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4Motion®

System Manual

Release Version: 3.0
June 2010
P/N 215697

Document History

Topic	Description	Date Issued
First Release for GA		July 2008
Rate Limiting for the NPU Section 3.4.7.2	Rate limits are configurable only by the vendor.	May 2009
Configuring ACLs Section 3.4.10	Updated default ACLs.	May 2009
Configuring Performance Data Collection Section 3.4.14	Added support for new counters groups, updated names.	May 2009
Configuring the Power Control Required C/N Level Parameters Section 3.9.4.2.2	Updated Defaults for cqi, cdma, qam64-1by2, qam64-2by3, qam64-3by4, qam64-5by6.	May 2009
Managing the BS Keep-Alive Functionality Section 3.9.22	Updated commands' syntax.	May 2009
Managing the BS Idle Mode Parameters Section 3.9.23	New feature	May 2009
Managing BS Services	Added new parameters: paging-cycle, paging-offset, lm-traffic-idle-period, dl-def-rate. Updated range and default value for max-subburst.	May 2009
Managing Ranging Parameters Section 3.9.19	The following tables were removed from operator CLI: Bandwidth Request, Handover Ranging, Initial Ranging, Periodic Ranging, Timing Correction. contbased-rsrvtimeout was removed from Ranging General table.	May 2009
Airframe General Parameters Sections 3.9.12.2.1, 3.9.12.3.1, 3.9.12.5.1	Updated parameters: Removed: enable-ul-scrotation. Added: auto-diversity, auto-rx-enable. Corrected name: ul-duration.	May 2009
Airframe Cyclic Delay Parameters Section 3.9.12.2.4	Updated descriptions.	May 2009
Airframe Linear Delay Parameters Previously Section 4.8.16.2.5	Updated descriptions.	May 2009

Topic	Description	Date Issued
Airframe Mapping Parameters Previously Section 4.8.16.2.6	Updated descriptions.	May 2009
Airframe Receive Parameters Previously Section 4.8.16.2.7	Updated descriptions.	May 2009
Airframe Downlink Diversity Parameters Section 3.9.12.2.3	Changed value range and default for the MIMO parameter.	May 2009
Airframe MIMO Parameters Sections 3.9.12.2.7, 3.9.12.3.4, 3.9.12.5.7	New Airframe parameters table.	May 2009
Neighbor BS General Parameters Sections 3.9.9.2.1, 3.9.9.3.1, 3.9.9.7.1	Updated parameters: Removed: restartcount ucd-configchangecount and dcd-configchangecount must be set to 0. Added: paging-grp-id, nbr-strt-rng-codes. Updated range and description: preamble-idx	May 2009
Service Mapping Rule R1 Profile Parameters	Removed: sdu-length, sdu-size. All possible values of datadeliverytype are supported (including rTVR and nRTVR). Updated descriptions of cir, mir, latency. Updated range for cir, mir.	May 2009
Service Mapping Rule R6 Profile Parameters,	Updated range for cir, mir.	May 2009
Feedback Allocation Parameters Section 3.9.5	Removed: pr-cdma, ert-poll-enable. Default value of ir-cdma changed from 20 to 2. Updated description of max-cqi.	May 2009
Trigger Setup Parameters	Removed: hysteresismargin, timetotrigger Updated description of avgduration-rssi.	May 2009
Neighbor BS Trigger Setup Parameters	Removed: hysteresismargin, timetotrigger	May 2009
Rate Adaptation Parameters (was previously Section 4.8.20)	All Rate Adaptation parameters were removed.	May 2009
Scan Negotiation Parameters Section 3.9.8	Removed: all parameters except enable-modify.	May 2009

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Handover Negotiation at SBS (was previously 4.8.12)	All Handover Negotiation at SBS parameters were removed.	May 2009
UCD Parameters (was previously 4.8.15)	All UCD parameters were removed.	May 2009
DCD Parameters (was previously 4.8.16)	All DCD parameters were removed.	May 2009
Authentication Relay Parameters Section 3.9.14	Removed: nonauth-macctrlratethrshld, nonauth-pduratethrshld Updated the default value of maxeaproundsthrshld to 100. Updated the default value of suspendedeapprocthrshld to 10000. Updated the description. Updated the default value of activemsthrshld to 1024.	May 2009
Handover Control Parameters Section 3.9.19	All configurable (read-write) parameters were removed. A new read-only parameter added: CINRReuse.	May 2009
BS Management Alarm Thresholds (was previously 4.8.26)	All BS Management Alarm Thresholds parameters were removed.	May 2009
BS Alarm Threshold Parameters Section 3.9.20	Removed: dl-droppedpackets, unalloc-slots, dl-retransmissions, ul-retransmissions, dl-subburstdrop, ul-subburstdrop. Updated description, range and default for ul-mednoise, ul-99prcntnoise. Added: Be-exc-dl-drop-thr, rt-exc-dl-drop-thr, nrt-exc-dl-drop-thr, ugs-exc-dl-drop-thr, ert-exc-dl-drop-thr.	May 2009
Managing the Site General Information Section 3.4.16.7	Added section on displaying the site general information. Address parameter value was changed to up to 70 characters. Removed: AsnName, Region.	May 2009
Managing the Unique Identifier Section 3.4.16.8	Added section on displaying the site ID.	May 2009
Displaying the Vendor Identifier Section 3.4.16.9	New feature.	May 2009

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AU Connectivity Parameters Sections 3.6.2.3, 3.6.3.3, 3.6.6.3	Added new parameters: service-ip, service-mask, service-next-hop. Updated possible values of bearervlanid and the read-only InternalManagementVLANID parameters.	May 2009
Configuring Physical and IP Interfaces Section 3.4.2	AU Fast Ethernet interfaces are not configurable.	May 2009
AAA Client Configuration Section 3.4.12.9.1	Updated with new parameters/commands and additional changes related to support of multiple AAA clients and AAA Redundancy. In addition: Removed the auth-port and acct-port parameters. Added command for configuring the format of the Calling Station ID MAC Address. Added configuration rules for primary-serveraddr and alternate-serveraddr. Updated default and presence requirement for primary-serveraddr. Updated default and presence requirement for rad-sharedsecret. Updated description, default, possible values and presence requirement for src-intf. Added comment: If the bearer interface IP address is being modified after aaa-client configuration, you must re-configure the src-intf parameter to "bearer" so that the aaa-client will attach itself to the new bearer interface IP address.	May 2009
Global RADIUS Parameters Configuration Section 3.4.12.9.2	Added: alrmAaaSwitchoverRetryFailThrshld	May 2009
PIU HW Version Section 3.4.16.1.2	Updated parameter's possible values.	May 2009
Displaying the Current Status of Shelf Components Section 3.11.1.2	Added description of displayed details.	May 2009
Service Group Section 3.4.12.10.1	srvc-grp (grp-alias) possible values changed to 1-30 characters,	May 2009

