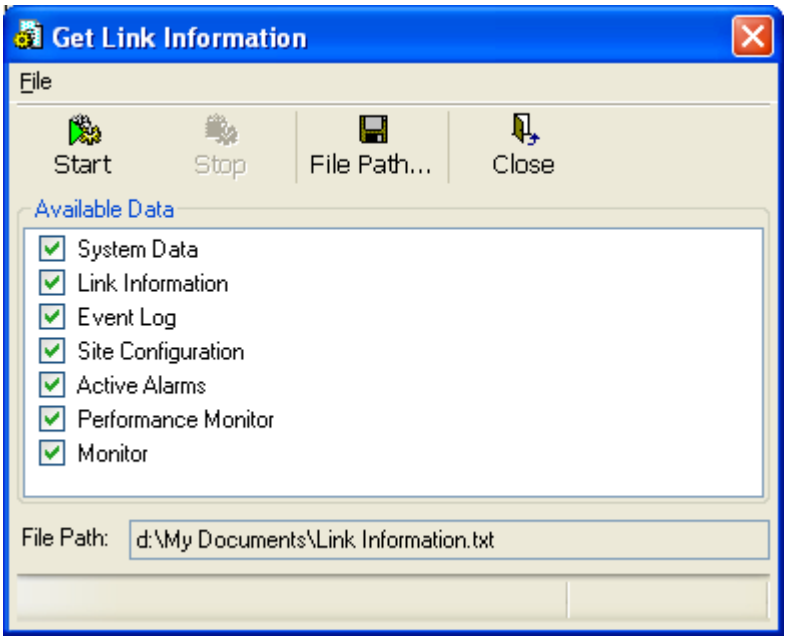


Figure 6-1: Get Link Information Dialog Box

2. Select or deselect the data options. If the file is to be sent to Technical Support leave all options checked.
3. Click **File Path** to specify the folder in which you want to save the file and then click **Start** to save the information.

   The file is saved in the specified folder as Link Information.txt

Link Compatibility

Link Compatibility indicates the version compatibility via software traps. As new hardware is added to existing networks compatibility issues may arise. An incompatibility issue is indicated to the user via a change of color of the Link Status box on the Main Menu screen. Trap messages in the Event Log indicate the problems or limitations and suggest upgrades when appropriate.

The following Link Status messages are given:

fullCompatibility - different software versions were detected that are fully compatible. Message indicates that upgrade is available.

restrictedCompatibility - different software versions were detected that operate correctly. However, new features are not supported

softwareUpgradeRequired - different software versions were detected with limited operation. The link will operate as Ethernet only; a full service will not be available. The message is software upgrade required.

versionsIncompatibility - different software versions were detected that are not compatible. User needs to perform local upgrades.

Table 6-2: Link Compatibility Trap Messages

Link State	**Link**	**Link Status**	**Site Description**	**Site**	**Link Status**
	State text	**Color**		**Desc. Color**	**Color**
fullCompatibility	Active	Green	SW Upgrade Available	Yellow	Green
restrictedCompatibility	Active - SW Version mismatch	Magenta (Same as authentication error)	SW Upgrade Recommended	Yellow	Magenta (Same as authentication error)
softwareUpgradeRequired	Active – SW Upgrade Required	Brown (Major)	SW Upgrade Required	Yellow	Brown (Major)
versionsIncompatibility	Not Active - SW Upgrade Required	Red	Local SW Upgrade Required	Yellow	Red

Testing the Connection

Testing the connection supports activation of the internal and external loopbacks on the local and remote units.

❋ **To activate a loopback:**

1. From the Maintenance menu, choose **Set Loopbacks**.

   The Loopbacks dialog box appears:

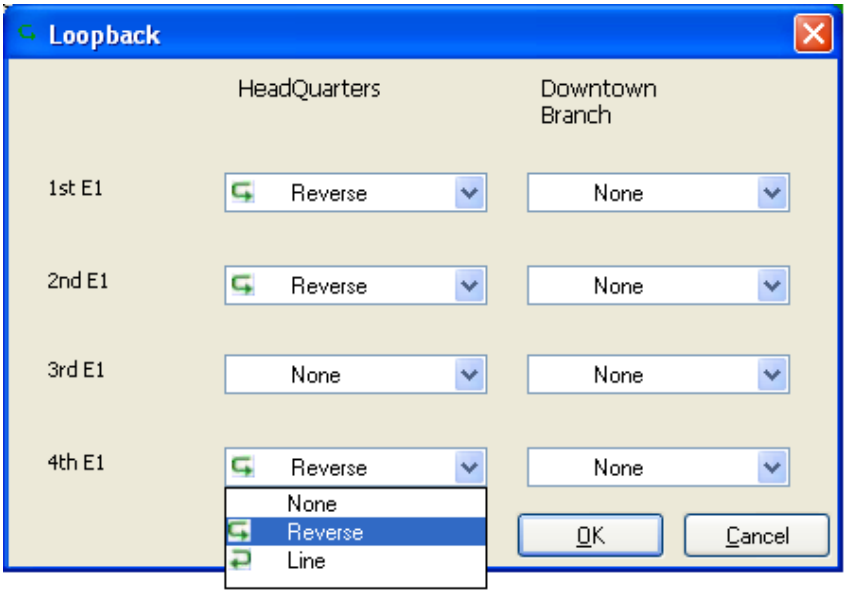


Figure 6-2: Loopback dialog box

2. From the Local or Remote drop-down box, select a loopback that you intend to run, and click **OK**.

   A confirmation message appears.

3. Click **OK** to activate a loopback.

   This activates selected loopback. A loopback status arrow in the Main menu turns green to indicate an active loopback.

❋ **To deactivate a loopback:**

- From the From the Local or Remote drop-down box of the Loopbacks dialog box, select **None** and click **OK**.

  A loopback is deactivated and the corresponding status arrow in the Main menu becomes dimmed.

Local External Loopback

Local external loopback can be set to an external loopback to test the local E1/T1 port and its connection to the local side user equipment. In this mode, data coming from the local user equipment is looped back to it. This loopback is initiated from a management station connected to the local unit.

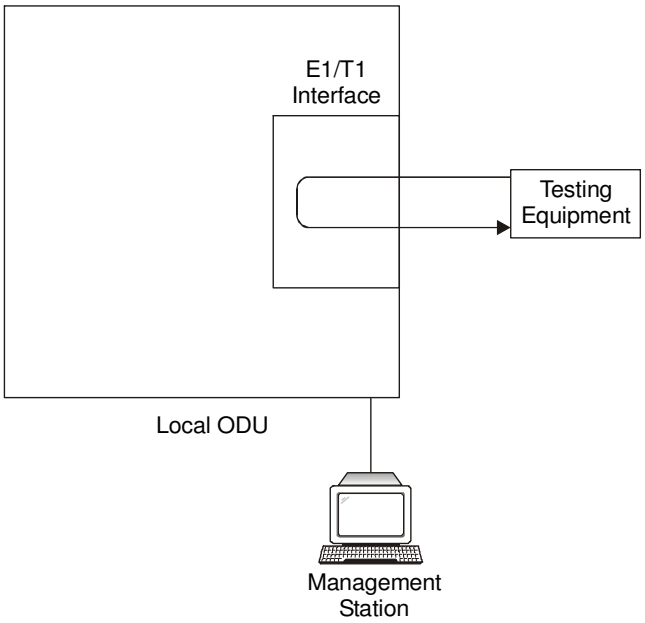


Figure 6-3: Local External Loopback

Remote Internal Loopback

Remote internal loopback can be set to an internal loopback to test connection between the local and remote units, the local E1/T1 port and its connection to the local side user equipment. In this mode, data coming from the local unit is looped back to it. This loopback is initiated in band from a management station connected to the local unit.

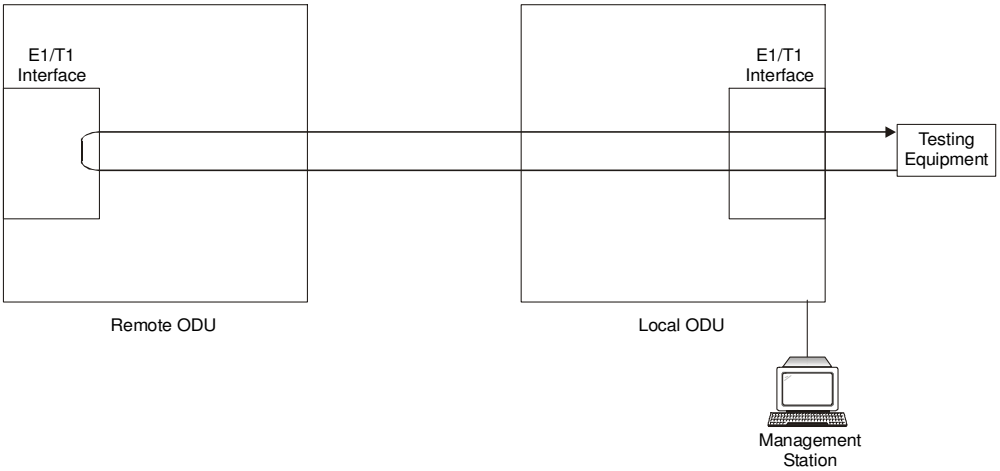


Figure 6-4: Remote Internal Loopback

Remote External Loopback

The remote unit can be set to an external loopback to test the remote E1/T1 port and its connection to the remote side user equipment. In this mode, data coming from the remote user equipment is looped back to it. This loopback is initiated by an in band command sent from a management station connected to the local unit.

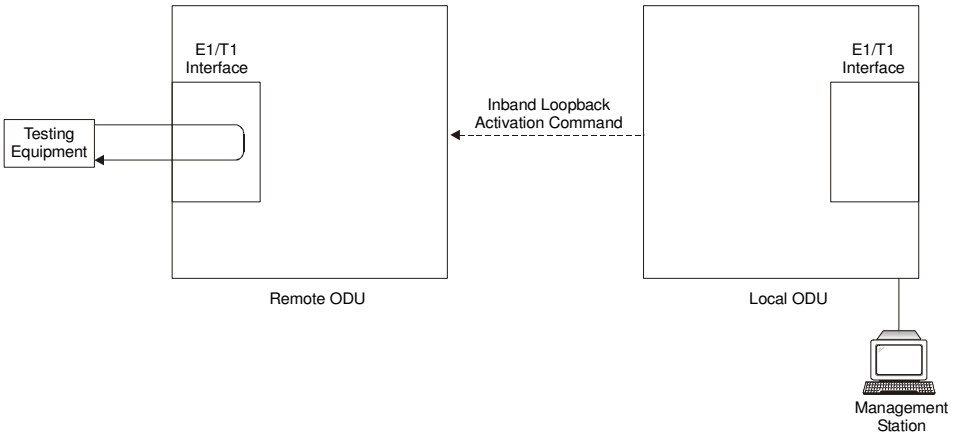


Figure 6-5: Remote External Loopback

Local Internal Loopback

The local unit can be set to close an internal loopback to test connection between the local and remote units, remote E1/T1 port and its connection to the remote side user equipment. In this mode, data coming from the remote user equipment is looped back to it. This loopback is initiated by an in band command sent from a management station connected to the local unit.

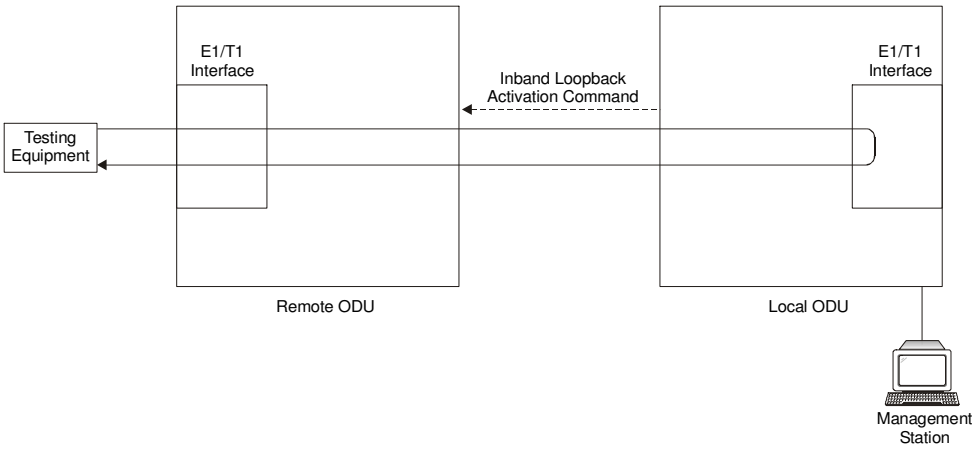


Figure 6-6: Local Internal Loopback

Reinstalling/Realigning the Link

It may be necessary to reinstall the link if the ODUs need to be realigned.

Note:

Activating Install Mode causes both sites to go into install mode, causing disruption in service for approximately fifteen seconds.

❋ **To reinstall the link:**

1. From the **Configuration** menu, choose a site.

   The Configuration dialog box opens.

2. In the Configuration dialog box, click the **Install Mode** button.

   A message box asking if you want to enter install mode appears.

3. Click **Yes** to continue.

   The system enters Install mode and the alignment tone becomes audible.

4. Realign the ODUs and start the Installation wizard (see Chapter *3*).

The Link Budget Calculator

The Link Budget Calculator is part of the WinLink™ 1000 Manager software and is found in the Help menu. This useful utility enables you to calculate the expected performance of the wireless link and the possible configurations for a specific link range including antenna size, cable loss and climate conditions.

The Link Budget Calculator enables you to calculate the expected RSS of the link, and determine the stability of services and their effective throughput as a function of the link range and deployment conditions.

The Link Budget Calculator is found on the Installation CD and from tech support so it can be used prior to installation to define and verify link parameters such as expected RSS, maximum range, and number of E1s/T1s that a link is capable of providing. It enables verification of installation quality and provides calculations that consider "real world" factors such as climate.

The Link Budget Calculator screen appears in the following figure.

Figure 6-7: WinLink™ 1000 - Link Budget Calculator

Performance Monitoring

Performance Monitoring constantly monitors traffic over the radio link and collects the following statistics data:

- Site 1/Site 2 received traffic rate (in Mbps)
- Site 1/Site 2 received frames rate (in Mbps)
- Radio signal strength (in dBm)
- Error (Blocks).

WinLink™ 1000 monitors the Air interface, ETH ports, and TDM trunks. It does so continuously, even when the WinLink™ 1000 Manager is not connected.

Two types of logs are recorded:

- **Monitor log** that records statistics on traffic rate and radio signal strength.
- **Events log** that records when the rates fall above or below a predefined threshold.

Both the statistics (monitor) log and event log can be saved as TXT files.

The Monitor Log

The Monitor log records performance statistics for predefined intervals. You can save the monitor log to a text file, as well as display the information in an on-screen report.

Saving the Monitor Log

You can save the recorded Monitor log statistics to a text file.

✱ **To save the monitor log:**

1. From the **Tools** menu, choose **Preferences**.

   The Preferences dialog box appears:

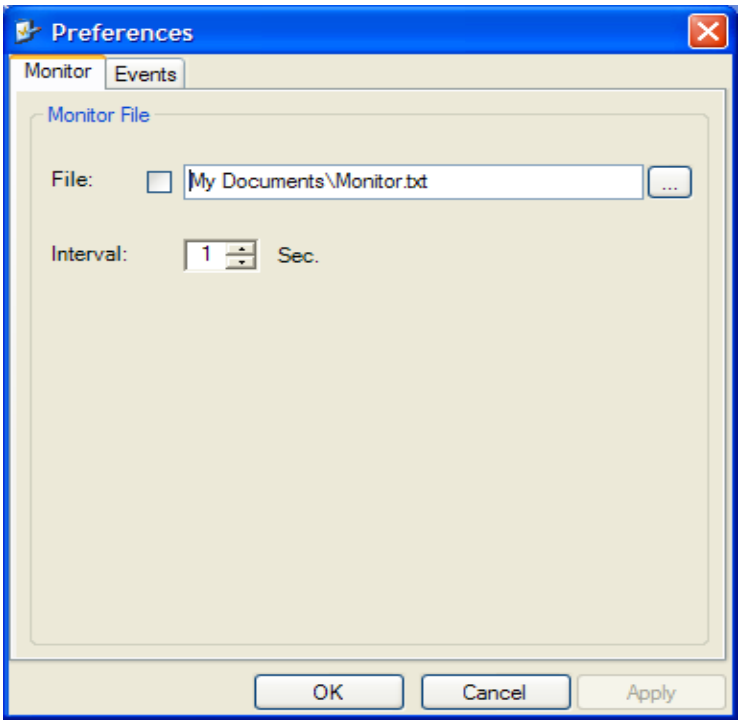


Figure 6-8: Preferences dialog box

2. Click the **Monitor** Tab.
3. Select the file to save.
4. Click the check box to open the file for saving.
5. Click the ... button and in the Select File dialog box indicate in which folder and under what name the monitor log file is to be saved.
6. Set the time interval for adding data to the file.
7. Click **OK** to save the file.

Viewing Performance Reports

The Performance Monitor Report displays performance views of each of the interfaces[3]:

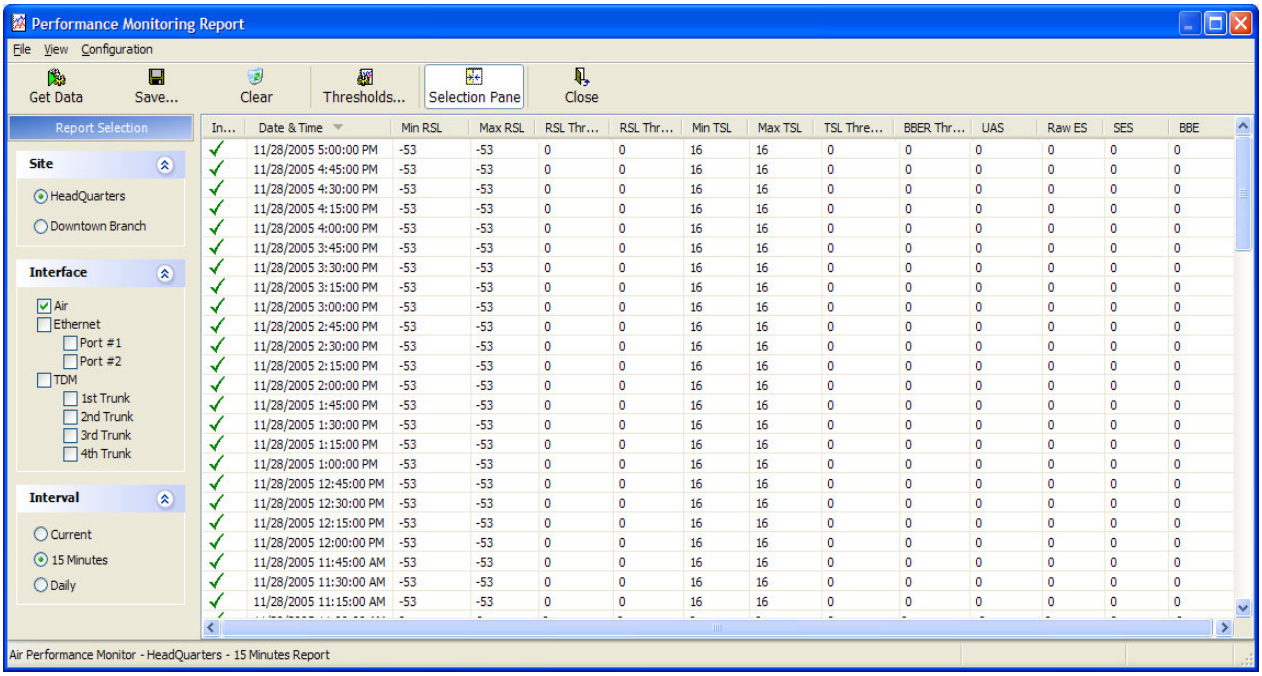


Figure 6-9: Performance Monitoring Report window

Several performance data occurrences are collected for each of the interfaces (ES, SES, and UAS), as well as Specific data per Interface type (e.g., TX and RX bytes for Ethernet). For the Air Interface, user defined thresholds data are collected. Refer to

[3] Ethernet performance is not collected in PoE systems.

Table 6-3 and *Table 6-4, Performance Monitoring Report Toolbar.*

Data is collected and selectively displayed based on three time intervals as selected by the **Interval** radio buttons:

- Current (t=0)
- 15 minutes Intervals
- Daily.

UAS – This parameter counts the time the air link was not providing any service. There are several potential reasons for this situation; one of the sites has a power failure, high interference, maintenance operation, etc.

Radio **BBER** Threshold – This parameter counts the seconds in which the radio performance is below a user specified threshold. The threshold is measured in percent. The threshold can be set from 0.1% up to 50%.

For links with E1/T1 service the recommended value is 1% (system default). Excellent TDM service is expected below the 1% threshold, meaning that for 1% threshold, the expected BBER value should be 0 if there are no problems during the 15 min interval. If the BBER threshold increases a degraded service might be noticed.

For links with Ethernet only service, 8% threshold is recommended and not 1% meaning that for 8% threshold, the recommended BBER value should be 0 if there are no problems during the 15 min interval. Since the system provides a loss less Ethernet service, there is throughput degradation in case of interference. The degradation is proportional to the BBER.

Radio RSS Threshold - Radio RSS Threshold can also be used to indicate problems in the radio channel. You can verify the RSS according to the link budget calculator during the installation. A value of -5dB from the current RSS is recommended as a threshold.

Table 6-3: Explanation of performance data

Data type	Reported Value	Explanation
Generic PM Data	UAS – Unavailable Seconds	Seconds in which the interface was out of service.
	ES – Error Second	The number of seconds in which there was at least an error block. Note that notation of an error block is different per interface.
	SES – Severe Error Second	The number of seconds in which the service quality is low (the actual BBER ratio varies per interface).
	BBE – Background Block Error	The number of error block in an interval.
	Integrity	A flag indicating that the data is valid. Note that the PM data is not valid if not all the values were stored[4].
Air Interface PM Data	Max RSL	The maximum of the receive signal level (measured in dBm).
	Min RSL	The minimum of the receive signal level (measured in dBm).
	Max TSL	The maximum of the transmit signal level (measured in dBm)[5].
	Min TSL	The minimum of the transmit signal level (measured in dBm).
	RSL Threshold 1	This parameter counts the number of seconds in which the RSL is below the specified threshold.
	RSL Threshold 2	This parameter counts the number of seconds in which the RSL is below the specified threshold.
	TSL Threshold 1	This parameter counts the number of seconds in which the RSL is above the specified threshold.

[4] Possible reasons are: Clock changes within the interval and Power up reset

[5] The transmit power is fixed. The value can be changed only by user configuration

Data type	Reported Value	Explanation
	BBER Threshold	The BBER Threshold value counts the number of seconds in which the Background Block Error Ratio (BBER) exceeds the specified threshold. Note, that the system is design for excellent quality of service with BBER of less then 1%. (at 1% BBER expected TDM BER is less than 1E-6.
Ethernet Interface PM Data	Received Bytes	The number of Mega bytes received in the specified port within the interval
	Transmitted Bytes	The number of Mega bytes transmitted in the specified port within the interval.

Performance Monitoring Report Toolbar

You can use the toolbar to perform the actions described in the following table:

Table 6-4: Action of the toolbar buttons

Command Button	Action
Save	Saves the alarms in CSV or text format for further analysis.
Refresh	Reads the alarms from the ODU, and displays the alarms.
Site	Selects site for the active alarms.
Close	Closes the active alarm window.

Setting Air Interface Thresholds

You use the Thresholds button on the Monitoring Performance Report toolbar to set the Air Interface Thresholds:

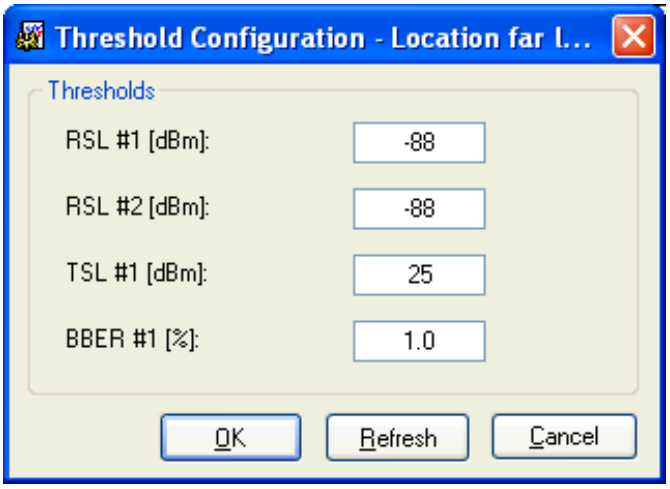


Figure 6-10: Threshold configuration dialog box

The Events Log

The Events log records system failures, loss of synchronization, loss of signal, and other events as described in the following table:

Table 6-5: Alarms and Information Messages

Message	Description
Radio Link – Sync	Radio link is synchronized
Radio Link – Out Of Sync	Radio link lost synchronization
Link Has Been Reset	ODU was reset due to internal problem
TDM Interface – Normal	TDM interface is operating properly
TDM Interface – LOS	Loss of Signal is reported by TDM interface
TDM Interface – AIS	Alarm Indication Signal is reported by TDM interface
TDM Interface – Loopback	A loopback is active on TDM interface
Link Resetting	Wireless link reset from the management station. This alarm is caused by automatic reset after link configuration.
Local ODU Resetting	The local ODU reset from the management station.
Monitor was stopped since no connection to the link	No ODU-to-IDU traffic was detected during the last 20 minutes.
TDM Service – Normal	TDM service is operating properly
TDM Service – Alarm	Error has been detected on a TDM line
Configuration problem detected	The link needs to be reinstalled
Channel Scanning in progress	The ODU is scanning the channels for the remote ODU
Transmitting on <frequency> GHz	The ODU is transmitting on the frequency channel listed
Radar activity was detected in <site>, on channel <frequency> GHz	For DFS versions only. Radar is detected; the channel is prohibited for 30 minutes.
Monitoring fo Radar activity on channel <frequency> GHz	For DFS versions only. ODU is looking for Radar activity.
Bit Failed indication	Indicates ODU hardware problem. Send error code to Technical Support.
Link Status	Indicates incorrect connection or incompatibility between versions. Available in 1.620 versions and above.
Site Status	Indicates incorrect connection or operation at the site. Available in 1.620 versions and above.