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Service Profile Section 3.4.12.11.3.1	profile-name possible values changed to 1-30 characters,	May 2009
Classification Rules Section 3.4.12.11.4.1	clsf-rule <rulename> possible values changed to 1-30 characters,	May 2009
PHS Rules Section 3.4.12.12.1	phs-rule <rulename> possible values changed to 1-30 characters,	May 2009
Bearer Plane QoS Marking Rules Section 3.4.12.7.1	qos-alias possible values changed to 1-30 characters, media-type possible values changed to 1-30 characters,	May 2009
Log File Name Section 3.4.13.1.5	file-name possible values changed to 1-50 characters,	May 2009
AU Maintenance VLAN ID Section 3.4.3	New feature	May 2009
AU Connectivity Parameters Sections 3.6.2.3, 3.6.3.3, 3.6.6.3	Added service interface parameters.	May 2009
Neighbor BS Triggers/Specific BS Triggers Sections 3.9.9.2.3, 3.9.9.7.4, 3.9.9.4	Added new table: Neighbor BS Specific BS Triggers. Updated-added details on deleting Neighbor BS Triggers.	May 2009
Power Control Target Noise and Interference Level Parameters Sections 3.9.4.2.1, 3.9.4.3.1, 3.9.4.5.1	Added: power-control-correction-factor.	May 2009
Managing Power Control Levels and Policies Section 3.9.4	The following tables were removed: Open Loop Correction Policy, Open Loop Correction Range, Closed Loop - Unstable MS, Closed Loop - MS in Network Entry, Closed Loop Correction Range.	May 2009
GPS Position Parameters Section 3.4.16.2.5	Added possible values details to Latitude and Longitude.	May 2009
GPS General Configuration Parameters Sections 3.4.16.2.2, 3.4.16.2.8	Removed: AdaptorRequired	May 2009
GPS Clock Mode Was previously in sections 4.3.15.2.5, 4.3.15.2.11	Removed	May 2009

Topic	Description	Date Issued
AU Properties Sections 3.6.2.1, 3.6.3.1, 3.6.6.1	Updated possible values for required-type. Removed: required-ports, required-bandwidth (and the corresponding InstalledPorts and InstalledBandwidth). Updated options for port-3 power and port-4-power parameters (removed the NA option).	May 2009
Sector Parameters Section 3.10.1	heading is not mandatory when creating a new sector. The default value is 0.	May 2009
Antennas Section 3.8	heading is not mandatory when creating a new antenna. Limitation related to antenna heading vs. sector heading was removed). Removed: gain, altitude, beamwidth, electrical-azymuth-adjustment. Added: antenna-product-id.	May 2009
BS Bearer Interface Parameters Section 3.9.13	Added: bearer-vlan. Updated possible values for linkusage-hardthrshld.	May 2009
Managing MSs for Specific MS Advanced Mode Data Collection	New feature.	May 2009
Handover Negotiation at TBS Parameter	The default value of defaultactiontime was changed to 9.	May 2009
Power Control Maximum EIRP Section 3.9.4.2.2	The default value for maxeirp was changed to -99.	May 2009
Neighbor Advertisement Parameters Section 3.9.6	Removed: mininterval-normalload, mininterval-highload.	May 2009
IGMP Parameters	Configurable only by the vendor.	May 2009
MIP Foreign Agent Parameters	Configurable only by the vendor.	May 2009
Proxy-MIP Client Parameters	Configurable only by the vendor.	May 2009
ASN Interface Parameters Section 3.4.12.1	Configurable only by the vendor. Updated display format.	May 2009
Authenticator Function Parameters Section 3.4.12.2	Configurable only by the vendor. Updated display format.	May 2009
Data Path Function Parameters Section 3.4.12.3	Configurable only by the vendor. Updated display format.	May 2009
Context Function Parameters Section 3.4.12.4	Configurable only by the vendor. Updated display format.	May 2009

Topic	Description	Date Issued
MS State Change Parameters Section 3.4.12.5	Configurable only by the vendor. Updated display format.	May 2009
Connectivity Service Network (CSN) Parameters Section 3.4.12.6	Configurable only by the vendor. Updated display format.	May 2009
Enabling/Disabling VLAN Service Interface Section 3.4.12.10.3	Added default (disable).	May 2009
Service Flows Sections 3.4.12.11.3.3, 3.4.12.11.3.5	Removed: ulSfQosSduSize, dlSfQosSduSize. Updated syntax of commands for better support of commands auto-completion. ul-unsol-intrvl not applicable for RTVR data delivery type. ulqos-trafficpriority and dlqos-trafficpriority not applicable for UGS. Updated range for ulqos-maxsustainedrate, dlqos-maxsustainedrate, ul-rsrv-rate-min, dl-rsrv-rate-min.	May 2009
Monitoring Software Components	Removed details on counters-full and updated information is provided in the Performance Management document.	May 2009
Displaying Statistics for Physical and IP Interfaces	Removed details on counters-full and updated information is provided in the Performance Management document.	May 2009
System Log Files Sections 3.4.13.1.5, 3.11.2	Corrected directory name to tftpboot/management/system_logs (added s at the end)	May 2009
Policy Framework Section 3.4.12.14	New feature	May 2009
Power Feeders Configuration Section 3.4.16.3	pfAuSlotNoDestination, pfAuPortNoDestination are optional.	May 2009
DHCP Server/Proxy Parameters Sections 3.4.12.10.4.2, 3.4.12.10.4.3.	Added: Second DNS support (dnssrvr-addr2)	May 2009
Dry Contact Input Alarms Sections 3.4.16.4, 3.4.16.6	Added alarmPolarity	May 2009
Displaying the Active Clear Timer and Event Rate Limit Section 3.4.15.2.6	New command	May 2009

Topic	Description	Date Issued
ODUs Sections 1.3.4, 2.1.3, 3.7.1.1, 3.7.1.2, 3.7.1.6, 3.7.2. Tables 1-3, 1-6, 1-10, 1-22.	Added new ODUs: ODU-HP-2.3-WCS, ODU-2340-2400-000N-36-1X1-N-0, ODU-2480-2690-000N-38-4X2-N-0. Removed: 2x1 ODUs. Updated the list of ODU types in CLI (including types that are not available yet).	May 2009
ODU General Parameters Sections 3.7.1.2, 3.7.1.3, 3.7.1.6.	Removed: heater-existence	May 2009
Antennas Table 1-39, Table 1-42	Added antennas: ANT.2.3-2.7GHz, D/S,65°,16±0.5dBi, ANT.3.5GHz, D/S,65°,16±0.5dBi	May 2009
Airframe Uplink Feedback Zone Parameters Section 3.9.12.2.4	Updated limitation for subchannels.	May 2009
Service Mapping Rule R6 Profile Parameters	Updated range for mediaflowtype.	May 2009
Configuring General Service Mapping Rule Parameters	Updated description of the srvc parameter.	May 2009
Performance Data Collection Section 3.4.14, Table 3-5	Updated syntax of commands for better support of commands auto-completion.	May 2009
Configuring Common Parameters of a Service Group Section 3.4.12.10.2	Updated syntax of commands for better support of commands auto-completion. Updated description of dhcp-ownaddr.	May 2009
Enabling/Disabling VLAN Service Interface Section 3.4.12.10.3	Updated syntax of commands for better support of commands auto-completion.	May 2009
Configuring the DHCP Server/Proxy/Relay Section 3.4.12.10.4	Updated syntax of commands for better support of commands auto-completion.	May 2009
IP-IP Service Interface Parameters Sections 3.4.12.8.2.1, 3.4.12.8.3	Updated syntax of commands for better support of commands auto-completion.	May 2009
Displaying Configuration Information for the Service Interface Section 3.4.12.8.6	Updated	May 2009

Topic	Description	Date Issued
VLAN Service Interface Parameters Sections 3.4.12.8.2.2,	Updated syntax of commands for better support of commands auto-completion. Updated possible values and description for vlan-id. Added mask for dflt-gw-ip.	May 2009
QinQ Service Interface Parameters Section 3.4.12.8.2.3	Updated syntax of commands for better support of commands auto-completion. Updated possible values and description for vlan-id.	May 2009
ASN-GW Keep-Alive Parameters Section 3.4.12.14	Updated syntax of commands for better support of commands auto-completion.	May 2009
Configuring Power Feeders Section 3.4.16.3.1	Updated syntax of commands for better support of commands auto-completion.	May 2009
RF Frequency Section 3.9.10	Updated possible values.	May 2009
General Neighbor BS Parameters Section 3.9.9.2.1	Updated possible values.	May 2009
Bearer Interface IP Address Section 3.4.2.3.3	Added comment: After changing the bearer IP address, save configuration and reboot to apply changed IP address on ASN and CSN interfaces.	May 2009
IP Connectivity Mode Section 3.4.1.1	Added comment: You must save the configuration for a change in connectivity mode to take effect after next reset.	May 2009
Next Boot Mode Section 3.4.4.1	Added comment: You must save the configuration for a change in boot mode to take effect after next reset.	May 2009
Restoring the Factory Default Configuration With Connectivity Section 3.4.5.4.7	New feature.	May 2009
displaying Failures in Configuration Restore Operations Section 3.4.5.4.8	New feature.	May 2009
Privilege Levels Sections 3.1.5.5, 3.1.6	The highest privilege level available for users is 10.	May 2009
DGW Profile Sections 3.4.12.11.3.1, 3.4.12.11.3.3.1	Added a note (parameters related to DGW profile are not applicable in current release).	May 2009

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Power Feeders Requirements Section 2.3.3.3	Required only in configurations with 6 AUs where each AU is connected to 4 2.x GHz or 3.5 GHz 1x1 ODUs.	May 2009
Configuring the Properties of the Physical Interface Section 3.4.2.1.2	Physical interfaces can be configured when the interface is enabled.	May 2009
Managing AUs Section 3.6	Up to 6 AUs may be active (removed limitation on number of AUs that can provide services).	May 2009
Managing BSs Section 3.9	Removed the requirement to explicitly configure at least one parameter in tables with no mandatory parameters.	May 2009
Apply command Table 3-28, Sections 3.9.4, 3.9.16, 3.9.19.	Apply command not required for Power Control Levels and Policies, Control Traffic QoS Marking Rules and Ranging parameters, unless none of the BS General parameters was configured.	May 2009
BS General Parameters Section 3.9.3	Added ul-def-rate, dl-def-rate.	May 2009
Commissioning-NPU Local Connectivity-External Management Interface Section 2.1.3.3	No need to shut-down external interface before configuring IP parameters.	May 2009
Commissioning-Completing the Site Configuration Using AlvariSTAR-Equipment Configuration-AU Section 2.2.4.1	Updated (only supported Type is AU 4x4 Modem, Ports and Bandwidth parameters were removed).	May 2009
Commissioning-Completing the Site Configuration Using AlvariSTAR-Equipment-Antenna Section 2.2.4.3	Updated: Added Antenna Product Type, Number of Ports applicable only if Antenna Product Type is set to Empty, Heading is not mandatory.	May 2009
Commissioning-Completing the Site Configuration Using AlvariSTAR-BS Configuration Section 2.2.6	Removed the requirement for clicking Apply on Radio Advanced screen and Connectivity Advanced screen.	May 2009
Commissioning-Completing the Site Configuration Using AlvariSTAR-ASNGW Configuration	It is not mandatory to define AAA client (the default client can be used).	May 2009

Topic	Description	Date Issued
Creating a Sector Association Entry Section 3.10.2.1	Updated association rules (relation between antenna-type, auto-diversity and auto-rx-enable parameters.	May 2009
Changes in Site Configuration Section 2.1.3.4	Reset is required only for a change in Connectivity Mode.	June 2009
Accessing the CLI from a Remote Terminal Section 3.1.2.2	No need to disable/enable the interface when configuring an IP Address.	June 2009
Adding/Modifying Users Section 3.1.6.1.1	Updated the command's syntax.	June 2009
Displaying the IP connectivity Mode Section 3.4.1.2	Updated display format.	June 2009
Managing VLAN Translation Section 3.4.2.1.3	Updated ranges. VLAN Translation entry can be created also when VLAN Translation is disabled.	June 2009
Configuring IP Interfaces Section 3.4.2.3	VLAN ID of Local Management Interface is configurable. It is not necessary to shut down an IP interface for configuring its parameters.	June 2009
Configuring a QoS Classification Rule Section 3.4.8.2.2	IP address of local-management can also be used as host source IP address.	June 2009
Configuring Static Routes Section 3.4.9	Added a note regarding automatically added/deleted kernel routes.	June 2009
Configuring ACLs in the Standard Mode Section 3.4.10.1.2	Removed paragraph on Standard ACL 1 which was previously available by default.	June 2009
Configuring Permit/Deny Rules from/to a Specific Protocol and Source/Destination IP Addresses Section 3.4.10.1.3.1	Any IANS value can be configured for the protocol-type parameter, including IP, OSPF and PIM.	June 2009
Attaching/De-attaching ACLs to/from an Interface Section 3.4.10.3	Removed paragraph on Standard ACL 1 which was previously available by default.	June 2009
Enabling the Interface Configuration Mode Section 3.4.10.3.1	By default, all traffic destined towards the AUs is denied and all traffic towards the NPU is permitted.	June 2009
Deleting Next-hop IP Address-Network ID Mappings	nw-id parameter is optional.	June 2009