The events are displayed in the Events log in the lower part of the WinLink™ 1000 Manager Main menu:

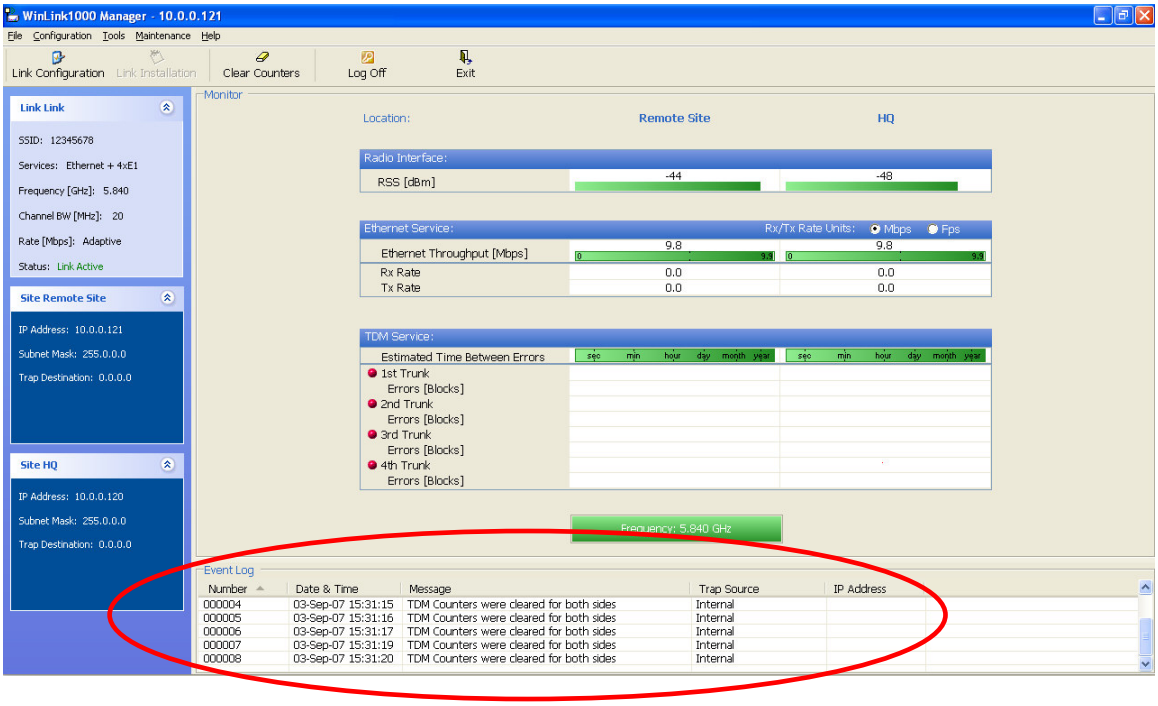


Figure 6-11: Events Log Display

Setting the Events Preferences

You can define a color for the traps to be displayed in the Active Alarms screen, according to the severity of the event. The severity is predefined.

To set the trap color:

1. From the **Tools** menu, choose **Preferences**.

   The Preferences dialog box appears.

2. Click the **Events** Tab:

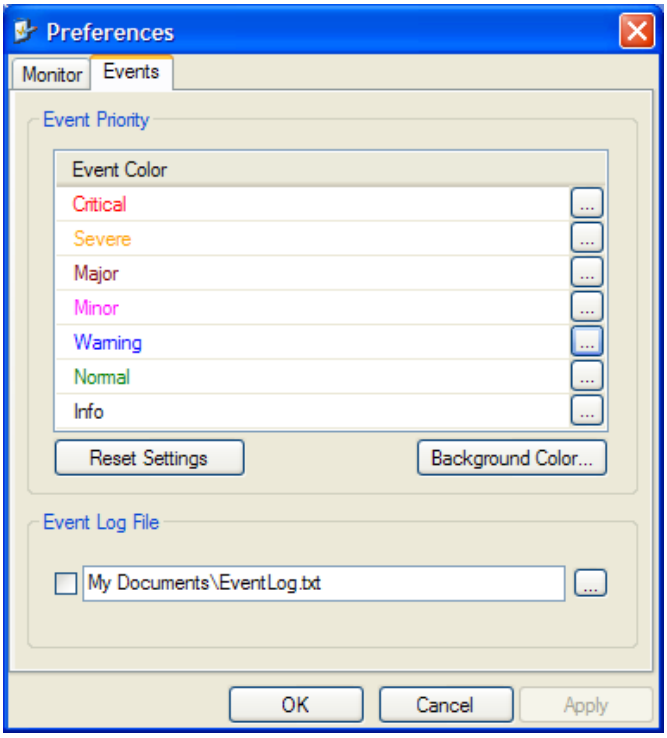


Figure 6-12: Preferences dialog box

3. Select the Event priority type and click on the ... button.

   A color chart opens.

4. Select the desired color.
5. Repeat for all the trap types.

✱ **To set the trap background color:**

- Click **Background Color** to change the text background.

✱ **To reset the trap colors:**

- Click **Reset Settings** to return to the default color settings.

Saving the Events Log

You can save recorded events in an Events log text file. New alarms are automatically added to the text file, as they enter the event log.

✱ **To save the event log:**

1. From the **Tools** menu, choose **Preferences**.

   The Preferences dialog box appears

2. Click the **Events** Tab.
3. Select the file to save.

4. Click the check box to open the file for saving.

5. Click the  button and in the Select File dialog box indicate in which folder and under what name the alarm log file is to be saved, and click **OK**.

Error Detection and Alarms

WinLink™ Error detection and Alarms detect compatibility problems, fault conditions of the radio or user links, and subsequently initiates alarms to alert the user.

Note:

To store the Event Log, first define the IP address, subnet mask, default gateway and trap address of the management PC, (see *Defining the Management Addresses, page 5-74 for details).*

Alarms (traps) are displayed in the Event Log in the lower panel of the Main Menu screen. The event log may be saved as a TXT file.

The event log includes the following fields:

- Sequential number (ID)
- Date and time stamp
- Message
- Trap source
- IP address of the ODU that initiated alarm.

✱ To view summary of saved alarms

- From the Tools menu, choose **Active Alarm Summary**.

  The Active Alarms Summary window opens:

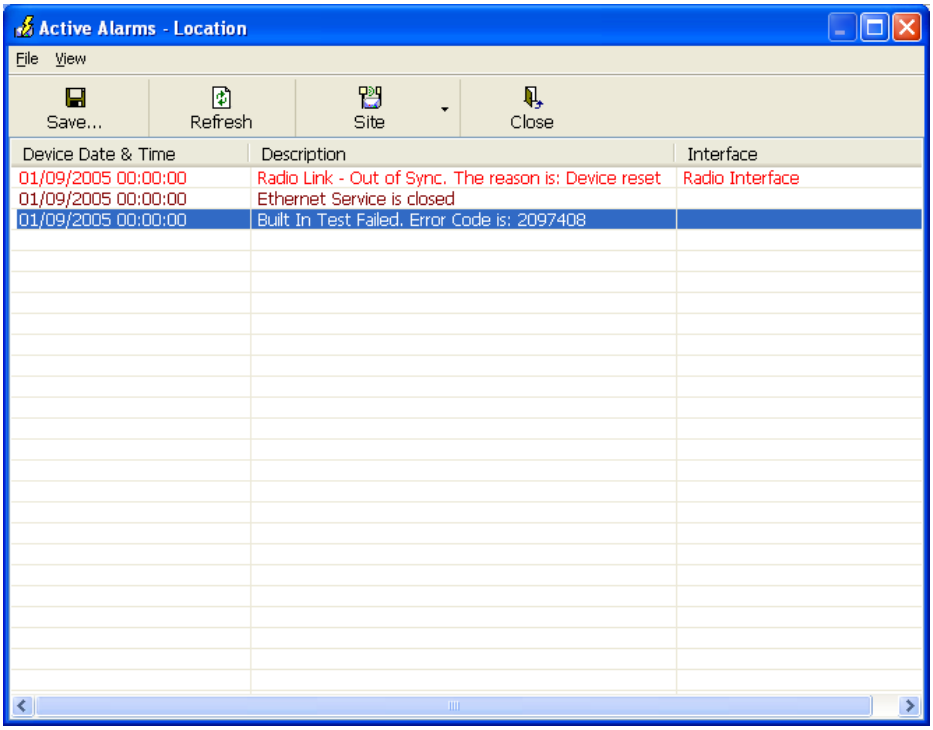


Figure 6-13: Active Alarms Summary

The following table provides an explanation of the command buttons.

Table 6-6: Active Alarms command buttons

	Action
Save	Saves the alarms in CSV or text format for further analysis.
Refresh	Reads the alarms from the ODU, and displays the alarms.
Site	Selects site for the active alarms.
Close	Closes the active alarm window.

Remote Power Fail Indication

Remote power fail indication indicates to one side that the other side has had a power failure. The failed site sends a final trap indication about the power loss just before powering off.

A Dying-Gasp circuit identifies the power failure at a minimum interval of 20 milliseconds before the IDU crash, during that interval a message notifying the power failure is sent to the remote end.

Alarm output number 4 indicates link loss due to power failure at the remote end.

Chapter 7
Security

WinLink™ 1000's integrated advanced encryption support provides enhanced air interface security for carriers and private networks by ensuring user data protection with one of the most sophisticated commercially available combined encryption and authentication techniques, CCM/AES. This technique combines message authentication (preventing anti-spoofing and replay protection) with commercial encryption, and complies with the IEEE 802.11i (phase iii) security recommendations.

CCM/AES uses a symmetric 128-bit encryption key (EK), and a nonce, and provides both message encryption and authenticating signature. The nonce mechanism enables the receiver to remember already received genuine messages and reject all replayed messages.

Initial encryption and authentication is based on a user-defined master key (Link Password). While standard Wireless LAN encrypts only the Ethernet Payload, the AES encrypts both the source and destination MAC addresses.

Entering and Changing Passwords

There are two passwords necessary to use the WinLink system:

- Management Password required for running the Management software
- Link Password used for encryption purposes. This link password is entered when installing or configuring the link.

Changing the Management Password

❋ **To change the management password**

1. From the Tools menu, select Change Password.

   The Change Password dialog box appears.

2. Enter the current password, and the new password.
3. Click **OK** to confirm.

Changing the Link Password

The Radio Link is encrypted using the Advanced Encryption System (AES) using a 128 bit dynamic key. During the installation process, you must enter a Link Password. An Initial encryption key is then generated. Each time a link is established, the system validates the Encryption key. If the validation fails, the link is established but no service or configuration is allowed. In this state, you can change the link password for each of the sites.

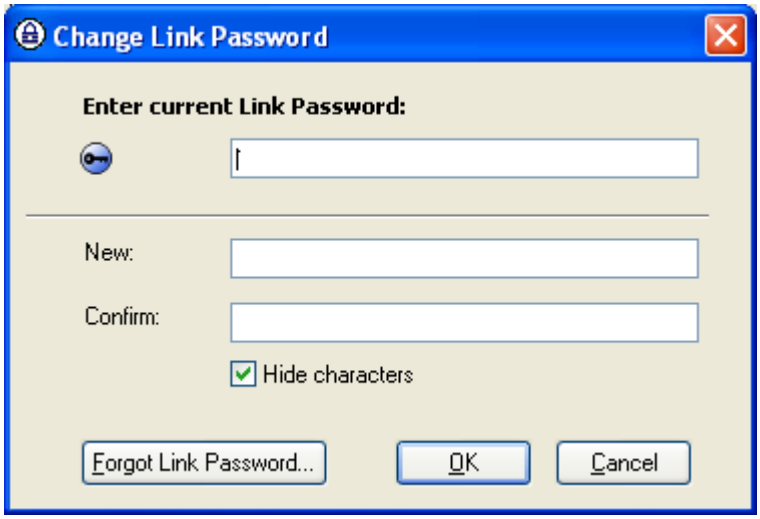
Note:

Returning to factory defaults returns the Link Password to the default password ***wireless-bridge****.*

✱ **To change the Link Password:**

1. From the Configuration dialog box, select the **Security** tab.
2. Click **Change** next to the Link Password field box.

   The Change Link Password dialog box appears:



3. Enter the current link password.
4. Enter the new password.
5. Enter the new password again in the Confirm box.

Forgotten Link Password

In case of a forgotten link password, you may enter the key password supplied with the product. The key password may be obtained from customer support after validation of the device serial number or MAC address. You may change the link password of both sides of the link at any time using the Link Configuration Wizard.

❋ **To enter the key password:**

1. From the Configuration dialog box, select the **Security** tab.
2. Click **Change** next to the Link Password field box.
3. The Change Link Password dialog box appears.
4. Click the Forgot Link Password button.
   The Key Link Password dialog box appears.
5. Type the key link password.
6. A new link password may now be set.

Chapter 8
Diagnostics and Troubleshooting

Use the following tables to diagnose any faults in the system.

Table 8-1: Troubleshooting

Symptom	Remedy
No power	Verify that AC power is connected to the IDU.
	Verify that the ODU cable is properly wired and connected.
No signal	Complete the installation procedure from the management software.
	Verify the ODU alignment. Check that the radio configuration of both site A and site B units are the same (channel and SSID).
Weak signal	Verify the ODU alignment, reconfigure the link.
	Verify the alignment tone sounds the Best Signal sequence.

The LEDs show faults in the system or the link.

Table 8-2: Troubleshooting with LEDs

LED	Status	Remedy
PWR	Off	Check that AC adapter is connected to the IDU-E and the AC power outlet.
IDU	Orange	Check that the IDU/ODU cable is properly wired and connected.
ODU	Red	Check that the IDU/ODU cable is properly wired and connected.
AIR I/F	Orange	Complete the installation procedure from the management software.
	Red	Check the ODU Antenna alignment. Check that the radio configuration of both site A and site B units are the same (channel and SSID).
SERVICE	Off	Check the TDM service configuration in the NMS.

LED	Status	Remedy
	Orange	Check that the system is not in loopback mode. Check the site B IDU ports and cables and site B external equipment.
	Red	Check the site A IDU ports, cables and external equipment.

Replacing an ODU

Prior to any action verify that both ODUs have the same software version (Configuration > Configure site xxxxxx>Inventory). If one ODU has an old software version, perform a software upgrade. It is important to configure the new ODU exactly the same as the old ODU to avoid configuration mismatches, which will disrupt the link.

An ODU may be replaced in several ways.

- **Use the backup**
  If a backup of the configuration is available, restore that configuration using Configuration > Configure site > Restore.
- **Manual Configuration**
  The new ODU can be configured manually according to the link configuration. Remember to use the same settings for SSID, channels, link password, IP addresses, and names.

Restore Factory Setup

The Restore Factory Setup feature is available from version 1.6xx forward. To use this feature, we recommend performing the following sequence:

1. Set the remaining ODUs back to the factory setup by using the Configuration>Configure site>Advance option.
2. Activate the second ODU and reconfigure the link from scratch.

Frequently Asked Questions

Q: What performance issues will arise due to environmental conditions?

A: The system is not sensitive to environmental conditions. However if heavy rain or snowfall is expected ensure the performance by allowing a higher fade margin in the link budget planning calculations. This can be accomplished by using higher gain antennas.

Q: When using the WinLink™ 1000, what is the potential for interference between our system and other cellular or wireless Networks devices?

A: The WinLink™ 1000 is a robust system. However since it operates in unlicensed ban, interference can occur. Nevertheless, the fact that we can manually set the frequency to one of 5 (6) non-overlapping channels gives you the flexibility to find a clean channel. In addition, each WinLink™ 1000 link incorporates Forward Error Correction and adaptive modulation to mitigate interference.

Q: What protocol does the WinLink™ 1000 use, i.e. 802.11?

A: **WinLink** uses a proprietary protocol; this protocol contains improved options that more efficiently support the clock reconstruction from the TDM services.

Q: What type of security is offered on WinLink™ 1000?

A: WinLink™ 1000 has three levels of security:

1. AES hardware mechanism
2. Each unit uses a unique SSID link-specific code (up to 24 alphanumeric characters)
3. Proprietary protocol protects from eavesdropping from other systems.

Q: Can we use horizontal and vertical polarization on the same frequency to double the number of wireless links?

A: Installing two WinLink™ 1000 systems in the same band with cross polarization provides 20–25 dB separations. However, spatial separation is a superior method and is recommended.

Q: Could you add the frequency of 5.735 to the manual selection in order to increase the number of 20 MHz channels to six?

A: Currently the system provides fixed channels, with one manual frequency setting. The manual setting provides flexibility of spectrum selection, including 5.735 MHz.

Q: Can we mange WinLink™ 1000 using SNMPc other than the supplied management software that comes with the units?

A: Yes. The WinLink™ 1000 is SNMP-based. The WinLink™ 1000 can be managed when using other SNMP software after implementing RADWIN MIB's.

Q: Can I use the WinLink™ 1000 with any vendor's external antenna?

A: RADWIN supplies the WinLink™ 1000 external ODU with an N-type typical connector. Any vendor's external antenna that is of the same type and of equal or less directional gain as an antenna that RADWIN authorized with its specific external ODU product, can be used. This is provided that it can be cascaded to our external unit. Please note that db losses in the cascading table between the external ODU and the antenna should be taken into consideration. (In the supplied cascading cable of one meter we have 1 dB loss).

Q: Do we need to add external arrestors on WinLink cables?

A: Although the WinLink™ ODU includes arrestors and lightening protection, it is suggested to implement external lightning/grounding suppression. See
Lightning and Grounding Guidelines.

Q: What is the actual Ethernet data rate and maximum throughput?

A: The maximum net throughput of the WinLink™ 1000 is full duplex 18 Mbps.

Note:

The WinLink™ 1000™ is a symmetrical system meaning that 18Mbps is provided in both directions.

Q: What is the sensitivity for each rate of the WinLink™ 1000?

A: The rate sensitivities for a 20MHz channel are:

Rate [Mbps]	**Sensitivity** [dB]
12	-84
18	-81
36	-74
48	-68

Q: Does WinLink™ 1000 withhold any MAC Addresses?

A: The WinLink™ 1000 is a layer 2 Bridge (VLAN transparent). The built-in switch contains a MAC Address table up to 2047.

Q: Can I use any category 5e cable in order to connect the IDU and ODU?

A: The cable should be suitable for outdoor use, and shielded Category 5e.

Q: What are the BER values expected in the WinLink™ 1000 link?

A: 10-11 (according to BER sensitivity threshold)

Q: Does WinLink™ 1000 use DSSS technique?

A: No, **WinLink™ 1000** uses the advanced OFDM technique.

Q: What are the advantages of the WinLink™ 1000 solution over other possible alternatives (e.g., wireline, wireless, etc.)?

A: Advantages include the following:

- Easy and intuitive installation using audio indication.
- Easy configuration using the management software of overall link site-to-site, there is no need to travel between the two sites in order to change the configuration.
- Easy migration between transmission channels.
- Backup option – backup and restore using .ini files.
- Very light ODU (1.5 kg). Low wind-loading
- No RF loss between IDU and ODU. Smaller antennas can be used
- Robust Air Interface Layer 2 ARQ insures "error-free" Ethernet service even in harsh conditions. Retransmit mechanism for TDM ensures low BER.
- Integrated E1/T1 and Ethernet radio over one single product.
- Supports simultaneous Voice and Data applications with a single radio – no need for external mediation device.
- Smooth migration to VoIP applications.
- Carrier class compliant with ITU standards for E1 and T1.
- Low and constant TDM latency (8 msec).
- Extremely accurate recovered clock low cost replacement to PDH radios.

Online Help

Online help can be accessed from the Help menu on the main screen of the WinLink™ 1000 Manager.

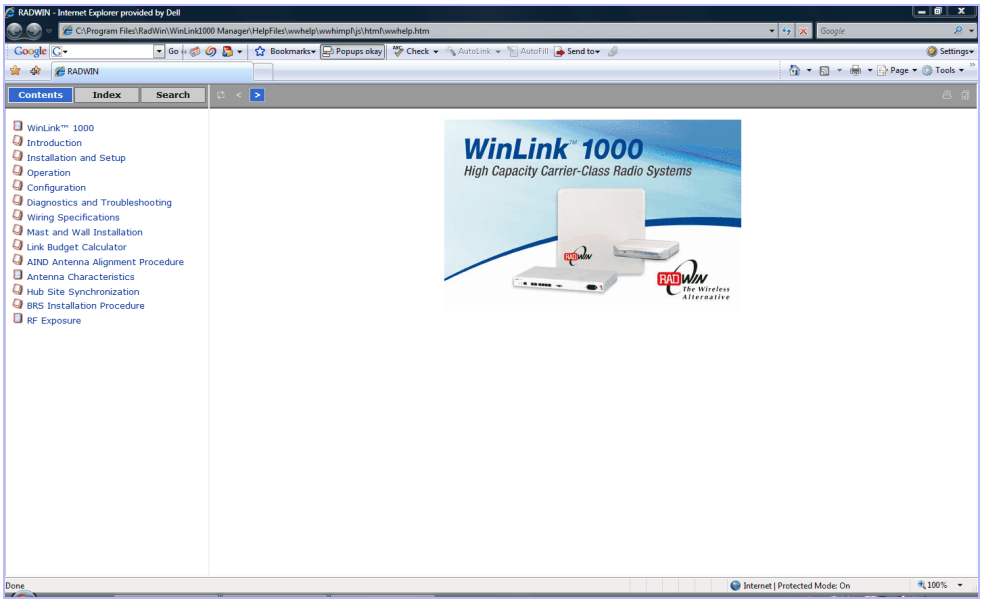


Figure 8-1: Online Help for WinLink™ 1000

Technical Support

Technical support for this product can be obtained from the local VAR, Integrator or distributor from whom it was purchased.

For further information, please contact the WinLink™ distributor nearest you or one of RADWIN's offices worldwide (click www.Radwin.com).

Appendix A
Wiring Specifications

The ODU-IDU cable is shielded/outdoor CAT-5, 4 twisted-pair 24 AWG FTP, terminated with RJ-45 connectors on both ends. It is covered by a cable gland on the ODU side for hermetic sealing.

The following table shows the connector pinout:

Table A-1: ODU-IDU Connector Pinout

IDU RJ-45		Color	Function	ODU RJ-45
1	twisted	White/Green	Ethernet (RxN)	1
2	pair	Green	Ethernet (RxT)	2
3	twisted	White/Orange	Ethernet (TxT)	3
6	pair	Orange	Ethernet (TxN)	6
4	twisted	Blue	Power (+)	4
5	pair	White/Blue	Power (+)	5
7	twisted	White/Brown	Power (–)	7
8	pair	Brown	Power (–)	8

User Port Connectors

The IDU includes ports for connecting E1/T1 and 10/100BaseT Ethernet user devices.

Trunk Port

The Trunk (E1/T1) interface terminates in an 8-pin RJ-45 balanced connector, wired in accordance to *Table A-2*.

Table A-2: E1/T1 Connector Pinout

Pin	Function
4,5	Receive (input)
1,2	Transmit (output)

LAN Port

The LAN 10/100BaseT interface terminates in an 8-pin RJ-45 connector, wired in accordance to *Table A-3*.

Table A-3: Fast Ethernet Connector Pinout

Pin	Signal	Function
1	TD (+)	Transmit Data (positive)
2	TD (–)	Transmit Data (negative)
3	RD (+)	Receive Data (positive)
6	RD (–)	Receive Data (negative)

LAN Port for PoE-8

When connecting the PoE-8 LAN port cable directly to PC, a crossed LAN cable, terminated with RJ-45 connectors on both ends must be used, wired according to the following table:

Table A-4: Fast Ethernet Connector Pinout

Pin		Wire Color	Function	PC
1	wisted	White/Green	Ethernet (RxN)	3
2	pair	Green	Ethernet (RxT)	6
3	twisted	White/Orange	Ethernet (TxT)	1
6	pair	Orange	Ethernet (TxN)	2
4	twisted	Blue	NA	4
5	pair	White/Blue	NA	5
7	twisted	White/Brown	NA	7
8	pair	Brown	NA	8

IDU-C Connectors

IDU-C DC Power Terminal

Table A-5: Terminal Block 3-pin -48VDC

Pin	Function
Right	**+**
Center	**Chassis**
Left	**–**

IDU-C Alarm Connector

Table A-6 lists the IDU-C Alarm connector pinout.