Topic	Description	Date Issued
Managing the Authenticator Function Section 3.4.12.2	Updated descriptions for eapTimerTransfer and eapCounterTransferMax.	June 2009
Managing the Data Path Function Section 3.4.12.3	Updated descriptions of dpTimerInitPathRegReq, dpCounterInitPathRegReqMax, dpTimerMsDeregReq, dpCounterMsDeregReqMax, dpTimerPathRegReq, dpCounterPathRegReqMax, dpTimerPathRegRsp, dpCounterPathRegRspMax.	June 2009
Managing the Context Function Section 3.4.12.4	Updated descriptions of all parameters.	June 2009
Managing the MS State Change Functionality Section 3.4.12.5	Updated descriptions of msscfnTimerMsscRsp, msscfnCounterMsscRspMax, msscfnTimerMsscDrctvReq, msscfnCounterMsscDrctvReqMax.	June 2009
Configuring Bearer Plane QoS Marking Rules Section 3.4.12.7	Corrected value: Up to a maximum of 20 Bearer Plane QoS Marking Rules can be defined.	June 2009
Deleting Bearer Plane QoS Marking Rules Section 3.4.12.7.5	"int_default" and "ext_default" Bearer Plane QoS Marking Rules cannot be deleted.	June 2009
Enabling the Service Interface Configuration Mode\Creating a Service Interface Section 3.4.12.8.1	Updated the value of the Service Interface alias parameter (1-30 characters).	June 2009
Configuring Parameters for IP-IP Service Interface Section 3.4.12.8.2.1	srcaddr is mandatory. The only allowed value is the Bearer IP Address. dstaddr is mandatory. Updated description of dstaddr.	June 2009
Configuring Parameters for VLAN Service Interface Section 3.4.12.8.2.2	vlan-id and dflt-gw-ip are mandatory.	June 2009
Configuring Parameters for QinQ Service Interface Section 3.4.12.8.2.3	vlan-id is mandatory.	June 2009

Topic	Description	Date Issued
Configuring the AAA Client Functionality Section 3.4.12.9	rad-CallingStationId parameter added to AAA Client parameters config command (instead of *config aaaserverMACFormat* command added in a previous version of this release).	June 2009
Restoring Operation with the Primary Server Section 3.4.12.9.1.2	Updated command syntax and description.	June 2009
Deleting the AAA Client Section 3.4.12.9.1.6	“default” client cannot be deleted.	June 2009
Configuring DHCP Server Parameters Section 3.4.12.10.4.2.1	No need to delete service group for updating pool-minaddr & pool-maxaddr values. Corrected range for lease-interval (24-4294967295). Added rules for pool-minaddr & pool-maxaddr. Added rules for renew-interval.	June 2009
Deleting a Service Group Section 3.4.12.10.9	To delete a VLAN type service group, first execute the "no vlan-enable" command.	June 2009
Configuring Parameters for the Policy Framework Previously Section 4.3.11.17.2	aaa-alias must be the alias of an active AAA client.	June 2009
Managing the ASN-GW Keep-Alive Functionality Section 3.4.12.14	Updated description of the feature.	June 2009
Configuring ASN-GW Keep-Alive Parameters Section 3.4.12.14.1	Added error condition. Updated range and default for rtx-time.	June 2009
Configuring BS Keep-Alive Parameters Section 3.9.22.1	Added error condition.	June 2009
Configuring the SNMP Manager Section 3.4.15.1	Clarified that each SNMP Manager entry is uniquely identified by the pair of values for the Read Community and Write Community.	June 2009
Configuring the Trap Manager Section 3.4.15.2	Added note: A route to forward traps to a configured Trap Manager IP address must exist.	June 2009
Displaying the Trap Rate Limit Section 3.4.15.2.5	Updated description.	June 2009

Topic	Description	Date Issued
Configuring the Date and Time Section 3.4.16.2.3	Corrected the presence of UTC to Optional.	June 2009
Configuring Power Feeders Section 3.4.16.3.1	Added note on error condition.	June 2009
Displaying the Unique Identifier for the 4Motion Shelf Section 3.4.16.8.2	Corrected command's syntax.	June 2009
Displaying the Vendor Identifier Section 3.4.16.9	Updated description.	June 2009
Displaying Location Information for the 4Motion Shelf	This section (previously Section 4.10.1.4) was removed (described in Section 3.4.16.7.2).	June 2009
Displaying the Unique Identifier for the 4Motion Shelf	This section (previously Section 4.10.1.5) was removed (described in Section 3.4.16.8.2).	June 2009
Enabling the Port Monitoring Session Section 3.12.2.1	Updated command's syntax.	June 2009
Disabling a Port Monitoring Session Section 3.12.2.1	Updated command's syntax. Updated description	June 2009
Upgrading the NPU: Step 2: Triggering Software Download	Added error condition (available memory).	June 2009
Upgrading the AU Step 3: Creating the AU-to-Image Mapping	Removed error condition (regarding mapping the AU to an image that is not residing in the AU flash).	June 2009
Displaying the Card Types Installed in Shelf Slots 1 - 9 Section 3.11.1.1	New	June 2009
ODU Names Table 1-6,	ODU-2340-2400-000N-36-1X1-N changed to ODU-HP-2.3b	June 2009
Configuring Bearer Plane QoS Marking Rules Section 3.4.12.7	Updated description of the feature.	June 2009
Deleting Source Addresses Section 3.4.12.11.4.5.5	Updated command syntax.	June 2009
Deleting Destination Addresses Section 3.4.12.11.4.6.5	Updated command syntax.	June 2009

Topic	Description	Date Issued
Enabling the Source Address Configuration Mode\ Creating a New Source Address Section 3.4.12.11.4.5.1	Added Privilege Level definition.	June 2009
Displaying the Status of the Manual Backup Procedure Section 3.4.5.4.2	Updated Privilege Level (10)	June 2009
Displaying the Automatic Backup Time Section 3.4.5.4.4	Added to manual.	June 2009
Displaying Failures in Configuration Restore Operations Section 3.4.5.4.8	Updated Privilege Level (10)	June 2009
Displaying the Currently Stored Backup Configuration Files Section 3.4.5.4.9	Updated Privilege Level (10)	June 2009
Displaying Configuration Information for SNMP Managers Section 3.4.15.1.3	Updated Privilege Level (10)	June 2009
Displaying Configuration Information for Trap Managers Section 3.4.15.2.4	Updated Privilege Level (10)	June 2009
Displaying Status Information for HARQ Maximum Retransmissions Parameter (was previously section 4.8.30)	Removed.	June 2009
Configuring Power Control Target Noise and Interference Level Parameters Section 3.9.4.2.1	Updated default value of pusc to -127.	June 2009
Specifying Configuration Parameters for the L3 Classification Rule Section 3.4.12.11.4.2	Added consistency and configuration rules for iptos-low and iptos-high.	June 2009
Enabling the Source Port Configuration Mode\ Creating a New Source Port Section 3.4.12.11.4.7.1	Added consistency rules for start-port and end-port.	June 2009
Enabling the Destination Port Configuration Mode\ Creating a New Destination Port Section 3.4.12.11.4.8.1	Added consistency rules for start-port and end-port.	June 2009

Topic	Description	Date Issued
Enabling Protocol Lists Section 3.4.12.11.4.4.2	Added consistency rules-impact of enabling destination port range	June 2009
Enabling the Destination Port Range Section 3.4.12.11.4.8.2	Added consistency rules-impact on parameters of IP protocol lists	June 2009
Enabling the Destination Port Range Section 3.4.12.11.4.7.2	Added consistency rules-impact on parameters of IP protocol lists	June 2009
Configuring the Position Section 3.4.16.2.5	Updated ranges for longitude and latitude.	June 2009
Managing Handover Negotiation at SBS Parameters	The previously removed section was brought back with one new parameter to support the Blackout Period feature.	June 2009
Configuring the AAA Client Functionality Section 3.4.12.9	Removed all commands and parameters associated with AAA server redundancy. Only a single client (default) is supported.	June 2009
Configuring the Output Parameters for Bearer Plane QoS Marking Rules Section 3.4.12.7.2	Added a note-for VLAN Service Interface only VLAN Priority marking is relevant.	June 2009
Managing Secure Shell (SSH) Parameters Section 3.1.7	New section	June 2009
Using Miscellaneous Commands Section 3.1.5.4	Update description of exit command.	June 2009
Managing the Session Section 3.1.8	New section	June 2009
Managing Service Groups Section 3.4.12.10	Added explanations on the different service group types. Added new type (VPWS-Mapped). Added acctInterimTmr parameter and updated range/default for acct parameter in IP Service Group configuration. Updated description for ms-loop. Changed structure/headings and added new sections for configuring VPWS service groups. Updated description of dhcp-ownaddr.	June 2009
Configuring Antenna Parameters Section 3.8.2	Updated value range for latitude and longitude, updated default for latitude.	June 2009

Topic	Description	Date Issued
Macro Outdoor BTS Sections 1.2.1, 1.3, 1.3.2 (new), 1.5.6, 1.5.7, 1.5.9, 1.5.10.2.1 (new), 1.5.10.2.2 (new), 1.5.10.2.3 (new), 2.4 (new). 3.1.1 (new)	New product line	June 2009
Configuring the Site General Information for the 4Motion Shelf Section 3.4.16.7.1	Removed ProductType (not configurable)	June 2009
Displaying the Site General Information Parameters Section 3.4.16.7.2	Product Type has several options.	June 2009
Replacing a PIU Section 2.3.10.4	Updated procedure	June 2009
Output Alarms Section 3.4.16.5.1	Corrected explanation of N.C. and N.O. terms.	June 2009
Displaying the Currently Stored Backup Configuration Files Section 3.4.5.4.9	Added description of the file's name format.	June 2009
Restoring the Configuration Defined in the Backup Configuration File Section 3.4.5.4.5	Added description of the file's name format.	June 2009
Downloading a Configuration File/Vendor Startup File from an External Server Section 3.4.5.2	Updated section, added info related to Vendor Startup file and file name format.	June 2009
Displaying the Status of the last File Download Operations Section 3.4.5.3	New section	June 2009
Configuring Service Parameters	Updated range for paging-cycle, paging-offset and lm-traffic-idle-period.	August 2009
4x2 ODU Installation Guidelines Section 2.1.4.2	Updated	August 2009
Configuring R6 Profile Parameters	Updated value range for cir and mir parameters.	August 2009
Configuring R1 Profile Parameters	Updated value range for cir and mir parameters.	August 2009

Topic	Description	Date Issued
Specifying Service Flow Configuration Parameters Section 3.4.12.11.3.3.2	Updated value range for ulqos-maxsustainedrate, dlqos-maxsustainedrate, ul-rsrv-rate-min, dl-rsrv-rate-min.	August 2009
Configuring Airframe MIMO Parameters Section 3.9.12.2.7	Updated default value of bcast-msgzone-loc.	August 2009
Managing the Policy Framework (was previously section 4.3.11.17)	Removed	August 2009
Managing Handover Negotiation at SBS (was previously 4.8.12)	Removed	August 2009
Configuring Alarm Threshold Parameters Section 3.9.20.1	Updated value range and default for ul-mednoise and ul-99prcntnoise.	August 2009
Managing Service Interfaces Section 3.4.12.8	Updated general description. Removed QinQ Service Interface.	August 2009
Default login ID Section 3.1	Changed from root to admin, with privilege level 10.	August 2009
Configuring Service Flows Section 3.4.12.11.3.3	Only IPv4CS service flows can be configured in the device.	August 2009
Configuring ACLs Section 3.4.10	Added details of modified ACL 1.	August 2009
Configuring ODU Port Parameters Section 3.7.2.2	Added warning - do not disable ODU ports	August 2009
Configuring Airframe General Parameters Section 3.9.12.2.1	auto-diversity and auto-rx-enable are forced to true (setting to false will be ignored).	August 2009
Configuring Airframe Cyclic Delay Parameters Section 3.9.12.2.4	Updated dependencies. The values are set by internal logic.	August 2009
Configuring Airframe Linear Delay Parameters Previously Section 4.8.16.2.5	Updated dependencies. The values are set by vendor file.	August 2009
Configuring Airframe Mapping Parameters Previously Section 4.8.16.2.6	Updated dependencies. The values are set by internal logic.	August 2009