Table A-6: IDU-C Alarm Connector (Dry-Contact)

Pin	I/O	Description
1	**Input 1**	**Positive**
2	**Input 2**	**Positive**
3	**Output 1**	**Normally Closed**
4	**Output 1**	**Normally Open**
5	**Output 2**	**Normally Open**
6	**Input 1**	**Negative**
7	**Input 2**	**Negative**
8	**Output 1**	**Common**
9	**Output 2**	**Common**

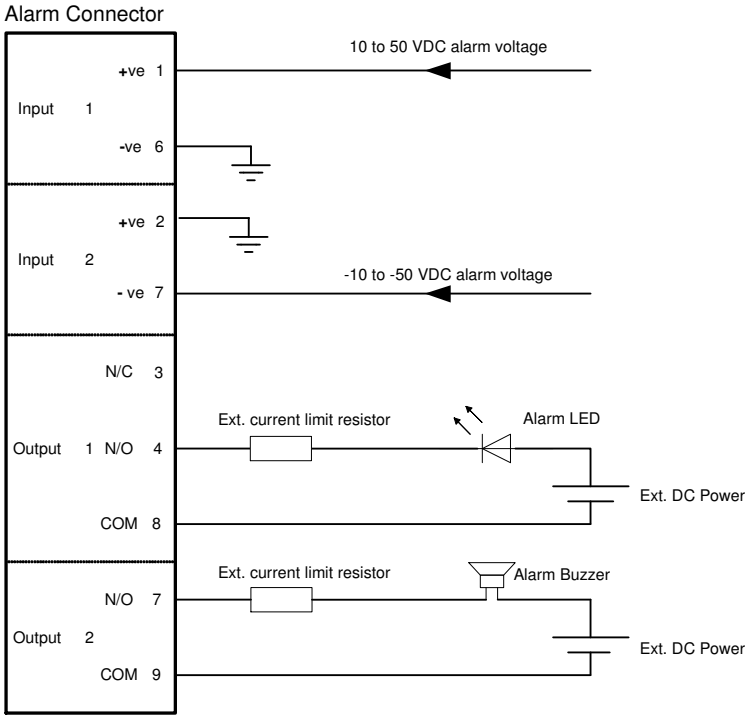


Figure A-1: Example for connecting the alarm connector

PoE Alarm Connector

The following table lists the PoE Alarm connector pinout.

Table A-7: PoE Alarm Connector (Dry-Contact)

Pin	I/O	Description
1	NA	NA
2	NA	NA
3	Output 1	Normally Closed
4	Output 1	Normally Open
5	Output 2	Normally Open
6	NA	NA
7	Output 2	Normally Closed
8	Output 1	Common
9	Output 2	Common

IDU-R and IDU-AL Alarm Connectors

The following table shows the pinout for the IDU-R and IDU-AL Alarm Connectors.

Table A-8: Alarm Connector (Dry-Contact)

Pin	I/O	Description
1	Input 1	Positive
2	Input 2	Positive
3	Output 1	Normally Closed
4	Output 1	Normally Open
5	Output 2	Normally Open
6	Input 1	Negative
7	Input 2	Negative
8	Output 1	Common
9	Output 2	Common

O-PoE to PC LAN Cable

When connecting the O-PoE ETH port cable directly to PC, a crossed LAN CAT-5, 4 twisted-pair 24 AWG FTP, terminated with RJ-45 connectors on both ends must be used.

The following table shows the connector pinout:

Table A-9: O-POE to PC Cable Connector Pinout

O-PoE (ETH) RJ-45		Wire Color	Function	PC
1	wisted	White/Green	Ethernet (RxN)	3
2	pair	Green	Ethernet (RxT)	6
3	twisted	White/Orange	Ethernet (TxT)	1
6	pair	Orange	Ethernet (TxN)	2
4	twisted	Blue	NA	4
5	pair	White/Blue	NA	5
7	twisted	White/Brown	NA	7
8	pair	Brown	NA	8

Appendix B
Mast and Wall Installation

The ODU or O-PoE can be mounted on a mast or a wall.

Ensure that the unit is oriented so that the cable connectors are at the bottom. **(If they are on top, water may penetrate into the unit causing damage.)**

ODU or O-PoE Mounting Kit Contents

The ODU or O-PoE mounting kit includes the following items:

- One Large Clamp (see Figure B-1)
- One Small Clamp (see Figure B-2)
- One Arm (see Figure B-3)
- Four Screw hex head M8x40
- Two Screw hex head M8x70
- Four Washer flat M8
- Three Washer spring M8
- Two M8 Nuts

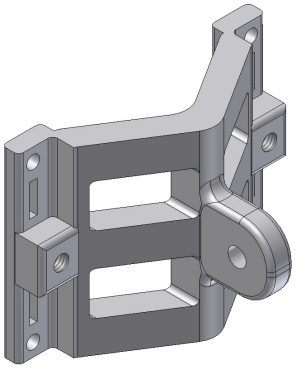


Figure B-1: Large Clamp

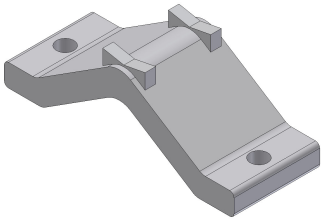


Figure B-2: Small Clamp

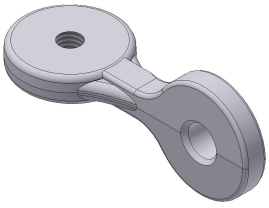


Figure B-3: Arm

Mounting WinLink™ 1000 on a Mast

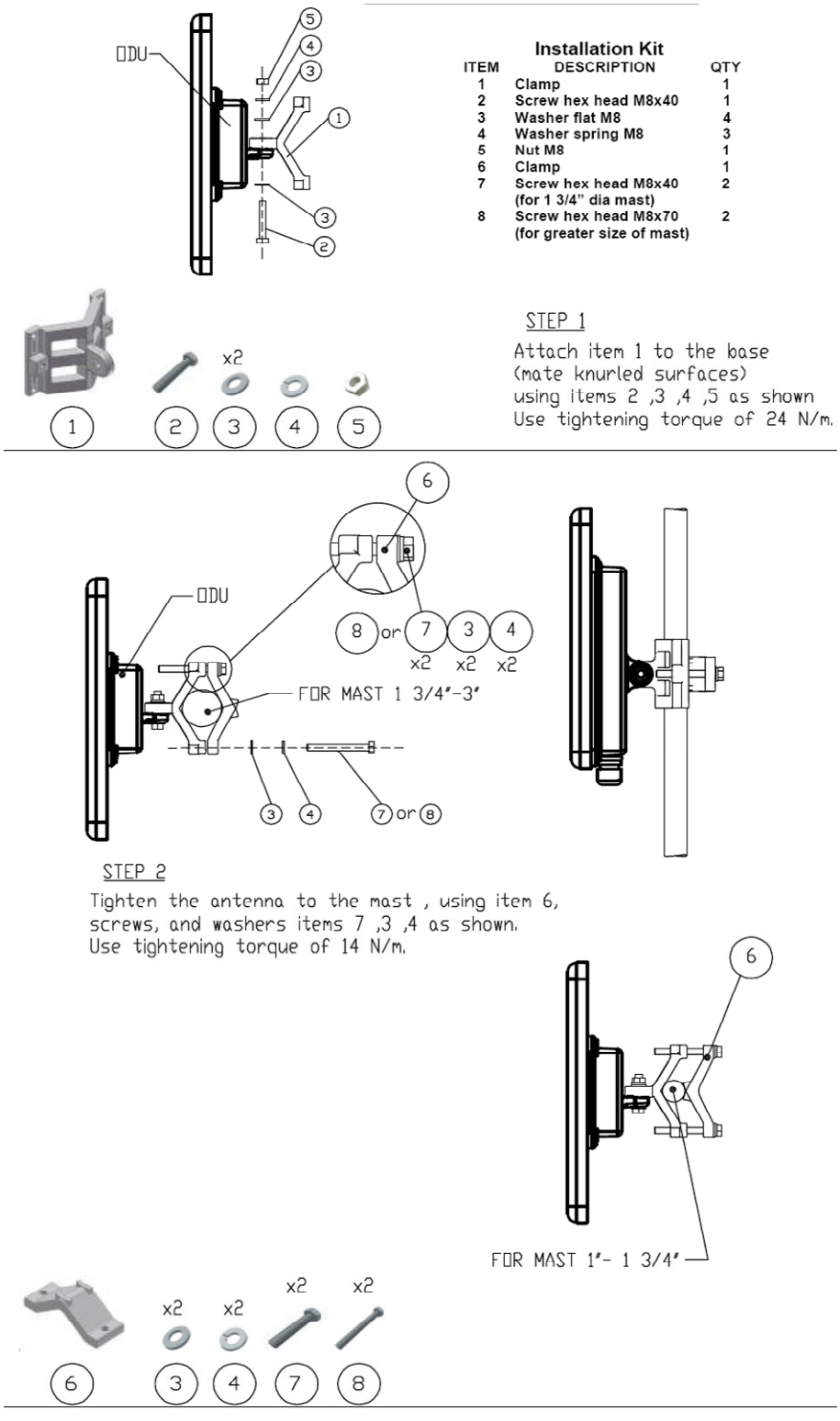


Figure B-4: Mounting on a Mast

Mounting WinLink on a Wall

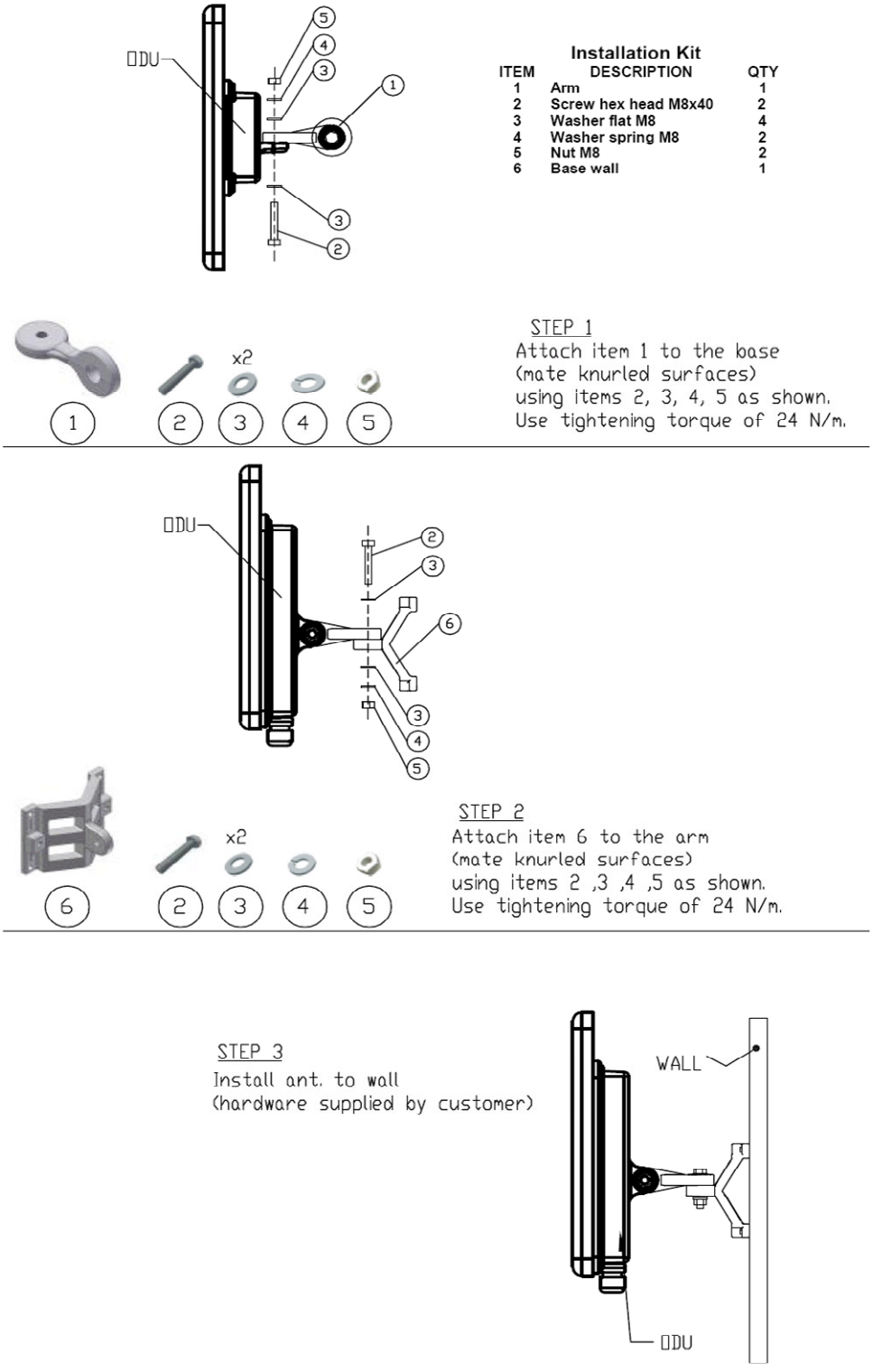


Figure B-5: Mounti ng on a Wall

Mounting an External Antenna

The optional external antenna can be mounted on a mast.

External Antenna Mounting Kit Contents

The external antenna mounting kit includes the following items:

- Twelve flat washers
- Eight spring washers
- Eight hex nuts
- Four bolts
- One U-bracket
- One pivoting bracket
- Two metal strap clamps.

❋ To install external antenna on the mast:

1. Attach the U-bracket to the back of the antenna using four flat washers, four spring washers and four hex nuts.
2. Attach the pivoting bracket to the U-bracket using eight flat washers, four spring washers, four hex nuts and four bolts.
3. Pass both strap clamps through the vertical slots in the pivoting bracket.
4. Attach the antenna to the mast using the two strap clamps.
5. Adjust the required tilt using the angular scale and tighten all bolts and nuts at the required position.

Appendix C
AIND Alignment

Use this procedure when using the all indoor system WinLink-ANID or manually aligning two WinLink units.

To achieve the best benefit and link budget from the WinLink™ 1000 installation, the link antennas must be aligned; the two antennas should exactly face each other.

In order to achieve the best performance, the line of sight must be as clear as possible with no obstructions between the two sites.

Prior to attempting alignment, install the hardware and software in accordance with the WinLink Installation and Operation Manual. The figure below shows the link setup. At least two people are needed to perform the alignment procedures.

Once the alignment is complete, you are able to evaluate the quality of the link.

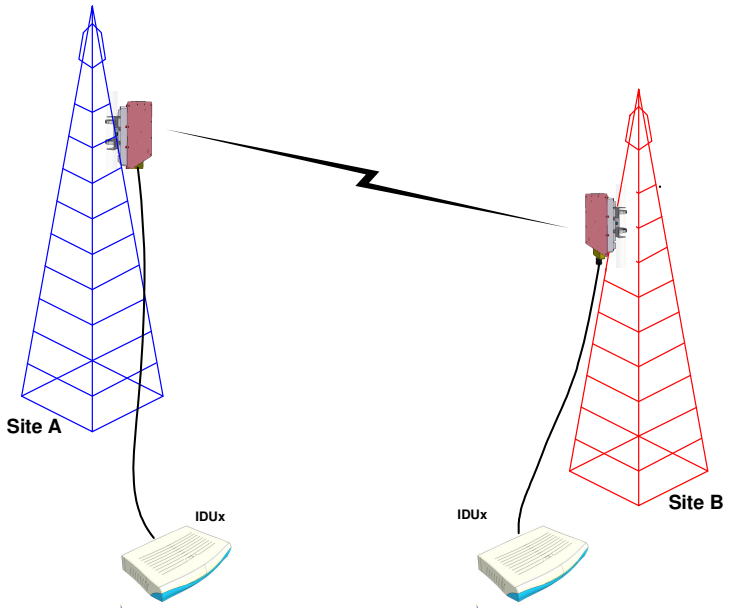


Figure C-1: WinLink Link Setup

Expected Signal Level for AIND radios

Use the Link Budget Calculator utility supplied on the WinLink™ Manager Software CD-ROM to calculate the expected performance of the WinLink™ wireless link. The utility allows you to determine the RSS of the link and number of E1/T1 services available at a specified distance. In all-indoor type installations, a long transmission line (RF cable) between the radio and antenna will be used; oftentimes over 100'. In this case the attenuation (RF loss) of the cable must be determined (for both sides) and entered as a dB loss in the Link Budget calculator. In many cases, a larger antenna is necessary to compensate for this transmission line loss.

Andrew LDF and AVA cables are good for minimizing loss.

Performing WinLink AIND Alignment

The supervisor of the antenna alignment is situated at the receive site with the Spectrum Analyzer.

Equipment Setup

❋ **To set up the antenna alignment equipment:**

1. Coarsely align the two antennas. Use the compass readings taken during the Site Survey to point the antennas in the correct direction.
2. Connect the equipment as shown in Figure C-1 but connect a spectrum analyzer in place of the remote WinLink-AIND.
3. Turn on the CW transmit signal from site A (from the WinLink NMS).
4. At site B, tune the SA to the frequency transmitted.
5. Increase the SA sensitivity according to the expected receive signal.

Aligning the antennas

Note *When one antenna is moved, the opposite site is passive. Move the antennas very slowly.*

❋ **To align the antennas:**

1. Slowly move the site B antenna azimuth axis (the elevation axis should be locked) until you see the best signal on the SA Lock the azimuth axis.
2. Slowly move the site A antenna azimuth axis (the elevation axis should be locked) until you see the best signal on the SA.
3. Lock the azimuth axis.
4. Slowly move the site B antenna elevation axis (the azimuth axis should be locked) until you see the best signal on the SA. Lock the elevation axis.
5. Slowly move the site A antenna elevation axis (the azimuth axis should be locked) until you see the best signal on the SA. Lock the elevation axis.
6. Repeat steps 1 to 4 until the reading on the SA is equal or as close as possible to the calculated receive signal (for Rx Power Level, see Expected Signal Level for AIND radios).
7. When the SA reads the expected receive signal, the antennas are aligned and there is an indication of a good link between the sites.
8. Tighten the antenna azimuth axis and elevation axis.
9. Stop the CW function. The NMS will restart the system.
10. Connect WinLink-AIND unit to the external antenna. See WinLink™ Installation and Operation Manual for details. The operational link is shown in Figure 2-1.
11. Configure WinLink™ NMS at both sites to operate at the pure channel frequency found in the RF survey. WinLink™ is now ready for operation.

Configuring the Link

1. Run the Installation Wizard in the WinLink™ Manager Software to set the configuration of the link. Configure the link in accordance with the parameters calculated in the Link Budget Calculator.
2. WinLink™ has a unique identification number, the SSID. Each side of the link looks for its partner with the same SSID. Therefore both sides of the link must be configured with the same SSID.
3. The WinLink™ link is now ready for operation.

Evaluating the Link

With the link operating at a pure channel as determined by the RF survey procedure, the recommended performance threshold of an WinLink™ link is the following:

RSS: –84 dBm minimum

There are cases when there is no line of sight, but still the link is of an acceptable quality.

If the link is not within the acceptable limit, see Troubleshooting.

Troubleshooting

If the link is not within the acceptable limit as defined in Evaluating the Link, check the following:

- Verify that both antennas have the same polarization (horizontal/vertical).
- Check all the WinLink-AIND cable connectors for faulty connections.
- Verify that there are no obstacles in the Fresnel zone of the antenna path such as large buildings, trees, etc.
- Use a spectrum analyzer with suitable sensitivity to measure the signal at the distance between the sites.
- If nothing improves the receive power level, check the overall link.
- Reduce the distance of the link–move the equipment from one site closer to the other site–where it is possible to actually see the antennas with the naked eye.
- If you now get the expected receive signal level, you can assume that the equipment is operational, and the problem arises from interference between the sites.

Appendix D
Antenna

An antenna is the radiating and receiving element from which the radio signal, in the form of RF power, is radiated to its surroundings and vice versa. The transmission range is a function of the antenna gain and transmitting power. These factors are limited by country regulations.

The WinLink may be operated with an integrated antenna attached to the ODU unit, or with an external antenna wired to the ODU via an N-type connector. All cables and connections must be connected correctly to reduce losses. The required antenna impedance is 50Ω.

Table D-1: Antenna Characteristics

Type		Gain [dBi]	Max Range		Beam width	Dimensions		Weight		Connector	Lightening Protection
			[km]	[miles]	[degrees]	mm	in	Kg	lb		
5.4, 5.3 GHz											
Integrated & External	**Flat panel**	**22**	**40**	**25**	**9.0**	**305×305×15**	**12×12×0.6**	**1.2**	**2.6**	**NR**	**Yes**
5.8 GHz											
External	**Dish**	**32.5**	**80**	**50**	**4.5**	**Dia 900**	**Dia 35.4**	**10**	**22**	**N-type**	**No**
Integrated	**Flat panel**	**22**	**40**	**25**	**9.0**	**305×305×15**	**12×12×0.6**	**1.2**	**2.6**	**NR**	**Yes**
External	**Flat panel**	**28**	**80**	**50**	**4.5**	**600×600×51**	**23.6×23.6×2**	**5.0**	**11.0**	**N-type**	**No**
2.4 GHz											
Integrated	**Flat panel**	**16**	**40**	**25**	**20**	**305×305×25**	**12×12×1**	**1.2**	**2.6**	**NR**	**Yes**
External	**Grid**	**24**	**80**	**50**	**H:10 V:14**	**600×997×380**	**23.5×39.2×15**	**2.0**	**4.6**	**N-type**	**No**
2.5 GHz											
Integrated	**Flat panel**	**17.5**	**40**	**25**	**25**	**305×305×25**	**12×12×1**	**1.2**	**2.6**	**NR**	**Yes**
External	**Grid**	**24**	**80**	**50**	**H:9 V:13**	**600x900**	**23.6x35.4**	**2.5**	**5.5**	**N-type**	**No**
4.9 GHz											
Integrated	**Flat panel**	**18.5**	**40**	**25**	**9.0**	**305×305×15**	**12×12×0.6**	**1.2**	**2.6**	**NR**	**Yes**
External	**Flat panel**	**26 (27-1)**	**80**	**50**	**4.5**	**600×600×51**	**23.6×23.6×2**	**5.0**	**11.0**	**N-type**	**No**
External	**Dish**	**26 (27-1)**	**80**	**50**	**5**	**Dia 600**	**Dia 23.6**	**5.0**	**11.0**	**N-type**	**Yes**

Parabolic Dish Antenna

The Parabolic dish antenna is a high-gain, reflector antenna used for radio, television, and data communications. The relatively short wavelength of electromagnetic (radio) energy at these frequencies allows reasonably sized reflectors to exhibit the very desirable highly directional response for both receiving and transmitting.

Grid Antenna

Used for 2.4 GHz applications. Due to the large size, the grid design minimizes weight and windloading.

Appendix E
Hub Site Synchronization

When several units are collocated at a common hub site, interference may occur from one unit to another. ODU units are supplied with special hardware for the collocation of up to eight units from a central site.

Using a method called Hub Site Synchronization (HSS) an external cable is connected from the master to all collocated ODUs; this cable carries pulses sent to each ODU, which synchronize their transmission with each other. The pulse synchronization ensures that the transmission of packets occurs at the same time for all collocated units. This also results in all of the hub units receiving data at the same time, eliminating the possibility of interference that could result if some units transmit while other units at the same location receive.

Figure E-1 shows interference caused by non-synchronized collocated units.

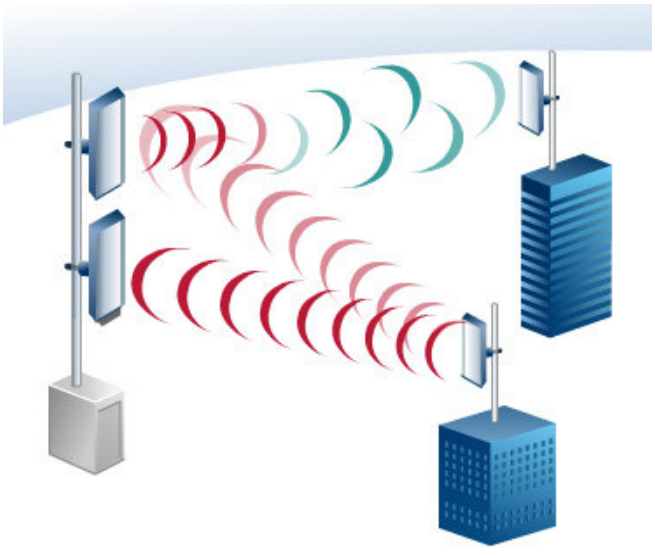


Figure E-1: Interference caused by collocated units

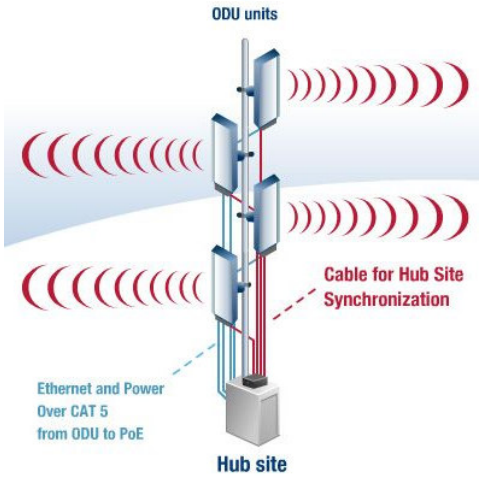


Figure E-2: Collocated units using Hub Site Synchronization

Collocation Planning

WinLink provides a collocation planning tool and calculator for planning the placement of multiple units at the same site. It provides physical guidelines for each specific installation scenario. The tool can be used prior to installation to define and verify the distance between the collocated units and their direction, polarization and TPC adjustment.

Frequency Band (GHz) 2.4 Clear All
Channel Bandwidth 20

Desired link	Height HS (m)	Antenna Type @ HS	Azimuth (degrees) @ HS	Range (Km)	Desired Air Rate (Mbps)	Height RS (m)	Antenna Type @ RS	Tx Power @ RS (dBm)	Forbidden Chanel Differences: Link A	Link B	Link C					
Link A	15	5.XG 28dbi ant MTI	110	5	18	15	.X 22dbi (integrated	16	-47dBm OK	Co,	Co,	N.A	N.A	N.A	N.A	N.A
Link B	16	4dbi ant Kenbonton	120	10	24	15	4dbi ant Kenbonton	16	Co,F1,	-56dBm OK	Co,	N.A	N.A	N.A	N.A	N.A
Link C	17	.4 16dbi (integrated	90	2	48	10	.4 16dbi (integrated	16	Co,	Co,	-56dBm OK	N.A	N.A	N.A	N.A	N.A
Fill Link Name...	0		0	0		0		16	N.A	N.A	N.A		N.A	N.A	N.A	N.A
Fill Link Name...	0		0	0		0		16	N.A	N.A	N.A	N.A		N.A	N.A	N.A
Fill Link Name...	0		0	0		0		16	N.A	N.A	N.A	N.A	N.A		N.A	N.A
Fill Link Name...	0		0	0		0		16	N.A	N.A	N.A	N.A	N.A	N.A		N.A
Fill Link Name...	0		0	0		0		16	N.A	N.A	N.A	N.A	N.A	N.A	N.A	

Figure E-3: Collocation Site Calculator

Appendix G
RF Exposure

WARNING:

The antennas used for the following transmitters must be installed to provide a separation distance of at least 200 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: For products having minimum safety distance values that are higher than 200 cm, the higher value must be considered.