Topic	Description	Date Issued
Configuring Airframe Receive Parameters Previously Section 4.8.16.2.7	The values are set by internal logic.	August 2009
Configuring Antenna Parameters Section 3.8.2	Updated possible values and default for antenna-product-id.	August 2009
Configuring Airframe Uplink Feedback Zone Parameters Section 3.9.12.2.4	Value of subchannels is set internally according to bandwidth.	August 2009
Configuring Airframe Downlink Data Zone Parameters Section 3.9.12.2.5	Value of subchannels is set internally according to bandwidth.	August 2009
Configuring Airframe Uplink Data Zone Parameters Section 3.9.12.2.6	Value of subchannels-number is set internally according to bandwidth. startallocation is hard-coded (value=0).	August 2009
Configuring Airframe MIMO Parameters Section 3.9.12.2.7	bcast-msgzone-loc is hard coded (set to nonSTCzoneOnly).	August 2009
Configuring Ranging Parameters Section 3.9.19.2	Updated valid values for start-of-rng-codes.	August 2009
Managing BS Feedback Allocation Parameters Section 3.9.5	Updated valid values for ir-cdma. The value for max-cqi is set by vendor file. Updated default value according to bandwidth.	August 2009
Configuring Power Control Target Noise and Interference Level Parameters Section 3.9.4.2.1	cqi-ack-ranging cannot be modified.	August 2009
Configuring the Power Control Maximum EIRP Section 3.9.4.2.2	maxeirp cannot be modified.	August 2009
Configuring the Power Control Required C/N Level Parameters Section 3.9.4.2.2	All parameters cannot be modified.	August 2009
Configuring Service Parameters	max-subburst is not relevant. trgt-err-rate cannot be modified.	August 2009

Topic	Description	Date Issued
Configuring the Unique Identifier for the 4Motion Shelf Section 3.4.16.8.1	A change in site identifier will take effect after reset. Special procedure needed when changing the site identifier of a device managed by AlvariSTAR.	August 2009
Managing the IP Connectivity Mode Section 3.4.1	Added AU maintenance IP domain. Added note on VLAN operation mode of the ports (tagged/untagged).	August 2009
Configuring Physical and IP Interfaces Section 3.4.2	Added AU maintenance IP domain.	August 2009
Configuring Parameters for VLAN Service Interface Section 3.4.12.8.2.2	A Service Interface VLAN ID shall not conflict also with AU Maintenance VLAN.	August 2009
Configuring BS Keep-Alive Parameters Section 3.9.22.1	Updated default values of tx-cnt and rtx-time.	August 2009
Managing Scheduler Parameters Section 3.9.24	New feature	August 2009
Configuring AU Connectivity Section 3.6.2.3	Updated description of service-ip.	August 2009
Chapter 2 - Installation	Updated instruction for installing 4x2 ODUs Updated instructions for installing GPS Receiver. Added Macro Outdoor BTS installation instructions	August 2009
ODUs Tables 1-3, 1-6 (new), 1-6, 1-10, 1-11 (new), 1-16 (new), Section 3.7.1.1 (added note, removed tables of currently available ODUs)	Updated ODUs	August 2009
Radio Standards Section 1.5.8	Added FCC part 25	August 2009
Managing Service Interfaces Section 3.4.12.8	QinQ Service Interface is supported (for special needs)	August 2009
Configuring Service Profiles Section 3.4.12.11.3	VLAN CS Service Flows can be configured for the Default Service Profile	August 2009

Topic	Description	Date Issued
1x1 ODU LEDs Table 2-3	ETH connector is functional	August 2009
Configuring General Neighbor BS Parameters Section 3.9.9.2.1	Updated range for frequency	August 2009
Configuring the RF Frequency Parameter Section 3.9.10.1	Updated range for frequency	August 2009
Configuring Bearer Traffic QoS Marking Rule Parameters Section 3.9.16.2	Updated range for srvcflow-datadeliverytype.	August 2009
Configuring/Modifying the VLAN ID for an IP Interface Section 3.4.2.3.5	Added note that after changing the bearer interface VLAN ID the bearervlanid of all AUs must be changed to the same value.	August 2009
Restoring the Factory Default Configuration Section 3.4.5.4.6	Added note-reset required.	August 2009
Restoring the Factory Default Configuration With Connectivity Section 3.4.5.4.7	Added note-reset required.	August 2009
Deleting Service Flows Section 3.4.12.11.3.3.7	Corrected range for flow-id	August 2009
Configuring ASN-GW Keep-Alive Parameters Section 3.4.12.14.1	Corrected command syntax	August 2009
Configuring Logging Section 3.4.13	Added note: Logging configuration reverts to default after NPU reset.	August 2009
Managing the BS Idle Mode Parameters Section 3.9.23	Updated description of the feature.	August 2009
IF Cables Tables 2-1, 2-2	Limitations/Max Length for 3.5 GHz units are the same as for other ODUs	August 2009
Commissioning Section 2.1	No need to configure ACL	August 2009

Topic	Description	Date Issued
Configuring Airftame Parameters Section 3.9.12.2	Removed sections related to Cyclic Delay Parameters, Linear Delay Parameters, Mapping Parameters and Receive Parameters. In General Parameters, auto-diversity and auto-rx-enable were removed. Added notes regarding parameters that are not relevant (ignored) in Uplink Feedback Zone Parameters, Downlink Data Zone Parameters, Uplink Data Zone Parameters, MIMO Parameters.	August 2009
Restoring Default Values for Airframe Parameters Section 3.9.12.3	Removed sections related to Cyclic Delay Parameters, Linear Delay Parameters, Mapping Parameters, Receive Parameters and Uplink Data Zone Parameters. In General Parameters, auto-diversity and auto-rx-enable were removed. Added a note that the command for restoring the default values for Uplink Data Zone parameters is not applicable for the current release. Added notes regarding parameters that are not relevant (ignored) in MIMO Parameters.	August 2009
Displaying Configuration Information for Airftame Parameters Section 3.9.12.5	Removed sections related to Cyclic Delay Parameters, Linear Delay Parameters, Mapping Parameters and Receive Parameters.	August 2009
Managing BS Feedback Allocation Parameters Section 3.9.5	Added a note related to max-cqi parameter that cannot be modified.	August 2009
Configuring Power Control Target Noise and Interference Level Parameters Section 3.9.4.2.1	Added a note related to cqi-ack-ranging parameter that cannot be modified.	August 2009
Restoring the Default Values of Power Control Target Noise and Interference Level Parameters Section 3.9.4.3.1	Added a note related to cqi-ack-ranging parameter that cannot be restored to default value.	August 2009