Product	FCC ID	Antenna gain [dBi]	Min. Safety Distance [cm]
F58/FCC/EXT	Q3KAMWL1000	28	83
F58/FCC/INT	Q3KAMWL1000	22	42
HE/F58/FCC/INT	Q3KAMWL1580	22	109
HE/F58/FCC/EXT	Q3KAMWL1580	28	217
HE/F58/FCC/EXT	Q3KAMWL1580	32.5	364
AIND/F58/FCC/EXT/4T1	Q3KAMWL1580	32.5	364
F53/FCC/INT	Q3KAMWL1530	22	9
F53/FCC/EXT	Q3KAMWL1530	28	9
F49/FCC/EXT	Q3KWL1000F49	27	35.5
F24/FCC/INT	Q3KAMWL1240	16	16
F53/FCC/EXT	Q3KAMWL1240	24	40
HE/F24/FCC/INT	Q3KAMWL1240H	15.2	37
HE/F24/FCC/EXT	Q3KAMWL1240H	24	71
HE/F25/BRS/INT	Q3KAMWL1250	17.5	26.6
HE/F25/BRS/EXT	Q3KAMWL1250	24	56.3
AIND/F25/BRS/EXT/4T1	Q3KAMWL1250	24	56.3
F54/FCC/CMB/EXT	Q3KAMWL1540C	22	200
F54/FCC/CMB/INT	Q3KAMWL1540C	22	200
HE/F49/FCC/EXT/INT	Q3KAMWL1490H	26	98

Table G-1: RF Exposure

4. Tighten the protective seal that is on the prepared cable over the RJ-45 connector.
5. Repeat for all ODUs that are to be collocated at the hub site. The next ODU to be connected is inserted to SYNC 2, followed by SYNC 3 and so on.

ODU/HSS Connection Pinout

Table E-1: ODU/HSS Connection Pinout

ODU RJ-45		Color	HSS HUB RJ-45	Notes
1	twisted	White/Green	1	
2	pair	Green	2	Not Applicable
3	twisted	White/Orange	3	
6	pair	Orange	6	
4	twisted	Blue	4	
5	pair	White/Blue	5	
7	twisted	White/Brown	7	
8	pair	Brown	8	

Architecture

One of the collocated ODUs at the hub site acts as the **Hub Sync Master (HSM)**; all the other collocated units are Hub Sync Clients. The Hub Sync Master generates the pulses that synchronize the timing of the Hub Sync Clients.

A Hub Sync Client can be configured to be two different types:

Hub Sync Client–Continue Transmission (HSC-CT): In the event that the unit loses synchronization with the Hub Sync Master, the link remains active. However, without synchronization pulses, it is possible that this unit will cause interference.

Hub Sync Client–Disable Transmission (HSC-DT): In the event that the unit loses synchronization with the Hub Sync Master, the link is dropped until the synchronization pulses resume. This setting prevents the unit from causing interference.

The remote ODUs that are not located at the hub site, are called Independent Units and do not require HSS hardware.

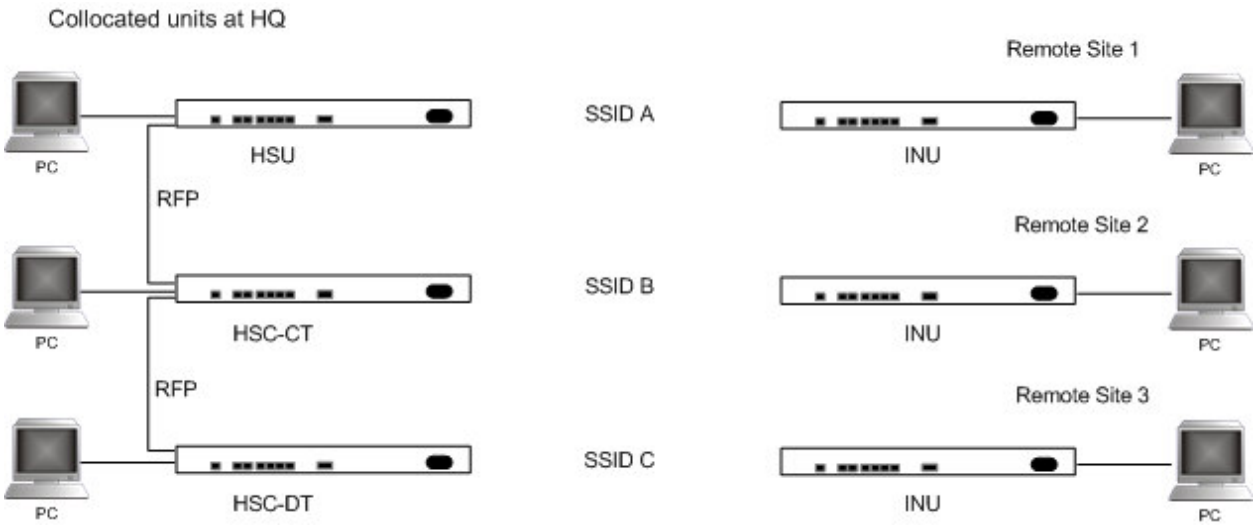


Figure E-5: HSS Typical Application

Radio Frame Pattern Table

The synchronization pulse is termed Radio Frame Pattern (RFP). Four RFP pulses are available. The RFP is selected depending on the type of services that the complete system is to provide - see the table below. Select the RFP that gives you the Best Fit for the system services and select the Channel Bandwidth accordingly.

Note

The RFP must be the same for each link within the collocated system.

Table E-2: Radio Frame Pattern Table

	Channel Bandwidth				
	20 MHz	**10 MHz**		**5 MHz**	
RFP	TDM & EDO	TDM	EDO	TDM	EDO
A	**Best**	**Fit**		--	
B	--	**Best**	**Fit**	**Best**	**Fit**
C	--	--	**Best**	--	**Fit**
D	--	--		--	**Best**

HSS Link Configuration

For HSS-enabled units, the Hub Site Synchronization Settings dialog box appears in the Link Configuration Wizard.

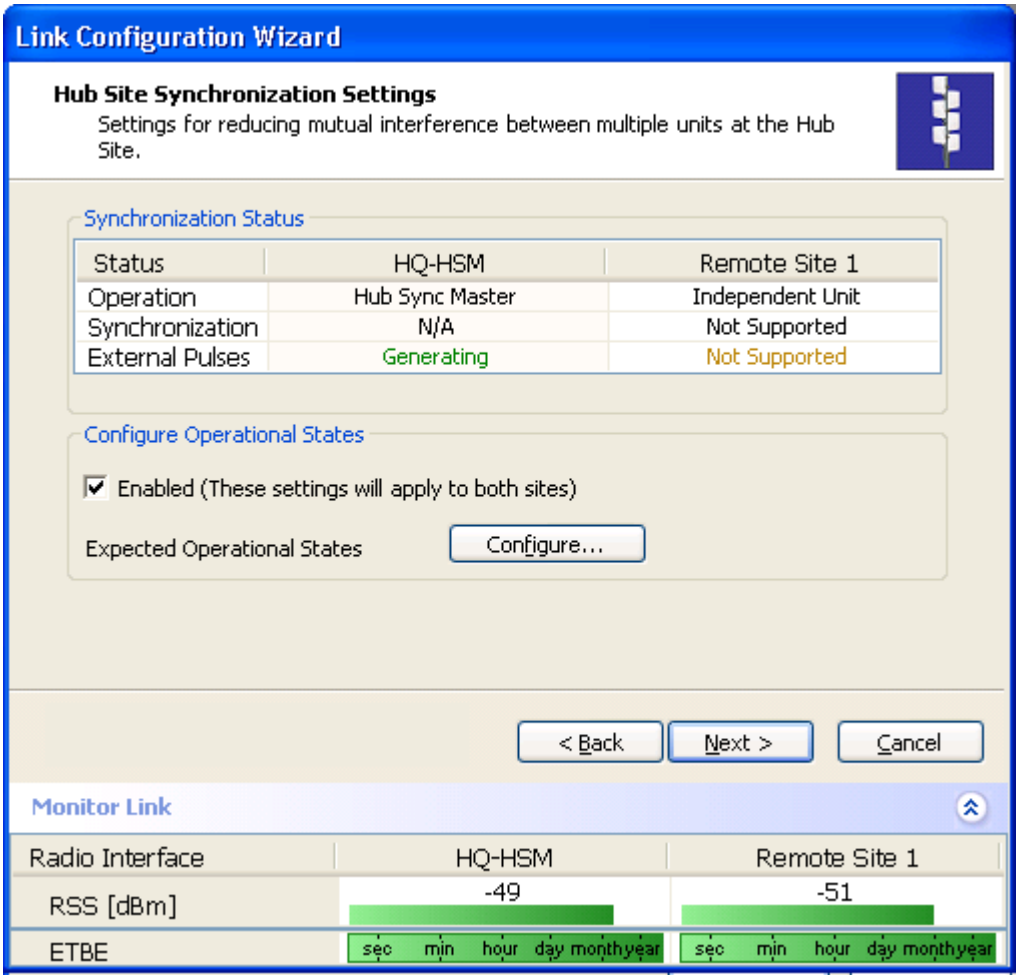


Figure E-6: Hub Site Synchronization Settings dialog box

The Synchronization Status dialog box displays the current status of each side of the link.

- Operation: Type of unit
  Hub Sync Master (HSM)
    Hub Sync Client – Disable Transmission (HSC-DT)
    Hub Sync Client – Continue Transmission (HSC-CT)
  Independent Unit
- Synchronization:
    N/A- for Master or Independent Units
    Synchronized – for Hub Site Clients
    Not Synchronized – for Hub Site Clients
- External Pulses: The status of the pulses running through the HSS cable. The Master generates such pulses. The severity of each of these states is indicated by green, yellow or red text color. Possible states are described in the following table:

Table E-3: External Pulse Status

Status	Description	Text Color
Not Detected	**Sync pulses not detected**	**Green**
Generating	**Unit is HSM and is generating RFP pulses**	**Green**
Generating and Detected	**Unit is HSM and generating RFP pulses and is also receiving pulses from another unit. Incorrect configuration.**	**Red**
Generating and Improper Detected	**Unit is HSM and generating RFP pulses and is also receiving incorrect pulses from another unit. Incorrect configuration.**	**Red**
Detected	**HSC detecting pulses**	**Green**
Improper Detected	**Incorrect RFP and BW configuration**	**Red**
Multiple Sources Detected	**More than one HSM generating pulses. Incorrect configuration.**	**Red**

❋ To configure the Operational States of the hub site unit

1. Click the **Enabled** check box
2. Click the **Configure** button

   The Hub Site Configuration dialog box with the current status of the ODUs is displayed.
3. Select the type of unit configuration from the drop-down list. Because only the relevant options are displayed according to the hardware configuration of each unit, usually the remote site will have only the Independent Unit option available.
4. Select the appropriate RFP radio button. Some RFP options may be disabled depending on the BW previously selected.

Note *Take care to avoid incorrect configuration of bandwidth, RFP or to set multiple Hub Sync Masters, as system interference can occur.*

WinLink™ 1000 gives error messages and tool tips if the system is configured with mismatches.

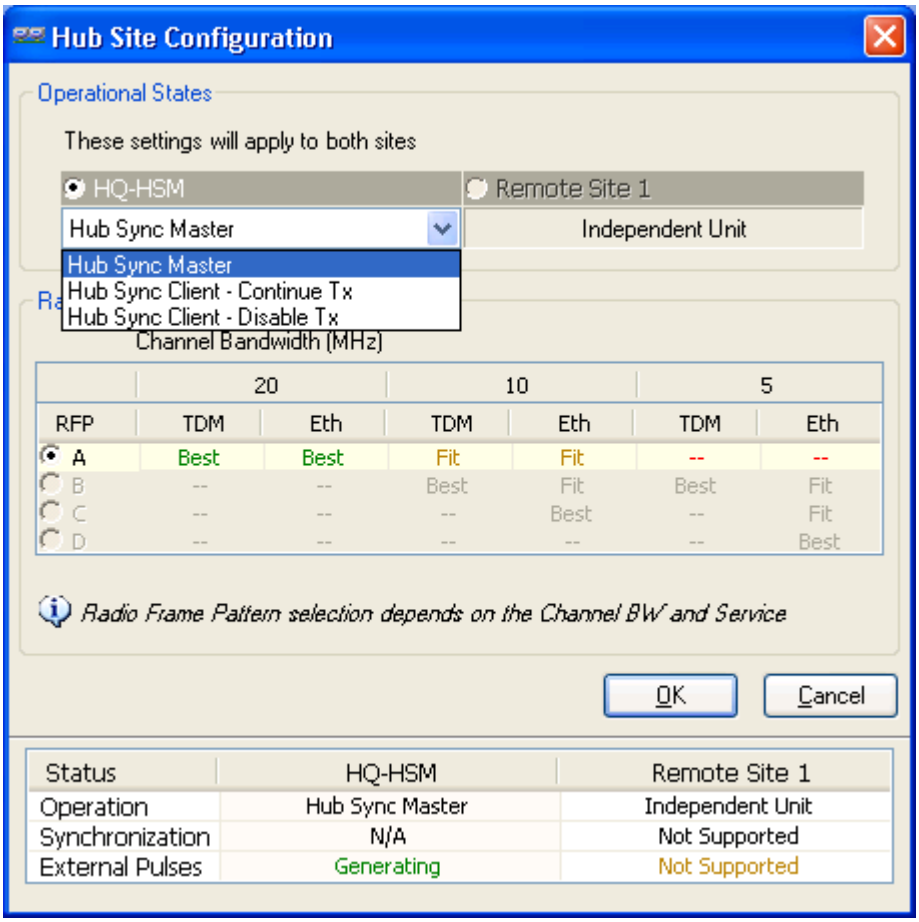


Figure E-7: Hub Site Configuration dialog box

Site Configuration

For units that support HSS, the Hub Site Sync option appears in the Air Interface section and displays the current HSS of the unit. Configure the unit from the Link Configuration Wizard according to the procedure described above.

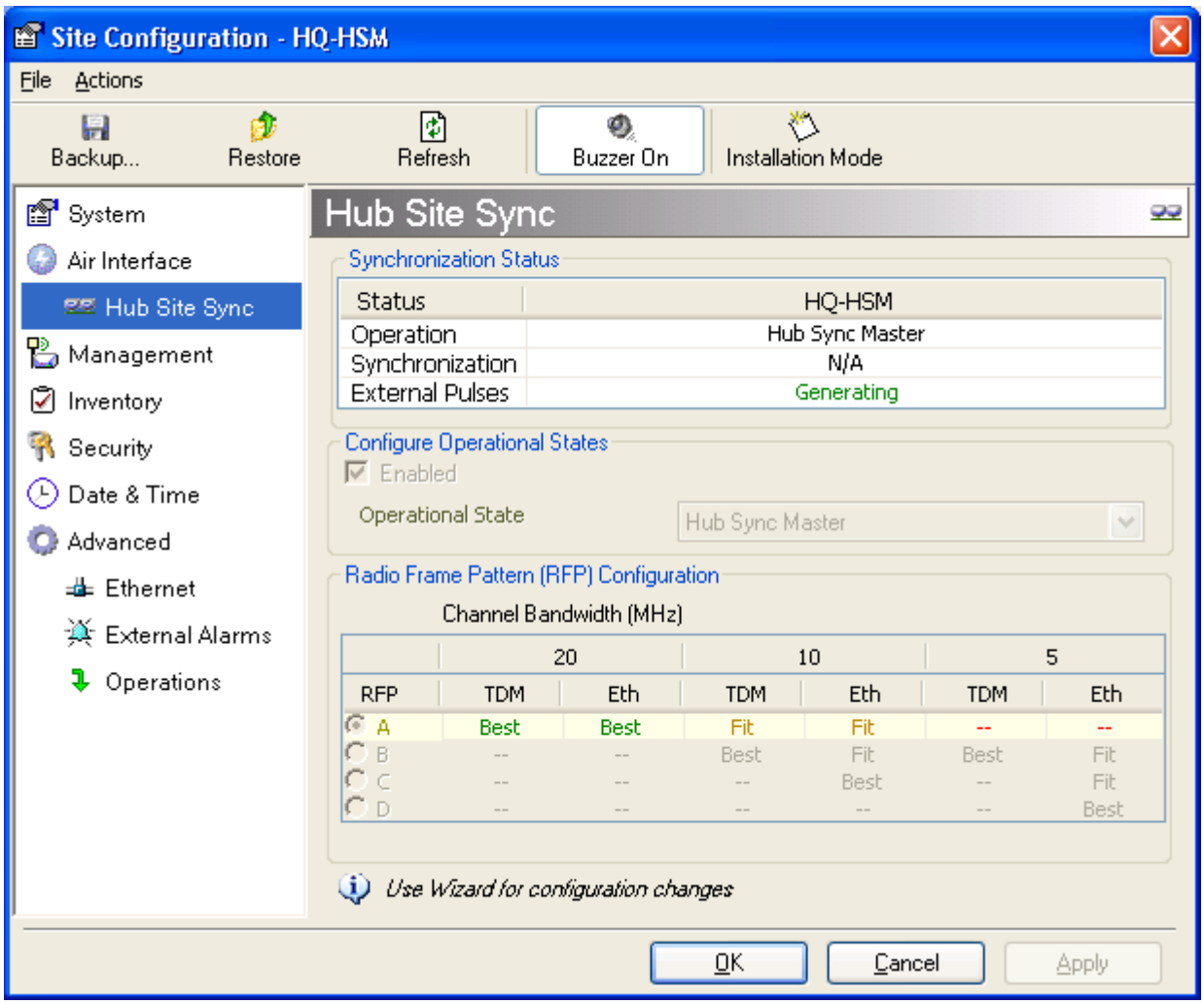


Figure E-8: Site Configuration – Hub Site Sync dialog box

The following figure is displayed when the hardware does not support HSS. These units may be used as independent remote units.

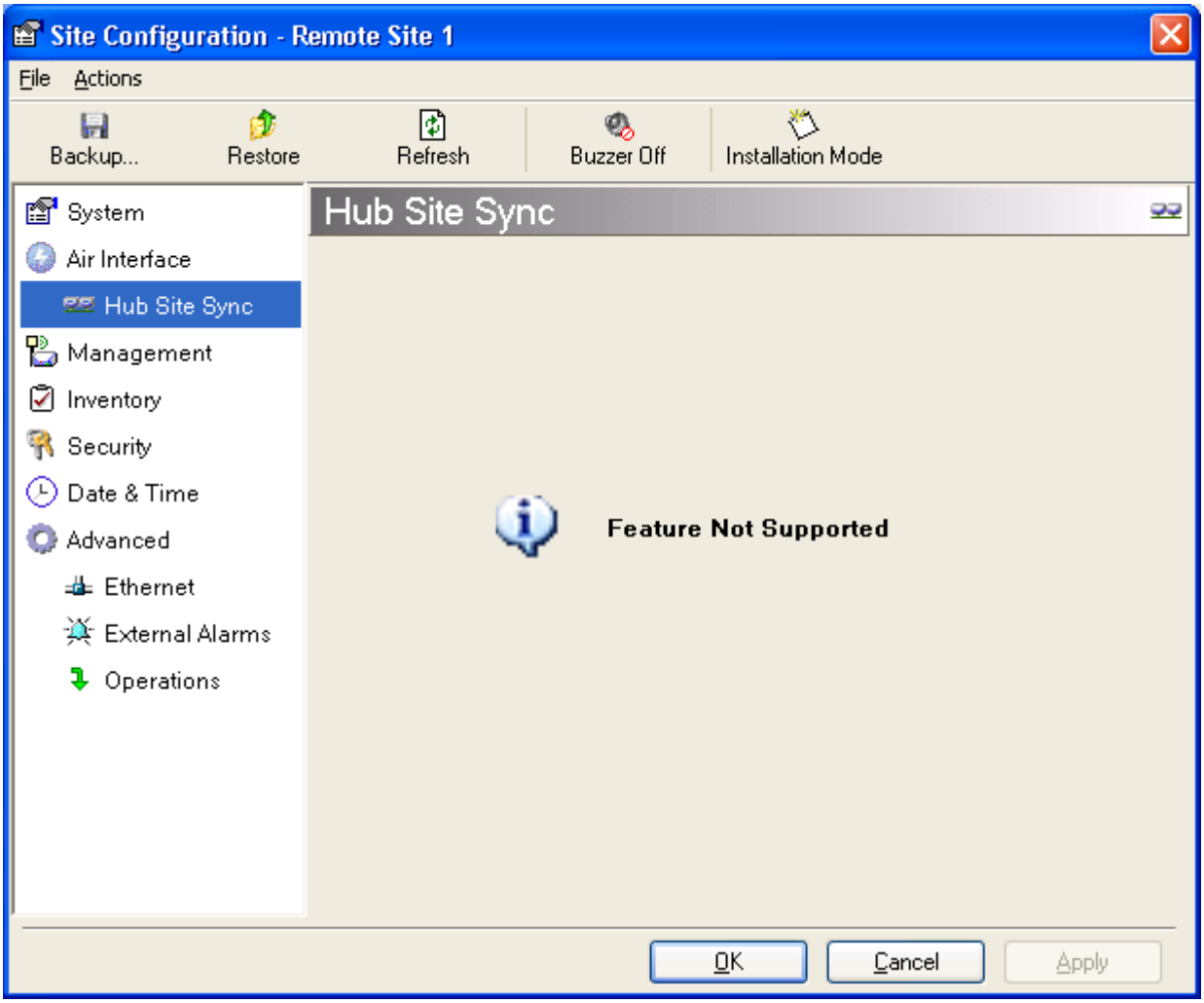


Figure E-9: HSS Not Supported

Appendix F
BRS Installation Procedure

BRS Link Activation

In accordance with 2.5 GHz standard, WinLink-BRS systems links must be activated before use. This is done at both ODUs independently before installation on site. Both ODUs must be configured the same.

To Activate a BRS Link

1. Install WinLink Manager software as usual.
2. When the Manager Main Screen is displayed it appears with the Link Status label red and showing Inactive. The Link Configuration and Link installation buttons are disabled.

Figure F-1: Inactive Manager Screen

3. Click **Configuration>Configure Location**
   The Air Interface dialog box opens:

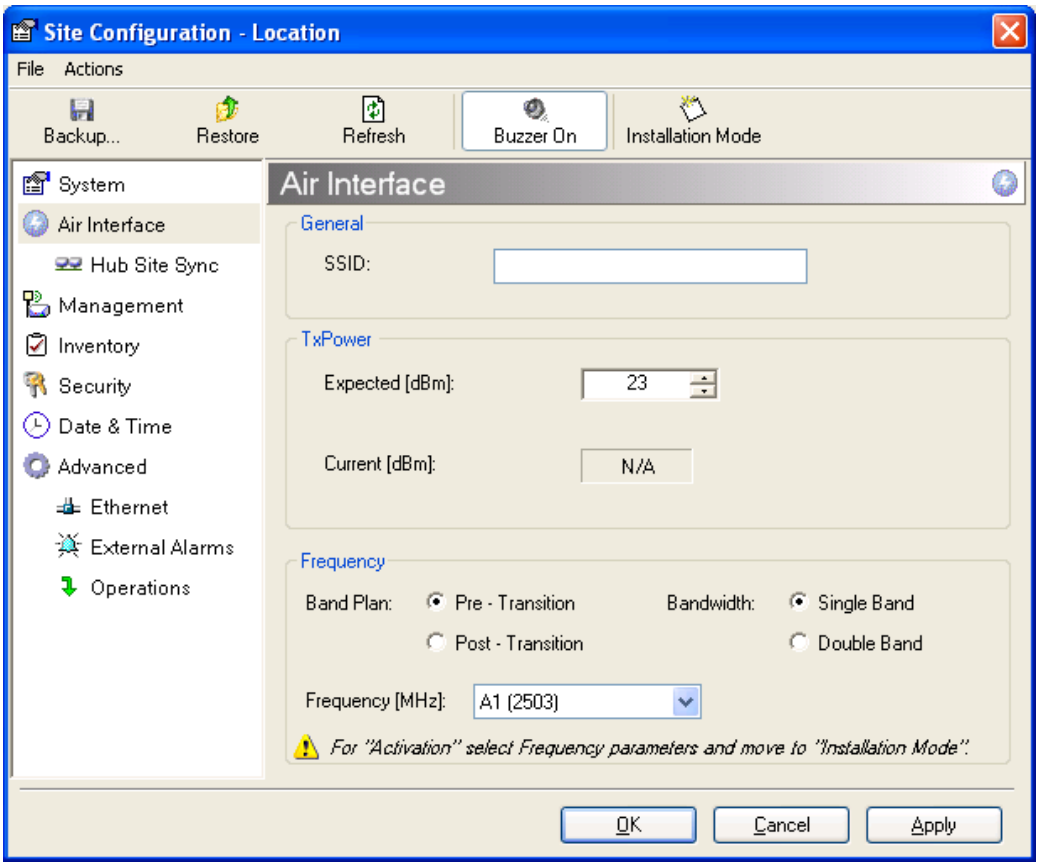


Figure F-2: BRS Air Interface dialog box

4. Set the appropriate Frequency Band Plan and Bandwidth.
5. Select the required frequency band, and click **Apply**.
6. Click **Installation Mode**
7. Repeat for the remote ODU.