Topic	Description	Date Issued
Managing Power Control Levels Section 3.9.4	Removed sections related to configuring or restoring the default value of Maximum EIRxP. Added a note that this command is not applicable for the current release. Updated the description for displaying configuration values of the parameter. Added a note regarding nilevels cqi-ack-ranging parameter that cannot be modified. Required C/N Levels are configurable. Updated default value for Required C/N Levels: ack, cqi, cdma.	August 2009
Configuring BS Service Parameters	Added a note regarding parameters that are not relevant or cannot be modified.	August 2009
Restoring Default Values for BS Service Parameters	Added a note regarding parameters that are not relevant or cannot be modified.	August 2009
Managing AUs Section 3.6	Removed sections related to configuring, restoring default values and displaying configured values of reserved parameters. Added a not that these commands are not applicable for current release.	September 2009
Configuring ODUs Section 3.7.1	Removed sections related to configuring, restoring default values and displaying configured values of reserved parameters. Added a not that these commands are not applicable for current release.	September 2009
Managing BS Reserved Parameters Section 3.9.21	Removed sections related to configuring, restoring default values and displaying configured values of reserved parameters. Added a not that these commands are not applicable for current release.	September 2009
Managing the IGMP Functionality	Removed details, added a note that relevant show commands are not applicable since the feature is not supported in the current release.	September 2009
Managing the MIP-Foreign Agent Functionality	Removed details, added a note that relevant show command is not applicable since the feature is not supported in the current release.	September 2009
Managing the Proxy-MIP Client Functionality	Removed details, added a note that relevant show command is not applicable since the feature is not supported in the current release.	September 2009

Topic	Description	Date Issued
Configuring the 4Motion Shelf Section 3.4.16	Updated descriptions of components.	September 2009
Configuring Bearer Plane QoS Marking Rules Section 3.4.12.7	Updated general description	September 2009
Configuring Power Control Target Noise and Interference Level Parameters Section 3.9.4.2.1	Updated range for pusc.	September 2009
Manual MS De-registration Section 3.5.1	Updated-added the options to de-rergister am MS by its MSID (MAC address) and de-register all MSs served by a specified BS.	October 2009
Transferring Files from the NPU Flash to a TFTP Server Section 3.4.13.1.8	New feature	October 2009
Creating a Collected System Logs File Section 3.4.13.1.7	New feature	October 2009
Displaying System Files Section 3.11.2	Added the command “show saved system logs”.	October 2009
Displaying MS Information Section 3.5.2	New display option (“brief”).	October 2009
ODU Tx Power Control Range Tables 1-6, 1-8, Section 3.7.2.1,.	Updated to 10 dB for all ODUs	October 2009
Commissioning Sections 2.1.3.2, 2.1.3.3, 2.1.4.	Updated specified sections	October 2009
Accessing the CLI from a Remote Terminal Section 3.1.2.2	Added details on creating IP level connectivity	October 2009
Using the History Feature Section 3.1.5.3	Updated-up to 14 previously executed commands can be displayed	October 2009
Privilege Levels Sections 3.1.5.5, 3.1.6	Correction-the lowest level is 1	October 2009
Configuring Static Routes Section 3.4.9	Updated description of default “Any Destination” route.	October 2009
Displaying IP Routes Section 3.4.9.3	Added a note: IP routes connected to an interface that is shut down are not displayed.	October 2009

Topic	Description	Date Issued
Adding a Static Route Section 3.4.9.1	Updated: ip_nexthop must be in the subnet of one of the NPU IP interfaces.	October 2009
Displaying the Temperature of the Shelf Section 3.11.1.3	New command	October 2009
Service Flows-Configuring Uplink/Downlink Classification Rule Names Section 3.4.12.11.3.3.4	.Added: If no classifier is associated with the service flow for one or both directions, it means any traffic.	October 2009
Managing VLAN Translation Section 3.4.2.1.3	Updated description	October 2009
Configuring ACLs Section 3.4.10	Updated description-priorities of ACLs	October 2009
Managing Global RADIUS Configuration Parameters Section 3.4.12.9.2	Removed alrmAaaSwitchoverRetryFailThrshld. Added vlan-classf-bit-align	November 2009
Configuring the DHCP Relay Option 82 Parameters Section 3.4.12.10.4.4.2	Added two new options to Subopt1value and Subopt2value	November 2009
Configuring the Next-hop IP Address-Network ID Mapping, Managing the IGMP Functionality, Managing the MIP-Foreign Agent Functionality, Managing the Proxy-MIP Client Functionality	Removed.	November 2009

Topic	Description	Date Issued
ODU Types Table 1-3, Section 1.5.3	Added new ODUs: ODU-2300-2400-000N-38-2X2-N-0 ODU-2485-2690-000N-38-2X2-N-0 ODU-2590-2690-000N-38-2x2-N-0 ODU-3345-3400-000N-33-1x1-N-0 ODU-3400-3600-000N-37-2x2-N-0 ODU-3400-3600-000N-37-4x2-BF-N-0 ODU-3650-3700-000N-22-1x1-N-0 Added Beam Forming Support specifications to all 4x2 ODUs tables. Added ETSI compliance requirements for 2.5 GHz ODUs.	February 2010
ODUs Specifications Section 1.5.3	Updated Power Consumption specifications	February 2010
2.3-2.7 GHz DDP Antennas Table 1-38	Added BS-EDT-DDP-ANT 2.3-2.7 (No RET support).	February 2010
Macro Outdoor Units Section 1.3.2	New unit types with 2-channels AUs.	February 2010
Micro Outdoor BTS	New product line.	February 2010
GPS for Macro BTS Sections 1.3.7.1, 1.5.10.4	Added details on new GPS receiver, updated specifications (added Interface specs) of Timing GPS.	February 2010
Managing BS Services, Managing Service Mapping Rules	Removed	February 2010
Managing the BTS Load Balancing Parameters Section 3.4.11	New feature	February 2010
Managing the BS ASN-GW Load Balancing Parameters Section 3.9.25	New feature	February 2010
Airframe MIMO Parameters Sections 3.9.12.2.7, 3.9.12.3.4, 3.9.12.5.7	Removed bcast-msgzone-loc	February 2010
Configuring the Airframe Downlink Diversity Mode Parameter Section 3.9.12.2.3	Added description of supported modes. Added beamForming option	February 2010