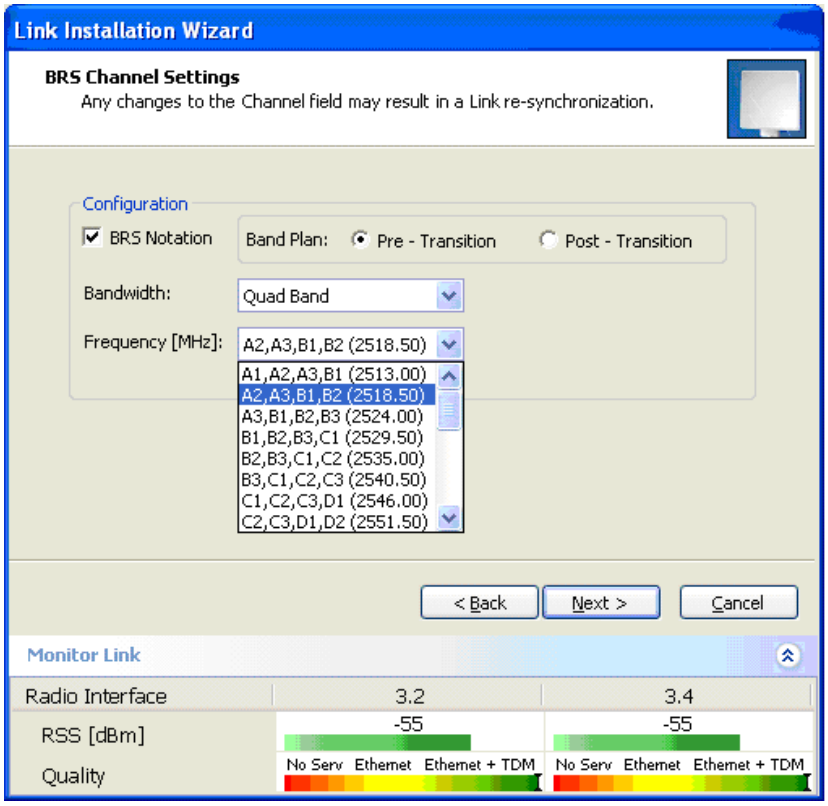


Figure F-3: BRS Channel Settings Pre-Transition

8. Perform the remainder of the Installation procedure as defined in the Installation section.

BRS Link Configuration

The BRS link is reconfigured during the Link Installation or the Link Configuration wizards, or from the Air Interface screen.

Note

Both sites in a BRS Link must be configured identically.

Any changes to the frequency settings cause the link to re-synchronize. A short loss of service will occur during re-synchronization.

To Configure BRS Channel Settings

1. Set the Band Plan.
2. Select the Bandwidth required,
   Single Band
   Double Band
3. Select the Frequency from the pull-down menu.
4. Click Next. The system is re-synchronized to the changes.

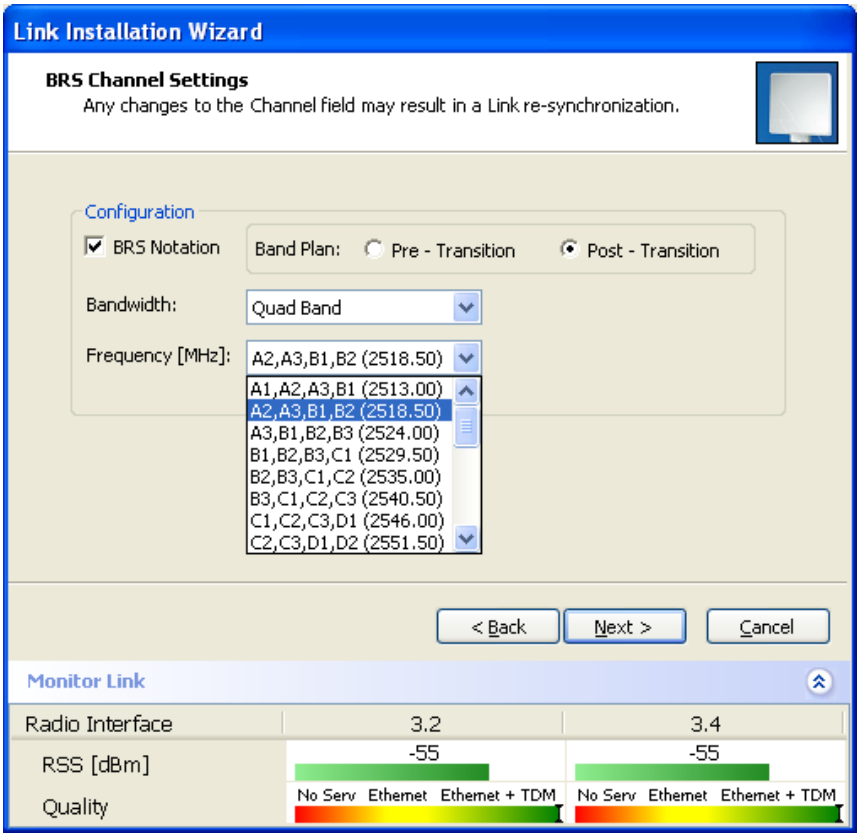


Figure F-4: BRS Channel Settings Post-Transition

Appendix G
RF Exposure

WARNING:

The antennas used for the following transmitters must be installed to provide a separation distance as specified. They must not be co-located or operated in conjunction with any other antenna or transmitter.

Product	FCC ID	Antenna gain [dBi]	Min. Safety Distance [cm]
F58/FCC/EXT	Q3KAMWL1000	28	83
F58/FCC/INT	Q3KAMWL1000	22	42
HE/F58/FCC/INT	Q3KAMWL1580	22	109
HE/F58/FCC/EXT	Q3KAMWL1580	28	217
HE/F58/FCC/EXT	Q3KAMWL1580	32.5	364
AIND/F58/FCC/EXT/4T1	Q3KAMWL1580	32.5	364
F53/FCC/INT	Q3KAMWL1530	22	9
F53/FCC/EXT	Q3KAMWL1530	28	9
F49/FCC/EXT	Q3KWL1000F49	27	35.5
F24/FCC/INT	Q3KAMWL1240	16	16
F53/FCC/EXT	Q3KAMWL1240	24	40
HE/F24/FCC/INT	Q3KAMWL1240H	15.2	37
HE/F24/FCC/EXT	Q3KAMWL1240H	24	71
HE/F25/BRS/INT	Q3KAMWL1250	17.5	26.6
HE/F25/BRS/EXT	Q3KAMWL1250	24	56.3
AIND/F25/BRS/EXT/4T1	Q3KAMWL1250	24	56.3
F54/FCC/CMB/EXT	Q3KAMWL1540C	22	200
F54/FCC/CMB/INT	Q3KAMWL1540C	22	200
HE/F49/FCC/EXT/INT	Q3KAMWL1490H	26	98

Table G-1: RF Exposure

Appendix H
Link Budget Calculator

Overview

The Link Budget Calculator is a utility for calculating the expected performance of the WinLink wireless link and the possible configurations for a specific link range.

The utility allows you to calculate the expected RSS of the link, and find the type of services and their effective throughput as a function of the link range and deployment conditions.

The Link Budget Calculator is supplied on the WinLink Manager CD. After installation, it may also be accessed from the menu bar of the WINLINK™ 1000 Manager as shown in the following figure:

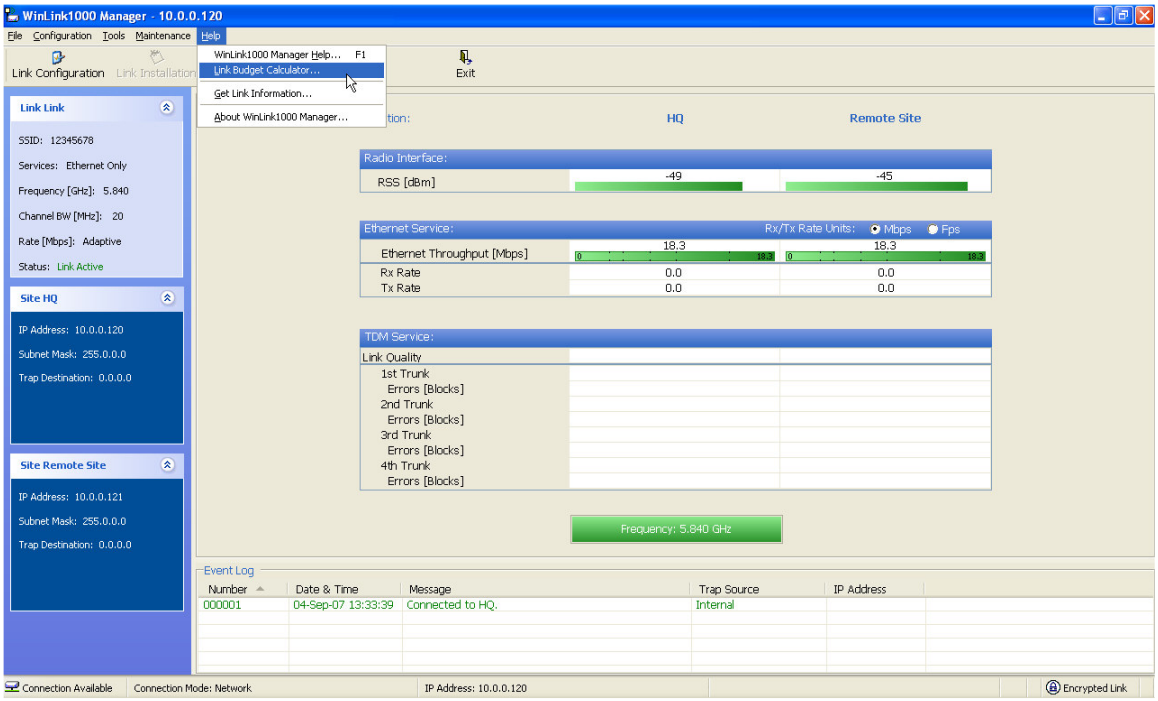


Figure H-1: Accessing the Link Budget Manager Calculator

Description of Parameters

The parameters described in this section are indicated in Figure H-2.

Fade Margin (FM) the margin taken in consideration as part of the parameters needed as spare for high availability. Min level accepted by the LBC is 6dB.

EIRP Tx Power + Antenna Gain (*) – in some products they are limited to a max value due to local regulation and type approval.

Example 1

10 x Log (Value in mW) = (Value in dBm)

1W is the maximum EIRP (Tx Power + Antenna Gain (*)) that is allowed in 5.4 GHz ETSI products by ETSI regulation, (*) considering cable loss.

Note: 3 dB = 2 x Power

1W = 1000 mW → 10 x Log (1000) = 30 dBm

2W = 2000 mW → 10 x Log (2000) =33 dBm

Max/ Min range (distance) WinLink sensitivity threshold in -60dB range

-30 dBm < RSS (sensitivity) <-90 dBm, in addition Propagation Delay is also considered 3.3uS / 1 km (refer to Throughput vs Distance guideline)

Example 2

RSS = Tx(power) + Ant(Tx) + Ant(Rx) – loss

loss = 32.5 + 20 Log (D) + 20 Log (f);

D – Distance in km, f – Center Frequency

Climate/Terrain Factor, see Figure H-3 and Figure H-4.

Expected FM and RSS, refer to A and B

Required Antenna Height, this is the required antenna height considering the Fresnel Zone. Refer to WinLink site-survey guideline.

based on antenna beam

Considering LOS (clear *Line of Site*)

Channel Bandwidth is required with the available Radio Frame Pattern (RFP) for collocated HSS systems.

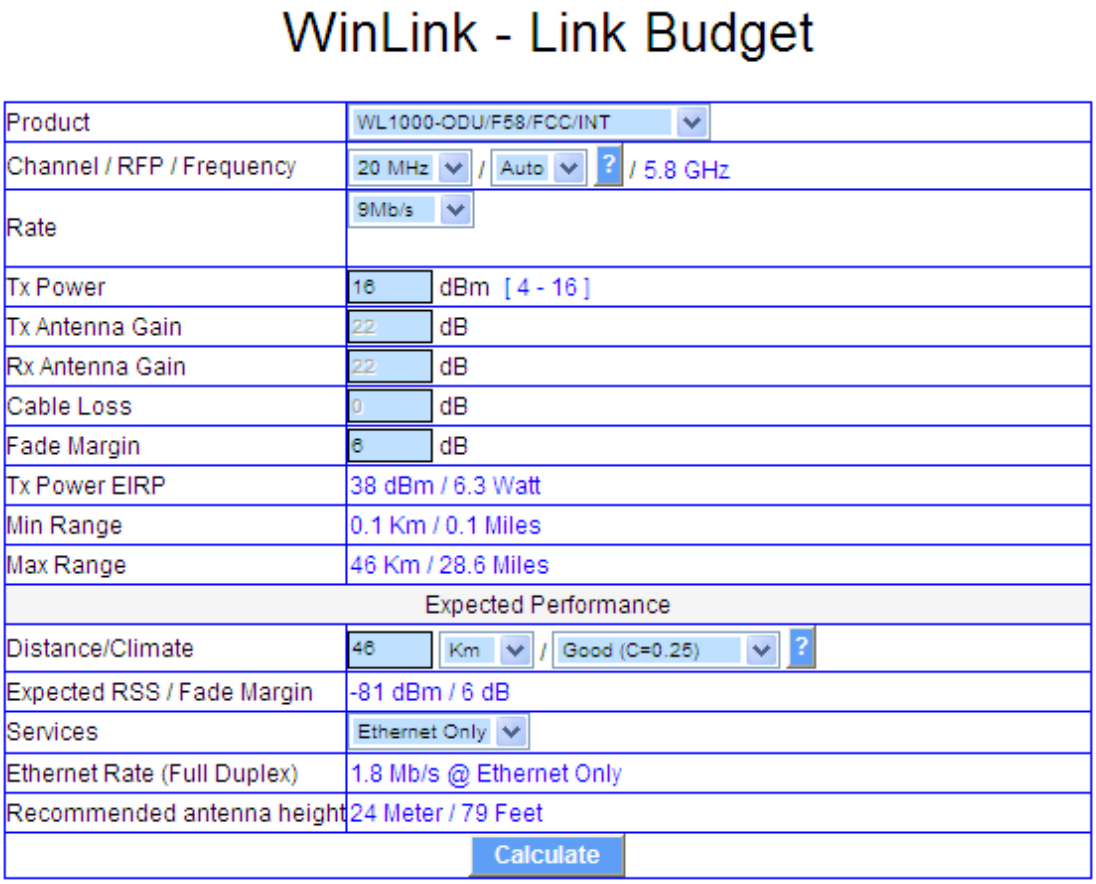


Figure H-2: Link Budget Screen

Figure H-3: Climate and Terrain Factor

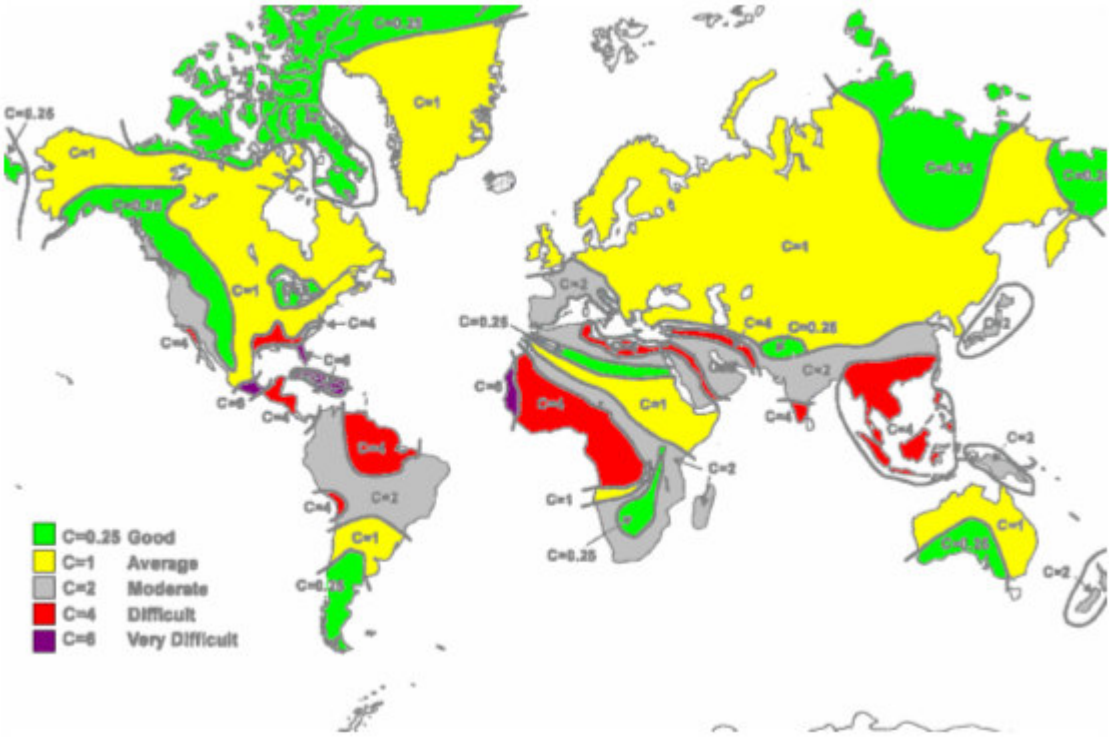


Figure H-4: Geographical Conditions

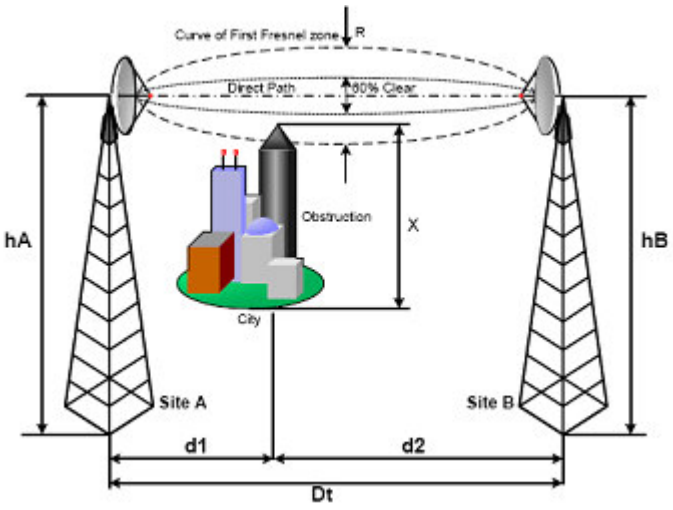


Figure H-5: Fresnel Zone

Using the Link Budget Calculator

The Link Budget Calculator is composed of one table where all the link parameters are defined.

❋ To calculate the link budget

1. Select your system product from the dropdown list of products.
2. Select the rate from the dropdown list. The rate defines the air-interface rate in Mbps. The system operates in TDD mode and has overhead of the air-interface protocol and therefore the accurate actual throughput is provided in the 'Service' Row and the effective Ethernet throughput is provided in the 'Ethernet Rate'.

Note *Throughput can be decreased as a function of range due to propagation delay.*

The remaining fields are completed automatically depending on the product selected in the product field. Standard WinLink™ system parameters are entered as default. Fields in blue boxes may be edited if non-standard antennas and cables are used.

The Fade margin is the minimum margin that is required for LOS conditions. For degraded link conditions, a larger fade margin should be taken into account.

The Tx power EIRP for the system is given in dBm and Watts.

3. Type the required link distance and select units of distance, kilometers or miles.
4. Select the general conditions
5. Select the services required
6. Click **Calculate**

The Expected Performance parameters are calculated and displayed in the lower part of the table.

- Expected RSS – this is the number that the WinLink™ Manager software shows when the WinLink™ ODUs are best aligned.
- Ethernet Rate – Maximum throughput available with the chosen system.

If the expected performance is not suitable for your application, select a different data rate and re-calculate.

Appendix I

Product Specification Table

Table I-1: Product Specification Table

Product		Band	Frequency (MHz)			Transmit Power (dBm)			Antenna Gain (dBi)	EIRP (dBm / Watt)	DFS	ACS
			Min	Max	Step	TPC	Min	Max				
1	WL1000-ODU/F23/HP/EXT	2.3	2312	2387	5		16	16	24	39 / 7.9		+
2	WL1000-ODU/F24/ETSI/EXT	2.4	2412	2472	5		-4	-4	24	19 / 0.1		+
3	WL1000-ODU/F24/HP/EXT		2312	2472	5	+	12	16	24	39 / 7.9		
4	WL1000-ACCESS/F24/HP/EXT		2312	2472	5	+	12	16	24	39 / 7.9		
5	WL1000-ODU/F24/FCC/EXT		2412	2462	5	+	12	18	24	41 / 12.6		+
6	WL1000-ACCESS/F24/FCC/EXT		2412	2462	5	+	12	18	24	41 / 12.6		+
7	WL1000-ODU/F24/FCC/EXT/PoE		2412	2462	5	+	12	18	24	41 / 12.6		+
8	WL1000-ODU/F24/FCC/INT		2412	2462	5	+	12	18	16	34 / 2.5		+
9	WL1000-HE/ODU/F24/FCC/INT		2412	2462	5	+	13	19	16	35 / 3.17		+
10	WL1000-HE/ODU/F24/FCC/EXT		2412	2462	5	+	13	19	24	42 / 15.8		+
11	WL1000-ODU-HE/F25/BRS/INT	2.5	2500	2690			15	22	17.5	39.5 / 8.9		-
12	WL1000-ODU-HE/F25/BRS/EXT		2500	2690			15	22	24	45 / 31.6		-
13	WL1000-ODU/F49/HP/EXT	4.9	4950	4980	5		8	23	27	49 / 79.4		+
14	WL1000-ODU/F49/FCC/EXT		4950	4980	5		9	15	21	35 / 3.2		+
15	WL1000-HE/ODU/F49/FCC/EXT		4950	4980	5		11	17	21	37 / 5		+
16	WL1000-HE/ODU/F49/HP/EXT		4950	4980	5		8	23	21	44 / 25.11		+
17	WL1000-ODU/F53/HP/EXT	5.3	5160	5335	5	+	4	16	28	43 / 20.0		+
18	WL1000-ODU/F53/ETSI/EXT		5180	5320	20	+	-2	15	28	42 / 15.8		+
19	WL1000-ODU/F53/HP/EXT/PoE		5160	5335	5	+	4	16	28	43 / 20.0		+
20	WL1000-ODU/F53/FCC/EXT		5260	5330	5		2	2	28	29 / 0.8		+
21	WL1000-ODU/F53/FCC/INT		5260	5330	5	+	4	8	22	30 / 1.0		+
22	WL1000-ODU/F54/ETSI/EXT	5.4	5500	5700	20	+	2	8	28	35 / 3.2	+	+
23	WL1000-ODU/F54/ETSI/INT		5500	5700	20	+	2	8	22	30 / 1.0	+	+
24	WL1000-HE/ODU/F54/ETSI/INT		5500	5700	20	+	2	8	22	30 / 1.0	+	+

Product		Band	Frequency (MHz)			Transmit Power (dBm)			Antenna Gain (dBi)	EIRP (dBm / Watt)	DFS	ACS
			Min	Max	Step	TPC	Min	Max				
25	WL1000-ODU/F54/ETSI-HG/EXT		5500	5700	20	+	-3	3	28	30 / 1.0	+	+
26	WL1000-HE/ODU/F54/ETSI-LG/EXT		5500	5700	20	+	-3	15	28	42 / 15.8	+	+
27	WL1000-ODU/F54/HP/EXT		5500	5700	20	+	4	18	28	45 / 31.6		+
28	WL1000-HE/ODU/F54/HP/EXT		5500	5700	20	+	4	23	28	50 / 100		+
29	WL1000-HE/ODU/F54/HP/INT		5500	5700	20	+	4	23	22	45 / 31.6		+
30	WL1000-HE/ODU/F54/IC/EXT		5500	5700	20	+	-3	15	28	42 / 15.8		+
31	WL1000-ODU/F54/HP/INT		5500	5700	20	+	4	18	22	40 / 10.0		+
32	WL1000-ODU/F58/CB/EXT		5740	5810	10	+	3	16	28	43 / 20.0		+
33	WL1000-ODU/F58/CB/INT		5740	5810	10	+	3	16	22	38 / 6.3		+
34	WL1000-ODU/F58/CN/EXT		5740	5835	5	+	0	5	28	32 / 1.6		+
35	WL1000-ODU/F58/CN/INT		5740	5835	5	+	0	11	22	33 / 2.0		+
36	WL1000-ODU/F58/FCC/EXT		5740	5835	5	+	4	16	28	43 / 20.0		+
37	WL1000-ACCESS/F58/FCC/EXT		5740	5835	5	+	4	16	28	43 / 20.0		+
38	WL1000-HE/ODU/F58/FCC/EXT		5740	5835	5	+	4	23	28	50 / 100		+
39	WL1000-HE/ODU/F58/FCC/INT	5.8	5740	5835	5	+	4	23	28	51 / 126		+
40	WL1000-ODU/F58/FCC/EXT/PoE		5740	5835	5	+	4	16	28	43 / 20.0		+
41	WL1000-ODU/F58/FCC/INT		5740	5835	5	+	4	16	22	38 / 6.3		+
42	WL1000-ODU-F58/IDA/EXT		5835	5865	5	+	4	16	28	43 / 20.0		+
43	WL1000-ACCESS/F58/IDA/EXT		5835	5865	5	+	4	16	28	43 / 20.0		+
44	WL1000-ODU-F58/IDA/EXT/PoE		5835	5865	5	+	4	16	28	43 / 20.0		+
45	WL1000-ODU-HE/F58/FCC/EXT		5740	5835	5	+	9	23	28	50 / 100		+
46	WL1000-ODU-HE/F58/UK/EXT		5740	5835	5	+	9	14	28	41 / 12.6		+
47	WL1000-ODU-HE/F59/HP/INT	5.9	5740	5940	5	+	9	23	22	45 / 31.6		+
48	WL1000-ODU-HE/F59/HP/EXT		5740	5940	5	+	9	23	28	50 / 100		+
49	WL1000-ODU-HE/F60/HP/EXT	6.0	5805	6020	5	+	9	23	28	50 / 100		+

Appendix J
Lightning and Grounding Guidelines

The WinLink™ Lightning protection system consists of the following components, as described below:

- Individual Grounding for each Indoor/Outdoor unit
- External Primary Surge Suppressor unit for the CAT-5 Outdoor cable
- Internal ESD protection circuits over the Power/Telecom lines

Grounding for Indoor/Outdoor Units

ODU (Out Door Unit) Grounding

WinLink™ uses a Shielded CAT-5 cable to interconnect the Outdoor (ODU) and Indoor (IDU) units.

However, this shielding does not provide a good Lightning Discharge path, since it can not tolerate the high Lightning Current surges.

In order to provide an alternate Lightning Discharge path, the ODU/Antenna Grounding posts should be connected to Ground point by a 10 AWG short Copper wire, as per NEC 810-21.

IDU (Indoor Unit) Grounding

The IDU's grounding post should be connected to the internal Ground point, merely for Safety and ESD protection reasons.

External Lightning Surge Suppressors

To minimize direct Lightning damages, an external well grounded CAT-5 Lightning Protector should be mounted outside the building, located as near as possible to the entrance of the CAT-5 ODU-IDU interconnection

cable. 3rd pary protectors may be used such as Motorola's 300SS, Hyperlink's HGLN-CAT5, or Sixnet's SP-ETH-2

Internal ESD Protection circuits

WinLink™ is designed to meet the ETSI/FCC/Aus/NZ/CSA EMC and Safety requirements. To fulfill these requirements, the system's Telecom lines at the ODU/IDU are Transformer-isolated and include internal ESD (Electro-Static-Discharge) Protection circuits.

Appendix K
MIB Reference

Introduction

About the MIB

The RADWIN MIB is a set of API's that can be used to control the RADWIN management functions via external applications.

The MIB is divided into a public and a private API groups. The private API group is owned by RADWIN and supplements the public group.

The RADWIN WinLink™ 1000 supports the variables of RFC-1213 (MIB II) public MIB set out in table Table K-2 below.

The RADWIN WinLink™ 1000 supports the following sections of RFC-1214 (MIB II) public MIB:

- System
- Interfaces – Only the interfaces description part is supported. The interfaces can not be blocked using *ifAdminStatus* variable.

About this Appendix

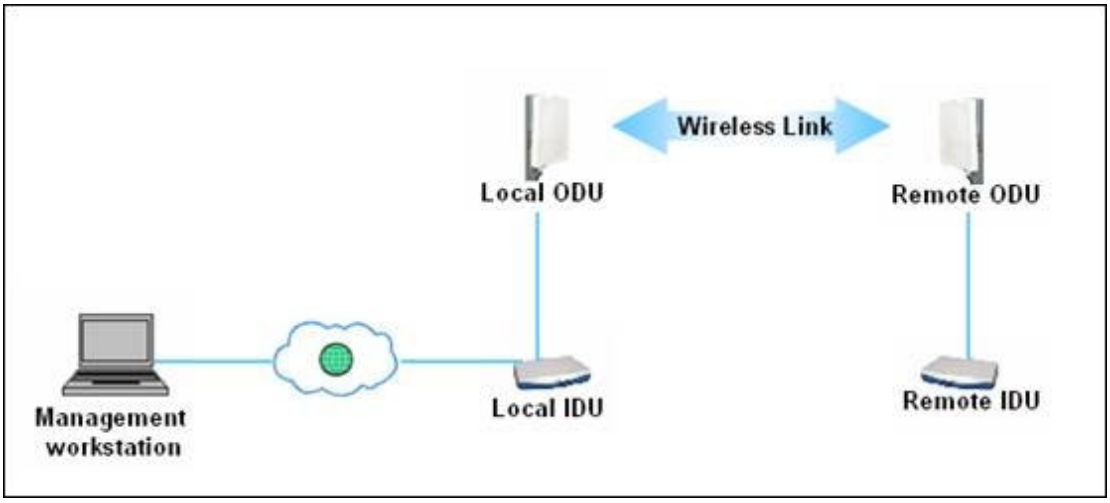
This guide describes RADWIN **private** MIB and **supported** sections of the RFC 1213.

Terminology

The following terms are used in this Appendix.

Term	Meaning
IDU	Indoor Unit
ODU	Outdoor Unit
MIB	Management Information Base
NMS	Network Management System
API	Application Programming Interface
SNMP	Simple Network Management Protocol

Interface API



System Configuration

The system includes SNMP agents on both ODU's. Each agent can be accessed only from the local side of the link. The management station can access the SNMP agent using the Ethernet port over any SNMP/UDP/IP network. The local SNMP agent contains data on both the local and remote ODU's and IDU's. Both agents communicate with each other over the air using a proprietary protocol. Each ODU has a single MAC and IP address.

Control Method

Winlink™ 1000 Manager Application provides all the tools and means to configure and monitor the WinLink™ 1000 link. TheWinlink™ 1000 Manager includes a wizard that guides the user through the installation and configuration processes. A user who wishes to control and configure the device using the MIB should follow the following rules.

- The connection for control and configuration is to the local ODU.
- All Parameters should be consistent between both of the ODU's. Note that the inconsistency of air parameters can break the air connection. To fix air parameters inconsistency the user is required to reconfigure each of the ODU's.

- A common practice is to configure the remote unit first and then to configure the local unit only if there was no problem in remote configuration.
- For some of the configuration parameters additional action must be taken before the new value is loaded. Please refer to the operation in the parameters description.
- Some of the MIB parameters values are product dependent. It is strongly recommend using the Winlink™ 1000 ManagerWinlink™ 1000 Manager Application for changing these values. Refer to the User Manual for each product specification. Setting wrong value may cause indeterminate results.

Community String

To control –

- A link, all SNMP requests should address the local ODU IP.
- The local ODU and IDU, use the *"public-bru1"* community string.
- The remote ODU and IDU, use the *"public-bru4097"* community string.

Private MIB Structure

The private **RADWIN** MIB consists of the top level sections

- RADWIN **Private** – Top level of the MIB.
- **Products Section** – Contains the Object IDs for all ODU configurations.
- **ODU Section** – Contains API sets that define the configuration, status and performance monitoring of the ODU.
- **IDU Section** – Contains API set that define the configuration status and performance monitoring of the IDU.
- **General Section** – Definition of the generic trap description parameter.

The following sections describe each of the branches individually.

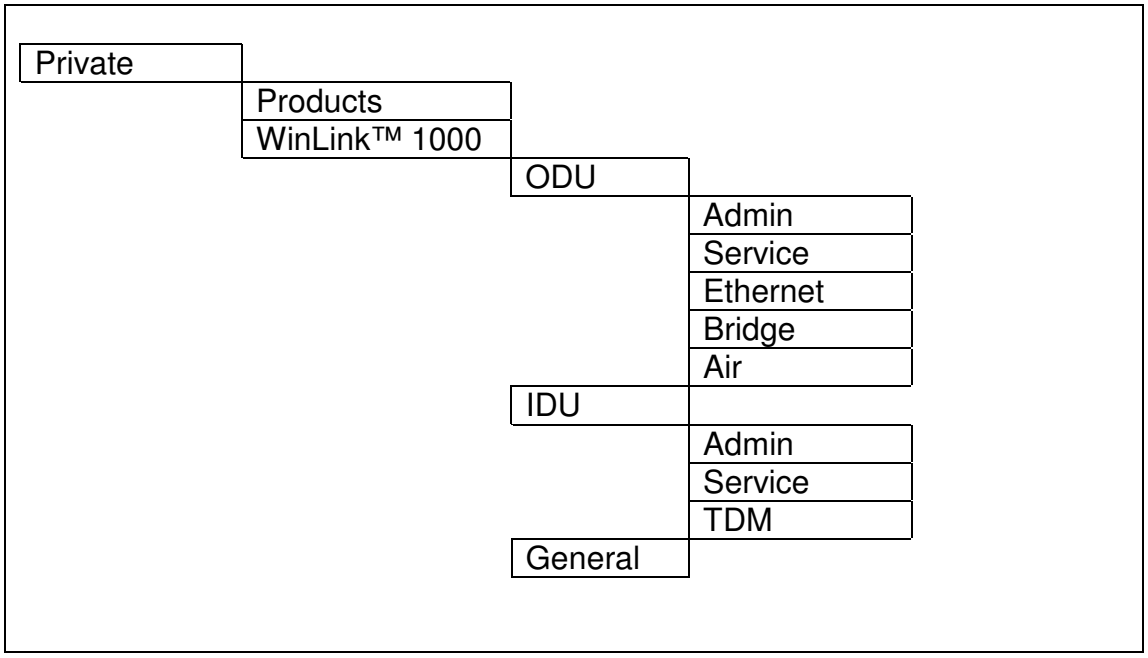


Table K-1: Top Level Sections of the private MIB

Products MIB

The products MIB section contains the definition of the Object IDs for each hardware configurations of the ODU. Supported hardware configurations are for integrated and external antennas.

ODU MIB

The ODU MIB is divided into five sub sections: Admin, Service, Ethernet, Bridge and Air.

The Admin section includes data about the software and hardware revisions of the product. It also enables configuration of the IP parameters.

The Service section contains the administrative state of the ODU. The ODU can be either in installation mode or in normal mode. During *install mode* no service is provided, the unit the wireless link is established at low rate (6 Mb/s) and a buzzer can be used to for the antenna alignment process. When connecting a *normal mode* ODU with an *install mode* ODU, the Normal node ODU switches temporary to *install mode*.

The Ethernet Section contains data about the current Ethernet service configuration.

The Bridge Section includes all the bridging service performance data. Note that, this data is available for each ODU separately.

The Air Section is includes, in the top level, configuration data such as frequency and rate and a sub-section for air interface performance data.

IDU MIB

The IDU MIB is divided into three sub sections: Admin, Service and TDM.

The Admin section includes data about the software and hardware revisions of the product. Note the IDU is managed via the ODU and therefore no IP configuration is available for this unit.

The service MIB is used both to configure the TDM services (either E1 or T1) and monitor the status of the services activation.

The TDM section includes two tables. The first is used for monitor trunks status and configure trunk modes, such as line coding and loop-back, the second table includes the trunk performance data.

General MIB

The general MIB include a single generic parameter that use be all traps as a trap description parameter.

MIB Parameter

The following section describes all the MIB parameters. The MIB parameters follow the following naming convention:

<winlink1000><Section 1>…<Section n><Parameter Name>

For each of the configuration and control parameters (parameters with read-write access), "Effective" column describes when the new value is effective. It is highly recommended to perform the appropriate action in order to make the values affective immediately after changing the value. In cases that a change is required in both sides of the link, it is recommended to change both sides of the link and then only perform the action.

Supported Variables from the RFC 1213 MIB

Table K-2 Supported RFC 1213 Variables

Name	OID	Type	Access	Description
ifIndex	.1.3.6.1.2.1.2.2.1.1.x[6]	Integer	RO	A unique value for each interface. Its value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the entity's network management system to the next re-initialization.
ifDescr	.1.3.6.1.2.1.2.2.1.2	DisplayString	RO	A textual string containing information about the interface. This string should include the name of the manufacturer, the product name and the version of the hardware interface.
ifType	.1.3.6.1.2.1.2.2.1.3	Integer	RO	The type of interface, distinguished according to the physical/link protocol(s) immediately `below' the network layer in the protocol stack.
ifSpeed	.1.3.6.1.2.1.2.2.1.5	Gauge	RO	An estimate of the interface's current bandwidth in bits per second. For interfaces which do not vary in bandwidth or for those where no accurate estimation can be made, this object should ontain the nominal bandwidth.
ifPhysAddress	.1.3.6.1.2.1.2.2.1.6	Phys-Address	RO	The interface's address at the protocol layer immediately `below' the network layer in the protocol stack. For interfaces which do not have such an address (e.g., a serial line), this object should contain an octet string of zero length.
ifAdminStatus	.1.3.6.1.2.1.2.2.1.7	Integer	RW	The desired state of the interface. The testing(3) state indicates that no operational packets can be passed.
ifOperStatus	.1.3.6.1.2.1.2.2.1.8	Integer	RO	The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed.
ifInOctets	.1.3.6.1.2.1.2.2.1.10.x	Counter	RO	The total number of octets received on the interface, including framing characters.
ifInUcastPkts	.1.3.6.1.2.1.2.2.1.11.x	Counter	RO	The number of subnetwork-unicast packets delivered to a higher-layer protocol.
ifInNUcastPkts	.1.3.6.1.2.1.2.2.1.12.x	Counter	RO	The number of non-unicast (i.e., subnetwork-broadcast or subnetwork-multicast) packets delivered to a higher-layer protocol.
ifInErrors	.1.3.6.1.2.1.2.2.1.14.x	Counter	RO	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
ifOutOctets	.1.3.6.1.2.1.2.2.1.16.x	Counter	RO	The total number of octets transmitted out of the interface, including framing characters.

[6] x is the interface ID

Name	OID	Type	Access	Description
ifOutUcastPkts	.1.3.6.1.2.1.2.2.1.17.x	Counter	RO	The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.
ifOutNUcastPkts	.1.3.6.1.2.1.2.2.1.18.x	Counter	RO	The total number of packets that higher-level protocols requested be transmitted to a non-unicast (i.e., a subnetwork-broadcast or subnetwork-multicast) address, including those that were discarded or not sent.

MIB Parameters List

Table K-3Private MIB Parameters List

Name	OID	Type	Access	Description
winlink1000 OduAdmProductType	1.3.6.1.4.1.4458.1000.1.1.1	DisplayString	RO	ODU configuration description.
winlink1000 OduAdmHwRev	1.3.6.1.4.1.4458.1000.1.1.2	DisplayString	RO	Hardware Revision of the ODU.
winlink1000 OduAdmSwRev	1.3.6.1.4.1.4458.1000.1.1.3	DisplayString	RO	Software Revision of the ODU.
winlink1000 OduAdmLinkName	1.3.6.1.4.1.4458.1000.1.1.4	DisplayString	RW	Link Name. A change is effective immediately.
winlink1000 OduAdmResetCmd	1.3.6.1.4.1.4458.1000.1.1.5	Integer	RW	Reset Command. A set command with a value of 3 will cause a device reset. The read value is always 0.
winlink1000 OduAdmAddres	1.3.6.1.4.1.4458.1000.1.1.6	IpAddress	RW	ODU IP Address. A change is effective only after reset. The above attribute is kept for backwards compatibility reasons
winlink1000 OduAdmMask	1.3.6.1.4.1.4458.1000.1.1.7	IpAddress	RW	ODU Subnet Mask. A change is effective only after reset. The above attribute is kept for backwards compatibility reasons
winlink1000 OduAdmGateway	1.3.6.1.4.1.4458.1000.1.1.8	IpAddress	RW	ODU default gateway. A change is effective only after reset. The above attribute is kept for backwards compatibility reasons
winlink1000 OduAdmBroadcast	1.3.6.1.4.1.4458.1000.1.1.10	Integer	RW	This parameter is reserved to the element manager provided with the product.
winlink1000 OduAdmHostsTable			N/A	Table of traps destinations. Each trap destination is defined by an IP address and a UDP port. Up to 10 addresses can be configured.
winlink1000 OduAdmHostsEntry			N/A	Table entry. INDEX { **winlink1000**OduAdmHostsIndex }
winlink1000 OduAdmHostsIndex			RO	Indexing of table.
winlink1000 OduAdmHostsIp	1.3.6.1.4.1.4458.1000.1.1.12.1.2	IpAddress	RW	Trap destination IP. A change is effective immediately.
winlink1000 OduAdmHostsPort	1.3.6.1.4.1.4458.1000.1.1.12.1.3	Integer	RW	UDP port of the trap destination. A change is effective immediately.
winlink1000 OduBuzzerAdminState	1.3.6.1.4.1.4458.1000.1.1.13	Integer	RW	This parameter controls the activation of the buzzer while the unit is in install mode. A change is effective immediately. The valid values are: disabled (0)
winlink1000 OduProductId	1.3.6.1.4.1.4458.1000.1.1.14	DisplayString	RO	This parameter is reserved to the element manager provided with the product.
winlink1000 OduReadCommunity	1.3.6.1.4.1.4458.1000.1.1.15	DisplayString	RW	Read Community String. This variable always returns ***** when retrieving its value. It is used by the element manager to change the Read Community String. The SNMP agent accepts only encrypted values.

Name	OID	Type	Access	Description
winlink1000 OduReadWriteCommunity	1.3.6.1.4.1.4458.1000.1.1.16	DisplayString	RW	The Read/Write Community String. This variable always returns ***** when retrieving its value. It is used by the element manager to change the Read/Write Community String. The SNMP agent accepts only encrypted values.
winlink1000 OduTrapCommunity	1.3.6.1.4.1.4458.1000.1.1.17	DisplayString	RW	The Trap Community String. This variable is used by the element manager to change the Trap Community String. The SNMP agent accepts only encrypted values.
winlink1000 OduAdmSnmpAgentVersion	1.3.6.1.4.1.4458.1000.1.1.18	Integer	RO	Major version of the SNMP agent.
winlink1000 OduAdmRemoteSiteName	1.3.6.1.4.1.4458.1000.1.1.19	DisplayString	RO	Remote site name. Returns the same value as the sysLocation variable of the remote site would.
winlink1000 OduAdmSnmpAgentMinorVersion	1.3.6.1.4.1.4458.1000.1.1.20	Integer	RO	Minor version of the SNMP agent.
winlink1000 OduAdmLinkPassword	1.3.6.1.4.1.4458.1000.1.1.21	DisplayString	RW	Link Password. This variable always returns ***** when retrieving its value. It is used by the element manager to change the Link Password. The SNMP agent accepts only encrypted values.
winlink1000 OduAdmSiteLinkPassword	1.3.6.1.4.1.4458.1000.1.1.22	DisplayString	RW	Site Link Password. This variable always returns ***** when retrieving its value. It is used by the element manager to change the Link Password of a single site. The SNMP agent accepts only encrypted values.
winlink1000 OduAdmDefaultPassword	1.3.6.1.4.1.4458.1000.1.1.23	Integer	RO	This parameter indicates if the current Link Password is the default password.
winlink1000 OduAdmConnectionType	1.3.6.1.4.1.4458.1000.1.1.24	Integer	RO	This parameter indicates if the Manager application is connected to the local ODU or to the remote ODU over the AIR interface
winlink1000 OduAdmBackToFactorySettingsCmd	1.3.6.1.4.1.4458.1000.1.1.25	Integer	RW	Back to factory settings Command. A change is effective only after reset. The read value is always 0.
winlink1000 OduAdmIpParamsCnfg	1.3.6.1.4.1.4458.1000.1.1.26	DisplayString	RW	ODU IP Configuration. The format is as follows: %IP_ADDR%|%NET_MASK%|%GATEWAY%|
winlink1000 OduAdmVlanID	1.3.6.1.4.1.4458.1000.1.1.27	Integer	RW	This is the ID of the VLAN. Valid ID is from 1 to 4094.This ID is initialized to 0 which means that no-VLAN is installed.
winlink1000 OduAdmVlanPriority	1.3.6.1.4.1.4458.1000.1.1.28	Integer	RW	This is the priority of the VLAN. 0 is the lowest priority
winlink1000 OduSrvMode	1.3.6.1.4.1.4458.1000.1.2.1	Integer	RW	Administrative mode of the system. The only mode that can be set is installMode
winlink1000 OduSrvBridging	1.3.6.1.4.1.4458.1000.1.2.3	Integer	RO	Bridging Service Admin Mode. The valid values are: disabled (0)
winlink1000 OduEthernetRemainingRate	1.3.6.1.4.1.4458.1000.1.3.1	Integer	RO	Current Ethernet bandwidth in bps.

Name	OID	Type	Access	Description
winlink1000 OduEthernetIfTable			N/A	ODU Ethernet Interfaces Table.
winlink1000 OduEthernetIfEntry			N/A	Table entry. INDEX { **winlink1000**OduEthernetIfIndex }
winlink1000 OduEthernetIfIndex	1.3.6.1.4.1.4458.1000.1.3.2.1.1	Integer	RO	If Index corresponding to this Interface.
winlink1000 OduEthernetIfAddress	1.3.6.1.4.1.4458.1000.1.3.2.1.5	DisplayString	RO	MAC address of the ODU.
winlink1000 OduEthernetIfAdminStatus	1.3.6.1.4.1.4458.1000.1.3.2.1.6	Integer	RW	The desired state of the interface.
winlink1000 OduEthernetIfOperStatus	1.3.6.1.4.1.4458.1000.1.3.2.1.7	Integer	RO	The current operational state of the interface.
winlink1000 OduEthernetIfFailAction	1.3.6.1.4.1.4458.1000.1.3.2.1.8	Integer	RW	The failure action of the interface.
winlink1000 OduEthernetNumOfPorts	1.3.6.1.4.1.4458.1000.1.3.3	Integer	RO	The number of network interfaces.
winlink1000 OduBridgeBasePortTable			N/A	ODU Bridge Ports Table.
winlink1000 OduBridgeBasePortEntry			N/A	Table entry. INDEX { **winlink1000**OduBridgeBasePortIndex }
winlink1000 OduBridgeBasePortIndex			RO	Port Number.
winlink1000 OduBridgeBaseIfIndex			RO	IfIndex corresponding to this port.
winlink1000 OduBridgeTpMode	1.3.6.1.4.1.4458.1000.1.4.4.101	Integer	RW	This parameter controls the ODU bridging mode. Using the HUB mode
winlink1000 OduBridgeTpPortTable			N/A	ODU Transparent Bridge Ports Table.
winlink1000 OduBridgeTpPortEntry			N/A	Table entry. INDEX { **winlink1000**OduBridgeTpPortIndex }
winlink1000 OduBridgeTpPortIndex			RO	Port Number.
winlink1000 OduBridgeTpPortInFrames	1.3.6.1.4.1.4458.1000.1.4.4.3.1.3	Counter	RO	Number of frames received by this port.
winlink1000 OduBridgeTpPortOutFrames	1.3.6.1.4.1.4458.1000.1.4.4.3.1.4	Counter	RO	Number of frames transmitted by this port.
winlink1000 OduBridgeTpPortInBytes	1.3.6.1.4.1.4458.1000.1.4.4.3.1.101	Counter	RO	Number of bytes received by this port.
winlink1000 OduBridgeTpPortOutBytes	1.3.6.1.4.1.4458.1000.1.4.4.3.1.102	Counter	RO	Number of bytes transmitted by this port.
winlink1000 OduAirFreq	1.3.6.1.4.1.4458.1000.1.5.1	Integer	RW	Installation Frequency Center. The possible values vary between the products. Please refer to the User Manual for supported frequencies. A change is effective after re-synchronization of the link. Measured in MHz under if frequency resolution value < 100

Name	OID	Type	Access	Description
winlink1000 OduAirDesiredRate	1.3.6.1.4.1.4458.1000.1.5.2	Integer	RW	This parameter is deprecated and read-only. Desired Rate of the air interface. This value is relevant for a Channel Bandwidth of 20 MHz only. For 5 & 10 MHz
winlink1000 OduAirSSID	1.3.6.1.4.1.4458.1000.1.5.3	DisplayString	RW	This parameter is reserved to the element manager provided with the product.
winlink1000 OduAirTxPower	1.3.6.1.4.1.4458.1000.1.5.4	Integer	RW	Transmit power in dBm for rates 6 - 24 Mb/s. This is a nominal value. The actual transmit power includes additional attenuation. The min and max values varies per specific product and regulation. For further details refer to the User Manual. A change is effective immediately.
winlink1000 OduAirSesState	1.3.6.1.4.1.4458.1000.1.5.5	Integer	RO	Current Link State. During normal operation active value read. The probing is a state in which the master monitors radars within a channel. This state is performed only in frequency bands were DFS/TPC is required.
winlink1000 OduAirMstrSlv	1.3.6.1.4.1.4458.1000.1.5.6	Integer	RO	This parameter indicates if the device was automatically selected into the radio link master or slave. The value is undefined if there is no link.
winlink1000 OduAirResync	1.3.6.1.4.1.4458.1000.1.5.8	Integer	RW	Setting this parameter to 1 will cause the link to restart the synchronization process.
winlink1000 OduAirRxPower	1.3.6.1.4.1.4458.1000.1.5.9.1	Integer	RO	Received Signal Strength in dBm.
winlink1000 OduAirTotalFrames	1.3.6.1.4.1.4458.1000.1.5.9.2	Counter	RO	Total Number of received radio frames.
winlink1000 OduAirBadFrames	1.3.6.1.4.1.4458.1000.1.5.9.3	Counter	RO	Total number of received radio frames with CRC errors.
winlink1000 OduAirCurrentRate	1.3.6.1.4.1.4458.1000.1.5.9.4	Integer	RO	This parameter is deprecated. Actual rate of the air interface in Mbps.This value is relevant for a Channel Bandwidth of 20 MHz only.For 5 & 10 MHz
winlink1000 OduAirCurrentRateIdx	1.3.6.1.4.1.4458.1000.1.5.9.5	Integer	RO	The index of the current air rate.
winlink1000 OduAirTxPower36	1.3.6.1.4.1.4458.1000.1.5.10	Integer	RW	This parameter is deprecated and read-only. This parameter controls the transmit power in dBm for an air rate of 36 Mbps.The actual transmit power includes additional attenuation. The min and max values vary per specific product and regulation. For further details refer to the User Manual. A change is effective immediately.
winlink1000 OduAirTxPower48	1.3.6.1.4.1.4458.1000.1.5.11	Integer	RW	This parameter is deprecated and read-only.This parameter controls the transmit power in dBm for an air rate of 48 Mbps. The actual transmit power includes additional attenuation. The min and max values vary per specific product and regulation. For further details refer to the User Manual. A change is effective immediately.

Name	OID	Type	Access	Description
winlink1000 OduAirCurrentTxPower	1.3.6.1.4.1.4458.1000.1.5.12	Integer	RO	Current Transmit Power in dBm. This is a nominal value. The actual transmit power includes additional attenuation. For further details refer to the User Manual.
winlink1000 OduAirMinFrequency	1.3.6.1.4.1.4458.1000.1.5.13	Integer	RO	Minimum center frequency in MHz.
winlink1000 OduAirMaxFrequency	1.3.6.1.4.1.4458.1000.1.5.14	Integer	RO	Maximum center frequency in MHz.
winlink1000 OduAirFreqResolution	1.3.6.1.4.1.4458.1000.1.5.15	Integer	RO	Frequency resolution. Measured in MHz if value < 100
winlink1000 OduAirCurrentFreq	1.3.6.1.4.1.4458.1000.1.5.16	Integer	RO	Current Frequency Center. Measured in MHz if frequency resolution value < 100
winlink1000 OduAirNumberOfChannels	1.3.6.1.4.1.4458.1000.1.5.17	Integer	RO	Number of channel frequencies that can be used.
winlink1000 OduAirChannelsTable			N/A	Table of channels used by the automatic channels selection. Selection of a single channel disables automatic selection.
winlink1000 OduAirChannelsEntry			N/A	Table entry. INDEX { **winlink1000**OduAirChannelsIndex }
winlink1000 OduAirChannelsIndex	1.3.6.1.4.1.4458.1000.1.5.18.1.1	Integer	RO	Channel Index.
winlink1000 OduAirChannelsFrequency	1.3.6.1.4.1.4458.1000.1.5.18.1.2	Integer	RO	Channel frequency in MHz.
winlink1000 OduAirChannelsOperState	1.3.6.1.4.1.4458.1000.1.5.18.1.3	Integer	RW	Channel administrative state. Can be changed by the user. Only enabled channels are used by the automatic channel selection mechanism
winlink1000 OduAirChannelsAvail	1.3.6.1.4.1.4458.1000.1.5.18.1.4	Integer	RO	Channel administrative state. Depends on the specific product and cannot be changed by the user. Only enabled channels are used the automatic channel selection mechanism
winlink1000 OduAirDfsState	1.3.6.1.4.1.4458.1000.1.5.19	Integer	RO	Radar detection state. The valid values are: disabled (0)
winlink1000 OduAirAutoChannelSelectionState	1.3.6.1.4.1.4458.1000.1.5.20	Integer	RO	Automatic channel selection state. This parameter is deprecated. Represents the ACS availability at the present channel bandwidth. The valid values are: disabled (0)
winlink1000 OduAirEnableTxPower	1.3.6.1.4.1.4458.1000.1.5.21	Integer	RO	This value indicates if Tx power configuration is enabled or disabled.
winlink1000 OduAirMinTxPower	1.3.6.1.4.1.4458.1000.1.5.22	Integer	RO	Minimum Tx power in dBm.
winlink1000 OduAirMaxTxPowerTable			N/A	Table of Maximum transmit power in dBm per Air interface rate.
winlink1000 OduAirMaxTxPowerEntry			N/A	Table entry. INDEX { **winlink1000**OduAirMaxTxPowerIndex }
winlink1000 OduAirMaxTxPowerIndex	1.3.6.1.4.1.4458.1000.1.5.23.1.1	Integer	RO	Air interface rate index.

Name	OID	Type	Access	Description
winlink1000 OduAirMaxTxPower	1.3.6.1.4.1.4458.1000.1.5.23.1.2	Integer	RO	Maximum transmit power in dBm.
winlink1000 OduAirChannelBandwidth	1.3.6.1.4.1.4458.1000.1.5.24	Integer	RW	Channel bandwidth in KHz. A change is effective only after device reset.
winlink1000 OduAirChannelBWTable			N/A	Table of channel bandwidths.
winlink1000 OduAirChannelBWEntry			N/A	Channel bandwidth table entry. INDEX { **winlink1000**OduAirChannelBWIndex }
winlink1000 OduAirChannelBWIndex	1.3.6.1.4.1.4458.1000.1.5.25.1.1	Integer	RO	Channel bandwidth index.
winlink1000 OduAirChannelBWAvail	1.3.6.1.4.1.4458.1000.1.5.25.1.2	Integer	RO	Channel bandwidth availability
winlink1000 OduAirRFD	1.3.6.1.4.1.4458.1000.1.5.26	Integer	RO	The current radio frame duration in microsecond units.
winlink1000 OduAirRatesTable			N/A	Table of administrative rate indexes for the current channel bandwidth. Some rates might be unavailable due to air interface conditions.
winlink1000 OduAirRatesEntry			N/A	Rate indexes table entry. INDEX { **winlink1000**OduAirRatesIndex }
winlink1000 OduAirRatesIndex	1.3.6.1.4.1.4458.1000.1.5.27.1.1	Integer	RO	Rate index.
winlink1000 OduAirRatesAvail	1.3.6.1.4.1.4458.1000.1.5.27.1.2	Integer	RO	Rate availability
winlink1000 OduAirDesiredRateIdx	1.3.6.1.4.1.4458.1000.1.5.28	Integer	RW	Desired rate index of the air interface. 0 is reserved for Adaptive Rate. A change is effective immediately after the Set operation is performed to the master side
winlink1000 OduAirLinkDistance	1.3.6.1.4.1.4458.1000.1.5.29	Integer	RO	Link distance in meters. A value of -1 indicates an illegal value and also used when no link is established.
winlink1000 OduAirLinkWorkingMode	1.3.6.1.4.1.4458.1000.1.5.30	Integer	RO	Link working mode in terms of versions compatibility. The possible modes are: Unknown - in case there is no link
winlink1000 OduAirMajorLinkIfVersion	1.3.6.1.4.1.4458.1000.1.5.31	Integer	RO	Major link interface version
winlink1000 OduAirMinorLinkIfVersion	1.3.6.1.4.1.4458.1000.1.5.32	Integer	RO	Minor link interface version
winlink1000 OduAirHssDesiredOpState	1.3.6.1.4.1.4458.1000.1.5.40.1	Integer	RW	Desired Hub Site Synchronization operating state.
winlink1000 OduAirHssCurrentOpState	1.3.6.1.4.1.4458.1000.1.5.40.2	Integer	RO	Current Hub Site Synchronization operating state.
winlink1000 OduAirHssSyncStatus	1.3.6.1.4.1.4458.1000.1.5.40.3	Integer	RO	Hub Site Synchronization sync status.

Name	OID	Type	Access	Description
winlink1000 OduAirHssExtPulseStatus	1.3.6.1.4.1.4458.1000.1.5.40.4	Integer	RO	Hub Site Synchronization external pulses detection status.
winlink1000 OduAirHssExtPulseType	1.3.6.1.4.1.4458.1000.1.5.40.5	Integer	RO	Hub Site Synchronization external pulses type.
winlink1000 OduAirHssDesiredExtPulseType	1.3.6.1.4.1.4458.1000.1.5.40.6	Integer	RW	Hub Site Synchronization desired external pulses type. The following values are valid for both 'Read' & 'Write' operations: {typeA(2)
winlink1000 OduAirHssRfpTable			N/A	ODU Radio Frame Patterns Table.
winlink1000 OduAirHssRfpEntry			N/A	ODU RFP Table entry. INDEX { **winlink1000**OduAirHssRfpIndex }
winlink1000 OduAirHssRfpIndex	1.3.6.1.4.1.4458.1000.1.5.40.7.1.1	Integer	RO	Table index. The index represent the Radio Frame Pattern: {typeA(2)
winlink1000 OduAirHssRfpEthChannelBW5MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.2	Integer	RO	Represents the compatibility of Ethernet service
winlink1000 OduAirHssRfpTdmChannelBW5MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.3	Integer	RO	Represents the compatibility of TDM service
winlink1000 OduAirHssRfpEthChannelBW10MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.4	Integer	RO	Represents the compatibility of Ethernet service
winlink1000 OduAirHssRfpTdmChannelBW10MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.5	Integer	RO	Represents the compatibility of TDM service
winlink1000 OduAirHssRfpEthChannelBW20MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.6	Integer	RO	Represents the compatibility of Ethernet service
winlink1000 OduAirHssRfpTdmChannelBW20MHz	1.3.6.1.4.1.4458.1000.1.5.40.7.1.7	Integer	RO	Represents the compatibility of TDM service
winlink1000 OduAirLockRemote	1.3.6.1.4.1.4458.1000.1.5.41	Integer	RW	Lock Remote status.
winlink1000 OduPerfMonCurrTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonCurrEntry			N/A	This is an entry in the Current Interval Table. INDEX {ifIndex }
winlink1000 OduPerfMonCurrUAS	1.3.6.1.4.1.4458.1000.1.6.1.1.1	Gauge	RO	The current number of Unavailable Seconds starting from the present 15 minutes period.
winlink1000 OduPerfMonCurrES	1.3.6.1.4.1.4458.1000.1.6.1.1.2	Gauge	RO	The current number of Errored Seconds starting from the present 15 minutes period.
winlink1000 OduPerfMonCurrSES	1.3.6.1.4.1.4458.1000.1.6.1.1.3	Gauge	RO	The current number of Severely Errored Seconds starting from the present 15 minutes period.
winlink1000 OduPerfMonCurrBBE	1.3.6.1.4.1.4458.1000.1.6.1.1.4	Gauge	RO	The current number of Background Block Errors starting from the present 15 minutes period.
winlink1000 OduPerfMonCurrIntegrity	1.3.6.1.4.1.4458.1000.1.6.1.1.5	Integer	RO	Indicates the integrity of the entry.
winlink1000 OduPerfMonIntervalTable			N/A	This table defines/keeps the counters of the current 15 min interval.

Name	OID	Type	Access	Description
winlink1000 OduPerfMonIntervalEntry			N/A	This is an entry in the Interval Table. INDEX {ifIndex
winlink1000 OduPerfMonIntervalIdx			RO	This table is indexed per interval number. Each intervalis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonIntervalUAS			RO	The current number of Unavailable Seconds per interval.
winlink1000 OduPerfMonIntervalES			RO	The current number of Errored Seconds per interval.
winlink1000 OduPerfMonIntervalSES			RO	The current number of Severely Errored Seconds per interval.
winlink1000 OduPerfMonIntervalBBE			RO	The current number of Background Block Errors per interval.
winlink1000 OduPerfMonIntervalIntegrity			RO	Indicates the integrity of the entry per interval.
winlink1000 OduPerfMonDayTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonDayEntry			N/A	This is an entry in the Days Table. INDEX {ifIndex
winlink1000 OduPerfMonDayIdx			RO	This table is indexed per interval number. Each intervalis of 24 hours and the oldest is 30.
winlink1000 OduPerfMonDayUAS			RO	The current number of Unavailable Seconds per interval of 24 hours.
winlink1000 OduPerfMonDayES			RO	The current number of Errored Seconds per interval of 24 hours.
winlink1000 OduPerfMonDaySES			RO	The current number of Severely Errored Seconds per interval of 24 hours.
winlink1000 OduPerfMonDayBBE			RO	The current number of Background Block Errors per interval of 24 hours.
winlink1000 OduPerfMonDayIntegrity			RO	Indicates the integrity of the entry per interval of 24 hours.
winlink1000 OduPerfMonAirCurrTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonAirCurrEntry			N/A	This is an entry in the Current Interval Table. INDEX {ifIndex }
winlink1000 OduPerfMonAirCurrMinRSL	1.3.6.1.4.1.4458.1000.1.6.4.1.1	Integer	RO	The current Min Received Level Reference starting from the present 15 minutes period.
winlink1000 OduPerfMonAirCurrMaxRSL	1.3.6.1.4.1.4458.1000.1.6.4.1.2	Integer	RO	The current Max Received Level Reference starting from the present 15 minutes period.
winlink1000 OduPerfMonAirCurrRSLThresh1Exceed	1.3.6.1.4.1.4458.1000.1.6.4.1.3	Gauge	RO	The number of seconds Receive Signal Level exceeded the RSL1 threshold in the last 15 minutes.
winlink1000 OduPerfMonAirCurrRSLThresh2Exceed	1.3.6.1.4.1.4458.1000.1.6.4.1.4	Gauge	RO	The number of seconds Receive Signal Level exceeded the RSL2 threshold in the last 15 minutes.

Name	OID	Type	Access	Description
winlink1000 OduPerfMonAirCurrMinTSL	1.3.6.1.4.1.4458.1000.1.6.4.1.5	Integer	RO	The current Min Transmit Signal Level starting from the present 15 minutes period.
winlink1000 OduPerfMonAirCurrMaxTSL	1.3.6.1.4.1.4458.1000.1.6.4.1.6	Integer	RO	The current Max Transmit Signal Level starting from the present 15 minutes period.
winlink1000 OduPerfMonAirCurrTSLThresh1Exceed	1.3.6.1.4.1.4458.1000.1.6.4.1.7	Gauge	RO	The number of seconds Transmit Signal Level exceeded the TSL1 threshold in the last 15 minutes.
winlink1000 OduPerfMonAirCurrBBERThresh1Exceed	1.3.6.1.4.1.4458.1000.1.6.4.1.8	Gauge	RO	The number of seconds Background Block Error Ratio exceeded the BBER1 threshold in the last 15 minutes.
winlink1000 OduPerfMonAirIntervalTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonAirIntervalEntry			N/A	This is an entry in the Interval Table. INDEX {ifIndex
winlink1000 OduPerfMonAirIntervalIdx			RO	This table is indexed per interval number. Each intervalis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonAirIntervalMinRSL			RO	The current Min Received Level Reference per interval.
winlink1000 OduPerfMonAirIntervalMaxRSL			RO	The current Max Received Level Reference per interval.
winlink1000 OduPerfMonAirIntervalRSLThresh1Exceed			RO	The number of seconds Receive Signal Level exceeded the RSL1 threshold per interval.
winlink1000 OduPerfMonAirIntervalRSLThresh2Exceed			RO	The number of seconds Receive Signal Level exceeded the RSL2 threshold per interval.
winlink1000 OduPerfMonAirIntervalMinTSL			RO	The current Min Transmit Signal Level per interval.
winlink1000 OduPerfMonAirIntervalMaxTSL			RO	The current Max Transmit Signal Level per interval.
winlink1000 OduPerfMonAirIntervalTSLThresh1Exceed			RO	The number of seconds Transmit Signal Level exceeded the TSL1 threshold per interval.
winlink1000 OduPerfMonAirIntervalBBERThresh1Exceed			RO	The number of seconds Background Block Error Ratio exceeded the BBER1 threshold per interval.
winlink1000 OduPerfMonAirDayTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonAirDayEntry			N/A	This is an entry in the Days Table. INDEX {ifIndex
winlink1000 OduPerfMonAirDayIdx			RO	This table is indexed per Day number. Each Dayis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonAirDayMinRSL			RO	The current Min Received Level Reference per Day.
winlink1000 OduPerfMonAirDayMaxRSL			RO	The current Max Received Level Reference per Day.

Name	OID	Type	Access	Description
winlink1000 OduPerfMonAirDayRSLThresh1Exceed			RO	The number of seconds Receive Signal Level exceeded the RSL1 threshold per Day.
winlink1000 OduPerfMonAirDayRSLThresh2Exceed			RO	The number of seconds Receive Signal Level exceeded the RSL2 threshold per Day.
winlink1000 OduPerfMonAirDayMinTSL			RO	The current Min Transmit Signal Level per Day.
winlink1000 OduPerfMonAirDayMaxTSL			RO	The current Max Transmit Signal Level per Day.
winlink1000 OduPerfMonAirDayTSLThresh1Exceed			RO	The number of seconds Transmit Signal Level exceeded the TSL1 threshold per Day.
winlink1000 OduPerfMonAirDayBBERThresh1Exceed			RO	The number of seconds Background Block Error Ratio exceeded the BBER1 threshold per Day.
winlink1000 OduPerfMonEthCurrTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonEthCurrEntry			N/A	This is an entry in the Current Interval Table. INDEX {ifIndex }
winlink1000 OduPerfMonEthCurrRxMBytes	1.3.6.1.4.1.4458.1000.1.6.7.1.1	Gauge	RO	The current RX Mega Bytes starting from the present 15 minutes period.
winlink1000 OduPerfMonEthCurrTxMBytes	1.3.6.1.4.1.4458.1000.1.6.7.1.2	Gauge	RO	The current TX Mega Bytes starting from the present 15 minutes period.
winlink1000 OduPerfMonEthIntervalTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonEthIntervalEntry			N/A	This is an entry in the Interval Table. INDEX {ifIndex
winlink1000 OduPerfMonEthIntervalIdx			RO	This table is indexed per interval number. Each intervalis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonEthIntervalRxMBytes			RO	The current RX Mega Bytes per interval.
winlink1000 OduPerfMonEthIntervalTxMBytes			RO	The current TX Mega Bytes per interval.
winlink1000 OduPerfMonEthDayTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonEthDayEntry			N/A	This is an entry in the Days Table. INDEX {ifIndex
winlink1000 OduPerfMonEthDayIdx			RO	This table is indexed per Day number. Each Day is of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonEthDayRxMBytes			RO	The current RX Mega Bytes per day.
winlink1000 OduPerfMonEthDayTxMBytes			RO	The current TX Mega Mega Bytes per day.
winlink1000 OduPerfMonTdmCurrTable			N/A	This table defines/keeps the counters of the current 15 min interval.

Name	OID	Type	Access	Description
winlink1000 OduPerfMonTdmCurrEntry			N/A	This is an entry in the Current Interval Table. INDEX {ifIndex }
winlink1000 OduPerfMonTdmCurrActiveSeconds	1.3.6.1.4.1.4458.1000.1.6.10.1.1	Gauge	RO	The parameter indicates whether the TDM service was active. Under TDM backup link
winlink1000 OduPerfMonTdmIntervalTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonTdmIntervalEntry			N/A	This is an entry in the Interval Table. INDEX {ifIndex
winlink1000 OduPerfMonTdmIntervalIdx			RO	This table is indexed per interval number. Each intervalis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonTdmIntervalActiveSeconds			RO	The parameter indicates whether the TDM service was active. Under TDM backup link
winlink1000 OduPerfMonTdmDayTable			N/A	This table defines/keeps the counters of the current 15 min interval.
winlink1000 OduPerfMonTdmDayEntry			N/A	This is an entry in the Days Table. INDEX {ifIndex
winlink1000 OduPerfMonTdmDayIdx			RO	This table is indexed per Day number. Each Dayis of 15 minutes and the oldest is 96.
winlink1000 OduPerfMonTdmDayActiveSeconds			RO	The parameter indicates whether the TDM service was active. Under TDM backup link
winlink1000 OduPerfMonTxThresh1	1.3.6.1.4.1.4458.1000.1.6.20	Integer	RW	When the TX power exceeds this threshold
winlink1000 OduPerfMonRxThresh1	1.3.6.1.4.1.4458.1000.1.6.21	Integer	RW	When the RX power exceeds this threshold
winlink1000 OduPerfMonRxThresh2	1.3.6.1.4.1.4458.1000.1.6.22	Integer	RW	When the RX power exceeds this threshold
winlink1000 OduPerfMonBBERThresh1	1.3.6.1.4.1.4458.1000.1.6.23	Integer	RW	When the BBER exceeds this threshold
winlink1000 OduAgnGenAddTrapExt	1.3.6.1.4.1.4458.1000.1.7.1.1	Integer	RW	If 'yes' is chosen
winlink1000 OduAgnNTPCfgTimeServerIP	1.3.6.1.4.1.4458.1000.1.7.2.1	IpAddress	RW	The IP address of the server from which the current time is loaded.
winlink1000 OduAgnNTPCfgTimeOffsetFromUTC	1.3.6.1.4.1.4458.1000.1.7.2.2	Integer	RW	The offset from Coordinated Universal Time (minutes). Possible values: -1440...1440.
winlink1000 OduAgnRealTimeAndDate	1.3.6.1.4.1.4458.1000.1.7.2.3	OctetString	RW	This parameter specifies the real time and date Format 'YYYY-MM-DD
winlink1000 OduAgnCurrAlarmLastChange	1.3.6.1.4.1.4458.1000.1.7.3.1	Integer	RO	This counter is initialized to 0 after a device reset and is incremented upon each change in the **winlink1000**OduAgnCurrAlarmTable(either an addition or removal of an entry).
winlink1000 OduAgnCurrAlarmTable			N/A	This table includes the currently active alarms. When a RAISED trap is sent

Name	OID	Type	Access	Description
winlink1000 OduAgnCurrAlarmEntry			N/A	Entry containing the details of a currently RAISED trap. INDEX { **winlink1000**OduAgnCurrAlarmCounter }
winlink1000 OduAgnCurrAlarmCounter	1.3.6.1.4.1.4458.1000.1.7.3.2.1.1	Integer	RO	A running counter of active alarms. The counter is incremented for every new RAISED trap.It is cleared after a device reset.
winlink1000 OduAgnCurrAlarmSeverity	1.3.6.1.4.1.4458.1000.1.7.3.2.1.2	Integer	RO	The current Alarm severity.
winlink1000 OduAgnCurrAlarmId	1.3.6.1.4.1.4458.1000.1.7.3.2.1.3	Integer	RO	The unique Alarm Identifier (combines alarm type and interface). The same AlarmId is used for RAISED and CLEARED alarms.
winlink1000 OduAgnCurrAlarmIfIndex	1.3.6.1.4.1.4458.1000.1.7.3.2.1.4	Integer	RO	The interface Index where the alarm occurred. Alarms that are not associated with a specific interface will have the following value: 65535.
winlink1000 OduAgnCurrAlarmUnit	1.3.6.1.4.1.4458.1000.1.7.3.2.1.5	Integer	RO	The unit associated with the alarm.
winlink1000 OduAgnCurrAlarmTrapID	1.3.6.1.4.1.4458.1000.1.7.3.2.1.6	Integer	RO	The ID of the RAISED trap that was sent when this alarm was raised.
winlink1000 OduAgnCurrAlarmTimeT	1.3.6.1.4.1.4458.1000.1.7.3.2.1.7	Integer	RO	The Timestamp of this alarm. This number is in seconds as of Midnight 1.1.1970.
winlink1000 OduAgnCurrAlarmText	1.3.6.1.4.1.4458.1000.1.7.3.2.1.8	DisplayString	RO	The alarm display text (same as the text in the sent trap).
winlink1000 IduAdmProductType	1.3.6.1.4.1.4458.1000.2.1.1	DisplayString	RO	IDU configuration description.
winlink1000 IduAdmHwRev	1.3.6.1.4.1.4458.1000.2.1.2	DisplayString	RO	IDU Hardware Revision.
winlink1000 IduAdmSwRev	1.3.6.1.4.1.4458.1000.2.1.3	DisplayString	RO	IDU Software Revision.
winlink1000 OduAdmNumOfExternalAlarmIn	1.3.6.1.4.1.4458.1000.2.1.4	Integer	RO	Indicates the number of currently available External Alarm Inputs.
winlink1000 OduAdmExternAlarmInTable			N/A	This is the External Alarm Inputs table.
winlink1000 OduAdmExternAlarmInEntry			N/A	Entry containing the elements of a single External Alarm Input. INDEX { **winlink1000**OduAdmExternAlarmInIndex}
winlink1000 OduAdmExternAlarmInIndex	1.3.6.1.4.1.4458.1000.2.1.5.1.1	Integer	RO	This value indicates the index of the External Alarm Input entry.
winlink1000 OduAdmExternAlarmInText	1.3.6.1.4.1.4458.1000.2.1.5.1.2	DisplayString	RW	This field describes the External Alarm Input. It is an optional string of no more than 64 characters
winlink1000 OduAdmExternAlarmInAdminState	1.3.6.1.4.1.4458.1000.2.1.5.1.3	Integer	RW	This value indicates if this External Alarm Input is enabled or disabled.
winlink1000 OduAdmExternAlarmInStatus	1.3.6.1.4.1.4458.1000.2.1.5.1.4	Integer	RO	This value indicates the current status of the External Alarm Input.
winlink1000 IduSrvDesiredTrunks	1.3.6.1.4.1.4458.1000.2.2.2	Integer	RW	Desired trunks bitmap. Note that the number of possible trunks that can be configured may vary

Name	OID	Type	Access	Description
winlink1000 IduSrvServices	1.3.6.1.4.1.4458.1000.2.2.4	ObjectID	RO	This parameter is reserved to the element manager provided with the product.
winlink1000 IduSrvActiveTrunks	1.3.6.1.4.1.4458.1000.2.2.6	Integer	RO	A bitmap describing the currently open TDM trunks.
winlink1000 IduSrvAvailableTrunks	1.3.6.1.4.1.4458.1000.2.2.8	Integer	RO	A bitmap describing the TDM trunks that can be opened in the current configuration. The values take into account the IDU hardware configuration
winlink1000 IduSrvPossibleServicesTable			N/A	IDU Possible Services Table.
winlink1000 IduSrvPossibleServicesEntry			N/A	Table entry. INDEX { **winlink1000**IduSrvPossibleServicesIndex }
winlink1000 IduSrvPossibleServicesIndex	1.3.6.1.4.1.4458.1000.2.2.10.1.1	Integer	RO	Table index
winlink1000 IduSrvPossibleTdmServices	1.3.6.1.4.1.4458.1000.2.2.10.1.2	Integer	RO	This parameter is deprecated. A bitmap describing the TDM trunks that can be opened in the corresponding Air Rate.
winlink1000 IduSrvPossibleEthServices	1.3.6.1.4.1.4458.1000.2.2.10.1.3	Integer	RO	This parameter is deprecated. This parameter describes if the Ethernet Service can be opened in the corresponding Air Rate. The valid values are: disabled (0)
winlink1000 IduSrvRemainingRate	1.3.6.1.4.1.4458.1000.2.2.10.1.4	Integer	RO	Current Ethernet bandwidth in bps per air rate.
winlink1000 IduSrvTrunkCost	1.3.6.1.4.1.4458.1000.2.2.10.1.5	Integer	RO	The cost of a single TDM Interface in bps.
winlink1000 IduSrvAvailServicesTable			N/A	ODU Possible TDM Services Table.
winlink1000 IduSrvAvailServicesEntry			N/A	Table entry. INDEX { **winlink1000**IduSrvAvailServicesIndex }
winlink1000 IduSrvAvailServicesIndex	1.3.6.1.4.1.4458.1000.2.2.11.1.1	Integer	RO	Table index. The index is the bit mask of the TDM service.
winlink1000 IduSrvAvailServicesState	1.3.6.1.4.1.4458.1000.2.2.11.1.2	Integer	RO	Represents the TDM service availability.
winlink1000 IduSrvAvailServicesMinRateIdx	1.3.6.1.4.1.4458.1000.2.2.11.1.3	Integer	RO	Minimum rate index of the air interface which make the service possible.
winlink1000 IduSrvAvailServicesMaxRateIdx	1.3.6.1.4.1.4458.1000.2.2.11.1.4	Integer	RO	Maximum rate index of the air interface which make the service possible.
winlink1000 IduSrvAvailServicesReason	1.3.6.1.4.1.4458.1000.2.2.11.1.5	Integer	RO	Information about the TDM Service availability. - Not Applicable in case the service is available. The reasons for TDM Service unavailability: - The available throughput isn't sufficient for Service demands
winlink1000 IduSrvEthActive	1.3.6.1.4.1.4458.1000.2.2.12	Integer	RO	Represents the Ethernet service activation state.
winlink1000 IduSrvEthAvailable	1.3.6.1.4.1.4458.1000.2.2.13	Integer	RO	Represents the Ethernet service availability state.

Name	OID	Type	Access	Description
winlink1000 IduSrvEthThroughput	1.3.6.1.4.1.4458.1000.2.2.14	Gauge	RO	Current available Ethernet service throughput in bps.
winlink1000 IduSrvEthMaxInfoRate	1.3.6.1.4.1.4458.1000.2.2.15	Integer	RW	Holds the maximum bandwidth (kbps) to be allocated for ethernet service. Value of zero means that ethernet service works as best effort. The maximum value is product specific
winlink1000 IduEthernetIfTable			N/A	IDU Ethernet Interfaces Table.
winlink1000 IduEthernetIfEntry			N/A	Table entry. INDEX { **winlink1000**IduEthernetIfIndex }
winlink1000 IduEthernetIfIndex			RO	If Index corresponding to this Interface.
winlink1000 IduEthernetIfAddress	1.3.6.1.4.1.4458.1000.2.3.1.1.5	DisplayString	RO	IDU MAC address.
winlink1000 IduEthernetNumOfLanPorts	1.3.6.1.4.1.4458.1000.2.3.3	Integer	RO	The number of LAN interfaces in the IDU.
winlink1000 IduBridgeTpAging	1.3.6.1.4.1.4458.1000.2.4.4.2	Integer	RW	Timeout in seconds for aging. Note that in order for this parameter to be effective
winlink1000 IduTdmTxClockAvailStates	1.3.6.1.4.1.4458.1000.2.6.1.1	Integer	RO	The available states of the TDM Tx Clock Control
winlink1000 IduTdmTxClockDesiredState	1.3.6.1.4.1.4458.1000.2.6.1.2	Integer	RW	The desired state of the TDM Tx Clock Control. A change is effective after re-activation of the TDM service.
winlink1000 IduTdmTxClockActualState	1.3.6.1.4.1.4458.1000.2.6.1.3	Integer	RO	The actual state of the TDM Tx Clock Control.
winlink1000 IduTdmMasterClockAvailOptions	1.3.6.1.4.1.4458.1000.2.6.2.1	Integer	RO	The available options of the TDM Master Clock Control
winlink1000 IduTdmMasterClockDesired	1.3.6.1.4.1.4458.1000.2.6.2.2	Integer	RW	The desired TDM Master Clock. A change is effective after re-activation of the TDM service.
winlink1000 IduTdmMasterClockActual	1.3.6.1.4.1.4458.1000.2.6.2.3	Integer	RO	The actual Trunk used for TDM Master Clock.
winlink1000 IduTdmConfigTable			N/A	IDU TDM Links Configuration Table.
winlink1000 IduTdmConfigEntry			N/A	Table entry. INDEX { **winlink1000**IduTdmConfigIndex }
winlink1000 IduTdmConfigIndex			RO	Table index.
winlink1000 IduTdmIfIndex			RO	Link index in the interfaces table.
winlink1000 IduTdmLineCoding	1.3.6.1.4.1.4458.1000.2.6.6.1.6	Integer	RW	This parameter applies to T1 trunks only. The parameter controls the line coding. Setting the value to each of the indices applies to all.A change is effective only after the next open of the TDM service.
winlink1000 IduTdmLoopbackConfig	1.3.6.1.4.1.4458.1000.2.6.6.1.9	Integer	RW	Loop back configuration table. Each of the trunks can be set Normal
winlink1000 IduTdmLineStatus	1.3.6.1.4.1.4458.1000.2.6.6.1.10	Integer	RO	Line status.

Name	OID	Type	Access	Description
winlink1000 IduTdmCurrentTable			N/A	IDU TDM Links Statistics Table.
winlink1000 IduTdmCurrentEntry			N/A	Table entry. INDEX { **winlink1000**IduTdmCurrentIndex }
winlink1000 IduTdmCurrentIndex			RO	Table index (Same as **winlink1000**IduTdmLineIndex).
winlink1000 IduTdmCurrentBlocks	1.3.6.1.4.1.4458.1000.2.6.7.1.101	Counter	RO	Number of correct blocks transmitted to the line.
winlink1000 IduTdmCurrentDrops	1.3.6.1.4.1.4458.1000.2.6.7.1.102	Counter	RO	Number of error blocks transmitted to the line.
winlink1000 IduTdmRemoteQual	1.3.6.1.4.1.4458.1000.2.6.8	Integer	RO	Estimated average interval between error second events. The valid values are 1-2^31 where a value of -1 is used to indicate an undefined state.
winlink1000 IduTdmRemoteQualEval	1.3.6.1.4.1.4458.1000.2.6.9	Integer	RO	Estimated average interval between error second events during evaluation process. The valid values are 1-2^31 where a value of -1 is used to indicate an undefined state.
winlink1000 IduTdmSrvEval	1.3.6.1.4.1.4458.1000.2.6.10	Integer	RW	Evaluated TDM service bit mask.Setting this parameter to value that is bigger than the activated TDM service bit mask will execute the evaluation process for 30 seconds. Setting this parameter to 0 will stop the evaluation process immediately.
winlink1000 IduTdmBackupAvailableLinks	1.3.6.1.4.1.4458.1000.2.6.11	Integer	RO	The number of TDM backup trunks.
winlink1000 IduTdmBackupTable			N/A	IDU TDM Links Statistics Table.
winlink1000 IduTdmBackupEntry			N/A	Table entry. INDEX { **winlink1000**IduTdmBackupIndex }
winlink1000 IduTdmBackupIndex	1.3.6.1.4.1.4458.1000.2.6.12.1.1	Integer	RO	Table index.
winlink1000 IduTdmBackupMode	1.3.6.1.4.1.4458.1000.2.6.12.1.2	Integer	RW	TDM backup mode: Enable or Disable
winlink1000 IduTdmBackupCurrentActiveLink	1.3.6.1.4.1.4458.1000.2.6.12.1.3	Integer	RO	TDM backup current active link: N/A
winlink1000 IduTdmJitterBufferSize	1.3.6.1.4.1.4458.1000.2.6.13	Integer	RW	TDM Jitter Buffer Size. The value must be between the minimum and the maximum TDM Jitter Buffer Size. The units are 0.1 x millisecond.
winlink1000 IduTdmJitterBufferDefaultSize	1.3.6.1.4.1.4458.1000.2.6.14	Integer	RO	TDM Jitter Buffer Default Size. The units are 0.1 x millisecond.
winlink1000 IduTdmJitterBufferMinSize	1.3.6.1.4.1.4458.1000.2.6.15	Integer	RO	TDM Jitter Buffer Minimum Size. The units are 0.1 x millisecond.
winlink1000 IduTdmJitterBufferMaxSize	1.3.6.1.4.1.4458.1000.2.6.16	Integer	RO	TDM Jitter Buffer Maximum Size. The units are 0.1 x millisecond.

Name	OID	Type	Access	Description
winlink1000 IduTdmJitterBufferSizeEval	1.3.6.1.4.1.4458.1000.2.6.17	Integer	RW	TDM Jitter Buffer Size for evaluation. The value must be between the minimum and the maximum TDM Jitter Buffer Size. The units are 0.1 x millisecond.
winlink1000 GeneralTrapDescription	1.3.6.1.4.1.4458.1000.100.1	DisplayString	RO	Trap's Description. Used for Trap variables.
winlink1000 GeneralTrapSeverity	1.3.6.1.4.1.4458.1000.100.2	Integer	RO	Trap's Severity. Used for Trap variables.
winlink1000 GeneralCookie	1.3.6.1.4.1.4458.1000.100.3	DisplayString	RW	

MIB Traps

General

Each of the link's ODU's can be configured with up to 10 different trap destinations. When the link is operational, each ODU issue traps from both ODU's. The trap source IP address is the sending ODU. Each trap contains at the very least, a parameter with a description of the event. The trap originator can be identified by the trap community string or the local or remote notation at the end of the trap description text (first parameter). The *"public-bru1"* is used for local ODU traps while the *"public-bru4097"* is used for remote ODU traps. Additional trap data is stored in the trap comment in the MIB. The data includes the recommended trap severity (for alarms only), clear data and parameters to display. The following table details all the **WinLink™ 1000** traps.

Trap parameters list

Table K-4 Trap List

Name	ID	Severity	Description
trunkStateChanged	1	normal	Indicates a change in the state of one of the TDM trunks. Raised by both sides of the link. Contains 3 parameters: 1 - Description: TDM Interface %n - %x. 2 - %n: Is the trunk number. 3 - %x: Is the alarm type and can be one of the following: Normal, AIS, LOS, Loopback.
linkUp	2	normal	Indicates that the radio link is up. Contains a single parameter, which is its description: 1 - Description: Radio Link - Sync on channel %n GHz. %n Is the channel frequency in GHz.
linkDown	3	critical	Indicates that the radio link is down. Contains a single parameter, which is its description: 1 - Description: Radio Link - Out of Sync. The reason is: %s. %s Is the reason.
detectIDU	4	normal	Indicates that the IDU was detected. Raised by both sides of the link. Contains a single parameter, which is its description: 1 - Description: IDU of Type %s was Detected. %s Is the type of the IDU.
disconnectIDU	5	major	Indicates that the IDU was disconnected. Raised by both sides of the link. Contains a single parameter, which is its description: 1 - Description: IDU Disconnected.
mismatchIDU	6	major	Indicates a mismatch between the IDU's. Raised by the master only. Contains a single parameter, which is its description: 1 - Description: IDU's Mismatch: One Side is %s and the Other is %s. %s Is the type of the IDU.
openedServices	7	normal	Indicates that services were opened. Raised by the master only. Contains 3 parameters: 1 - Description: %n2 out of %n1 Requested TDM Trunks have been Opened. 2 - %n1: Is the requested number of TDM truncks. 3 - %n2: Is the actual number of TDM trunks that were opened.
closedServices	8	normal	Indicates that services were closed. Raised by the master only. Contains a single parameter, which is its description: 1 - Description: TDM Service has been closed. The reason is: %s. %s Is the reason.
incompatibleODU's	9	critical	Indicates that the ODU's are incompatible. Contains a single parameter, which is its description: 1 - Description: Incompatible ODU's.
incompatibleIDU's	10	major	Indicates that the IDU's are incompatible. Contains a single parameter, which is its description: 1 - Description: Incompatible IDU's.
incompatibleOduIdu	11	major	Indicates that the ODU and IDU are incompatible. Contains a single parameter, which is its description: 1 - Description: The IDU could not be loaded. The reason is: %s. %s Is the incompatibility type.
probingChannel	12	normal	Indicates that the ODU is monitoring radar activity. Contains a single parameter, which is its description: 1 - Description: Monitoring for radar activity on channel %n GHz. %n is the channel frequency in GHz.
radarDetected	13	normal	Indicates that radar activity was detected. Contains a single parameter, which is its description: 1 - Description: Radar activity was detected in %s, on channel %n GHz. %s Is the site name. %n Is the channel frequency in GHz.

Name	ID	Severity	Description
transmittingOnChannel	14	normal	Indicates that the ODU is transmitting on channel. Contains a single parameter, which is its description: 1 - Description: Transmitting on channel %n GHz. %n Is the channel frequency in GHz.
scanningChannels	15	normal	Indicates that the ODU is scanning channels. Contains a single parameter, which is its description: 1 - Description: Channel scanning in progress.
incompatiblePartner	16	critical	Indicates that configuration problem was detected and that link installation is required in order to fix it. Contains a single parameter, which is its description: 1 - Description: Configuration problem detected. Link installation required.
timeClockSet	17	normal	Indicates that the ODU time clock was set. Contains a single parameter, which is its description: 1 - Description: The time was set to: %p. %p Is the date and time.
configurationChanged	18	normal	Indicates that the ODU was recovered from an error, but there are configuration changes. Contains two parameters: 1 - Description: Configuration changed. Error code is: %n. 2 - %n number.
hssOpStateChangedToINU	19	normal	Indicates that the HSS operating state was changed to INU type. Contains a single parameter, which is its description: 1 - Description: HSS operating state was changed to: INU.
hssOpStateChangedToHSM	20	normal	Indicates that the HSS operating state was changed to HSM type. Contains a single parameter, which is its description: 1 - Description: HSS operating state was changed to: HSM.
hssOpStateChangedToHSC	21	normal	Indicates that the HSS operating state was changed to HSC type. Contains a single parameter, which is its description: 1 - Description: HSS operating state was changed to: HSC_DT/HSC_CT.
vlanModeActive	22	normal	Indicates to non-VLAN PC that after 2 minutes the system will support only VLAN tag on management interface. Contains a single parameter, which is its description: 1 - Description: VLAN Mode is active. Non-VLAN traffic will be blocked in 2 minutes.
tdmServiceAlarm	100	major	Indicates that TDM Service is in alarm state. Contains a single parameter, which is its description: 1 - Description: TDM Service - Alarm.
ethServiceClosed	101	major	Indicates that Ethernet Service is closed. Contains a single parameter, which is its description: 1 - Description: Ethernet Service is closed.
ethServiceNotPermitted	102	major	Indicates that Ethernet Service is not permitted. Contains a single parameter, which is its description: 1 - Description: A valid Idu could not be detected at %s. Please check your configuration. %s - Is the Local Site name or Remote Site name or both sides of the Link.
encryptionAlarm	103	major	Indicates an encryption key mismatch. Contains a single parameter which is its description: 1 - Description: Encryption Status - Failed. No Services are available.
changeLinkPasswordAlarm	104	major	Indicates that a failure has occurred while attempting to change the Link Password. Contains a single parameter which is its description: 1 - Description: Failed to change the Link Password at/on: %s. %s - Is the Local Site name or Remote Site name or both sides of the Link.
externalAlarmInPort1Alarm	105	major	The trap is sent every time an alarm occurs in the External Alarm Input of port #1. Contains a single parameter which is its description: 1 - Description: External Alarm 1 - <User Text> - Alarm.
externalAlarmInPort2Alarm	106	major	The trap is sent every time an alarm occurs in the External Alarm Input of port #2. Contains a single parameter which is its description: 1 - Description: External Alarm 2 - <User Text> - Alarm.

Name	ID	Severity	Description
bitFailedAlarm	107	critical	The trap is sent in case there is no way to recover from the situation. Contains two parameters: 1 - Description: ODU power up built in test failed. Error code is: %n. 2 - %n number.
wrongConfigurationLoadedAlarm	108	major	The trap is sent in case there is a way to recover from the situation. Contains two parameters: 1 - Description: Wrong configuration loaded. Error code is: %n. 2 - %n number.
lanPort1DisconnectedAlarm	109	major	Indicates the LAN port 1 status changed to disconnected. Contains a single parameter which is its description: 1 - Description: LAN port 1 status changed to disconnected.
lanPort2DisconnectedAlarm	110	major	Indicates the LAN port 2 status changed to disconnected. Contains a single parameter which is its description: 1 - Description: LAN port 2 status changed to disconnected.
mngPortDisconnectedAlarm	111	major	Indicates the management port status changed to disconnected. Contains a single parameter which is its description: 1 - Description: Management port status changed to disconnected.
externalAlarmInPort3Alarm	112	major	The trap is sent every time an alarm occurs in the External Alarm Input of port #3. Contains a single parameter which is its description: 1 - Description: External Alarm 3 - <User Text> - Alarm.
externalAlarmInPort4Alarm	113	major	The trap is sent every time an alarm occurs in the External Alarm Input of port #4. Contains a single parameter which is its description: 1 - Description: External Alarm 4 - <User Text> - Alarm.
swVersionsMismatchFullCompatibilityAlarm	114	warning	The trap is sent in case SW versions mismatch with full link functionality. Contains a single parameter which is its description: 1 - Description: Software versions mismatch - full link functionality
swVersionsMismatchRestrictedCompatibilityAlarm	115	minor	The trap is sent in case SW versions mismatch with restricted link functionality. Contains a single parameter which is its description: 1 - Description: Software versions mismatch - restricted link functionality
swVersionsMismatchSoftwareUpgradeRequired	116	major	The trap is sent in case SW versions mismatch and SW upgrade is required. Contains a single parameter which is its description: 1 - Description: Software versions mismatch - Software upgrade required
swVersionsIncompatible	117	critical	The trap is sent in case SW versions are incompatible. Contains a single parameter which is its description: 1 - Description: SW Versions incompatible
hssMultipleSourcesDetectedAlarm	118	major	Indicates that multiple sync pulse sources were detected. Contains a single parameter which is its description: 1 - Description: HSS multiple sync sources were detected.
hssSyncToProperSourceStoppedAlarm	119	major	Indicates that synchronization to a proper sync pulse source was stopped. Contains a single parameter which is its description: 1 - Description: HSS sync pulse - Down. The_reason_is: %s. %s - Is the reason for the sync down.
hssSyncPulseDetectedAlarm	120	major	Indicates that HSS additional sync pulse was detected. Contains a single parameter, which is its description: 1 - Description: HSS additional sync pulse was detected.
tdmBackupAlarm	121	major	Indicates that the TDM backup link was activated. Contains a single parameter, which is its description: 1 - Description: TDM backup alarm - backup link was activated.
linkLockUnautorizedRemoteODU	122	major	Indicates that the remote ODU is unautorized. Contains a single parameter which is its description: 1 - Description: Unauthorized remote ODU connection rejected.

Name	ID	Severity	Description
linkLockUnautorizedODU	123	major	Indicates that the ODU is unautorized. Contains a single parameter which is its description: 1 - Description: Unauthorized ODU connection rejected.
tdmServiceClear	200	normal	Indicates that TDM Service fault is cleared. Contains a single parameter, which is its description: 1 - Description: TDM Service - Normal.
ethServiceOpened	201	normal	Indicates that Ethernet Service has been opened. Contains a single parameter,3 which is its description: 1 - Description: Ethernet Service has been opened.
encryptionClear	203	normal	Indicates that encryption is OK. Contains a single parameter which is its description: 1 - Description: Encryption Status - Normal.
changeLinkPasswordClear	204	normal	Indicates that the Link Password was changed successfully. Contains a single parameter which is its description: 1 - Description: Link Password has been changed at/on: %s. %s - Is the Local Site name or Remote Site name or both sides of the Link.
externalAlarmInPort1Clear	204	normal	This Trap is sent every time an External Alarm Input fault of port # 1 is cleared. Contains a single parameter which is its description: 1 - Description: External Alarm 1 - <User Text> - Alarm Cleared.
externalAlarmInPort2Clear	206	normal	This Trap is sent every time an External Alarm Input fault of port # 2 is cleared. Contains a single parameter which is its description: 1 - Description: External Alarm 2 - <User Text> - Alarm Cleared.
lanPort1Clear	209	normal	Indicates the LAN port 1 status changed to connected. Contains two parameters: 1 - Description: LAN port 1 status changed to connected - %s. 2 - %s Is the Eth. mode (speed & duplex).
lanPort2Clear	210	normal	Indicates the LAN port 2 status changed to connected. Contains two parameters: 1 - Description: LAN port 2 status changed to connected - %s. 2 - %s Is the Eth. mode (speed & duplex).
mngPort2Clear	211	normal	Indicates the management port status changed to connected. Contains two parameters: 1 - Description: Management port status changed to connected - %s. 2 - %s Is the Eth. mode (speed & duplex).
externalAlarmInPort3Clear	211	normal	This Trap is sent every time an External Alarm Input fault of port # 3 is cleared. Contains a single parameter which is its description: 1 - Description: External Alarm 3 - <User Text> - Alarm Cleared.
externalAlarmInPort4Clear	213	normal	This Trap is sent every time an External Alarm Input fault of port # 4 is cleared. Contains a single parameter which is its description: 1 - Description: External Alarm 4 - <User Text> - Alarm Cleared.
swVersionsMatchFullCompatibilityClear	214	normal	The trap is sent in case SW versions match. Contains a single parameter which is its description: 1 - Description: Software Versions compatible
swVersionsMatchRestrictedCompatibilityClear	215	normal	The trap is sent in case SW versions match and link functionality is not restricted. Contains a single parameter which is its description: 1 - Description: Software Versions compatible
swVersionsMatchSoftwareUpgradeRequiredClear	216	normal	The trap is sent in case SW versions match and SW upgrade is successful. Contains a single parameter which is its description: 1 - Description: Software Versions compatible
swVersionsCompatibleClear	217	normal	The trap is sent in case SW versions compatible Contains a single parameter which is its description: 1 - Description: Software Versions compatible

Name	ID	Severity	Description
hssMultipleSourcesDisappearedClear	218	normal	Indicates that multiple sync pulse sources disappeared. Contains a single parameter which is its description: 1 - Description: HSS multiple sync pulse sources disappeared.
hssSyncToProperSourceAchievedClear	219	normal	Indicates that synchronization to a proper Sync source was achieved. Contains a single parameter which is its description: 1 - Description: HSS sync pulse - Up.
hssSyncPulseDisappearedClear	220	normal	Indicates that HSS additional sync pulse disappeared. Contains a single parameter, which is its description: 1 - Description: HSS additional sync pulse was disappeared.
tdmBackupClear	221	normal	
linkLockAutorizedODU	223	normal	Indicates that the ODU is autorized. Contains a single parameter which is its description: 1 - Description: Authorized ODU connection permitted.
linkAuthenticationDisabled	224	normal	Indicates that the Link Lock is disabled. Contains a single parameter which is its description: 1 - Description: Link Authentication has been disabled.

Appendix L
Alarms System Specification

Alarms System Specification

The three products, IDU-E-AL, IDU-C and PoE-8 have a dry contact alarm relay through a 9 or 25 pin connector. There are two alarm types – input and output.

1. Input alarm

The input alarms are raised by events from external equipment such as a fire warning or an air conditioner failure.

2. Output alarm

Output alarms are generated by the external link, for example from a sync loss, disconnection.

For each product, the table below sets out each possible input and output alarm.

Table L-1 IDU Alarms

IDU Configuration	Name	Description	Alarm On State	Alarm Off State
IDU-E-AL	Input 1	User External Alarm	User External Alarm On	User External Alarm Off
	Input 2	User External Alarm	User External Alarm On	User External Alarm Off
	Input 3	User External Alarm	User External Alarm On	User External Alarm Off
	Input 4	User External Alarm	User External Alarm On	User External Alarm Off
	Output 1	Air Link Alarm	1. Link is Down 2. Link in Installation mode 3. Link Authentication Problem	Link is up
	Output 2	Equipment Alarm	1. Built in Test (BIT) Error 2. No connection to the ODU 3. Incompatible Software	Both ODU and IDU are in operational state
	Output 3	Service Alarm Remote End	<u>At least one of two conditions:</u> 1. Link is up, but at least one of the ports (with service configured) at remote is at LOS or AIS (only for TDM serv.) state. 2. At least one of the ports (with service configured) at local IDU are at LOS or AIS (only for TDM serv.) state.	Link is down or Link is up and ALL ports (with service configured) at the remote and local IDU's are at NORMAL state.
	Output 4	Link Loss due to Power Fail at the remote End	A Link Loss occurred while a power fail was detected by the remote end IDU.	Link is up or Link is down without the power fail indication within the last two seconds of the active link

IDU Configuration	Name	Description	Alarm On State	Alarm Off State
IDU-C	Input 1	User External Alarm	User External Alarm On	User External Alarm Off
	Input 2	User External Alarm	User External Alarm On	User External Alarm Off
	Output 1	Air Link Alarm	1. Link is Down 2. Link in Installation mode 3. Link Authentication Problem	Link is up
	Output 2	Equipment Alarm	1. Built in Test (BIT) Error 2. No connection to the ODU 3. Incompatible Software	Both ODU and IDU are in operational state
			ODU Current LED indicator	
PoE-8	Output 1	Over Current	**RED**	**OFF**
			Power LED indicator	
	Output 2	Power out of range	**RED**	**GREEN**

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