Topic	Description	Date Issued
Airframe Dynamic Permutations Parameters Section 3.9.12	Removed (changed to vendor parameters)	February 2010
Configuring Airframe General Parameters Section 3.9.12.2.1	Updated value range for ul-duration and frame-offset. Added nbr-beam-forming.	February 2010
Configuring Airframe Map Zone Parameters Section 3.9.12.2.2	Added RCID-Usage	February 2010
Configuring Airframe Uplink Feedback Zone Parameters Section 3.9.12.2.4	Removed subchannels (changed to vendor parameter)	February 2010
Configuring Airframe Downlink Data Zone Parameters Section 3.9.12.2.5	Removed subchannels (changed to vendor parameter)	February 2010
Configuring Airframe Uplink Data Zone Parameters Section 3.9.12.2.6	Removed subchannels-number (changed to vendor parameter) and startallocation (obsolete-hard coded to 0). permbase is mandatory when creating a new BS.	February 2010
Restoring the Default Values of Airframe General Parameters Section 3.9.12.3.1	Added nbr-beam-forming (new parameter) and frame-offset	February 2010
Restoring the Default Values of Airframe Map Zone Parameters Section 3.9.12.3.2	Added RCID-Usage	February 2010
Displaying Configuration Information for Airframe General Parameters Section 3.9.12.5.1	Added NeighborBeamForming	February 2010
Displaying Configuration Information for Airframe Map Zone Parameters Section 3.9.12.5.2	Added RcidUsage	February 2010
Displaying Configuration Information for Airframe Uplink Feedback Zone Parameters Section 3.9.12.5.4	Removed subchannels	February 2010
Displaying Configuration Information for Airframe Downlink Data Zone Parameters Section 3.9.12.5.5	Removed subchannels	February 2010

Topic	Description	Date Issued
Displaying Configuration Information for Airframe Uplink Data Zone Parameters Section 3.9.12.5.6	Removed subchannels-number and startallocation.	February 2010
Managing BS Feedback Allocation Parameter Section 3.9.5	Removed max-cqi (changed to vendor parameter)	February 2010
Managing BS Bearer Interface Parameters Section 3.9.13	Removed linkusage-hardthrshld and mtu (changed to vendor parameters). Added ASNGWStatus (read-only).	February 2010
Managing BS General Parameters Section 3.9.3	Added dl-def-rate-for data. Changed dl-def-rate to dl-def-for-management and updated default value. Added deployment	February 2010
Configuring Alarm Threshold Parameters Section 3.9.20.1	Updated descriptions and defaults of ul-mednoise and ul-99prcntnoise.	February 2010
Configuring Power Control Parameters Section 3.9.4.2	Changed pusc to target-ni. Updated step size to 1. Removed cqi-ack-ranging.	February 2010
Managing Handover Negotiation at TBS Parameters	Removed. defaultactiontime is obsolete (calculated automatically), fastrangingalloc changed to vendor parameter)	February 2010
Configuring AU Parameters Section 3.6.2	Added support for AU type au2x2 (2-ports AU).	February 2010
Managing the BS Idle Mode Parameters Section 3.9.23	Removed idle-Mode-ms-initiated-for-ugs (changed to vendor parameter)	February 2010
Managing Software Upgrade Section 3.2	Moved to Operation Chapter (was previously an Appendix)	February 2010
Managing AAA Client Configuration Section 3.4.12.9.1	Added support for AAA server redundancy. src-intf can be configured to either the bearer or external-management IP interface.	February 2010
Configuring the DHCP Relay Option 82 Parameters Section 3.4.12.10.4.4.2	Added new option to Subopt1value and Subopt2value	February 2010

Topic	Description	Date Issued
Mapping of Macro Outdoor BTS AUs to Slot # Table 3-1	Corrected mapping	February 2010
Managing Neighbor BSs Appendix 3.9.9	Removed Trigger Setup parameters.	February 2010
Managing Trigger Setup Parameters	Removed	February 2010
Displaying Configuration and Status Information for ODU Ports Section 3.7.2.6	Added new read-only parameters odu-status-mask RSSI	February 2010
Managing Service Interfaces Section 3.4.12.8	removed mtu (changed to vendor parameter)	February 2010
Configuring IP Interfaces Section 3.4.2.3	removed mtu (changed to vendor parameter)	February 2010
Managing the Hot-Lining Feature Section 3.4.12.13	New feature.	February 2010
Configuring BS Keep-Alive Parameters Section 3.9.22.1	Corrected Possible Values range of rtx-cnt, Updated Default of rtx-time.	February 2010
configuring ASN-GW Keep-Alive Parameters Section 3.4.12.14.1	Updated range and default for rtx-cnt, updated range for rtx-time.	February 2010
Configuring General Configuration Parameters for the GPS Section 3.4.16.2.2	Updated default value for HoldoverTimeout	February 2010
Managing the Context Function Section 3.4.12.4	Updated to reflect the ability to configure the ms-capacity-threshold parameter.	February 2010
Managing the Data Path Function Section 3.4.12.3	Updated to reflect the ability to configure the throughput-threshold parameter.	February 2010
Configuring/Displaying the Daylight Saving Parameters Sections 3.4.16.2.4, 3.4.16.2.10	New feature	February 2010
Creating a Sector Association Entry Section 3.10.2.1	Updated configuration rules	February 2010
Sector Connections Schemes Appendix A	New section, replacing previous Antenna Configurations section	February 2010

Topic	Description	Date Issued
Configuring Parameters for IP-IP Service Interface Section 3.4.12.8.2.1	Updated Description, Presence and Default Value for srcaddr and dstaddr.	February 2010
Configuring Parameters for VLAN Service Interface Section 3.4.12.8.2.2	Updated Description, Presence and Default Value for vlan-id and dflt-gw-ip.	February 2010
Configuring DHCP Server Parameters Section 3.4.12.10.4.2.1	Updated default value of opt60.	February 2010
Specifying DHCP Proxy Configuration Parameters Section 3.4.12.10.4.3.1	Updated default value of opt60.	February 2010
Configuring the DHCP Relay Parameters Section 3.4.12.10.4.4.1	Updated Description, Presence and Default Value of server-addr.	February 2010
Configuring Classification Rules Section 3.4.12.11.4	Updated and corrected the sections related to L2 classifiers.	February 2010
Managing the Baseband Bandwidth Parameter Section 3.9.11	A bandwidth of 7 MHz is not applicable for ODUs in the 2.x GHz band.	February 2010
Configuring Authentication Parameters Section 3.9.14.1	Alarms associated with suspendedeapprocthrshld and maxeaproundsthrshld are not supported	February 2010
Configuring ODU Ports Section 3.7.2	Tx power resolution updated to 1 dBm	April 2010
Operation and Administration of the Micro BTS Chapter 4	New chapter	April 2010
Configuring Performance Data Collection Section 3.4.14	Updated section content, updated supported counters groups.	April 2010
Managing MSs for Specific MS Advanced Mode Data Collection	Removed (feature not supported)	April 2010
Monitoring Software Components	Removed (display of real-time counters not supported by CLI)	April 2010
Displaying Statistics for Physical and IP Interfaces	Removed (display of real-time counters not supported by CLI)	April 2010
Managing Power Control Parameters Section 3.9.4	Removed: power-control-correction-factor Added: allowed-if-level	April 2010

Topic	Description	Date Issued
Displaying the VLAN Translation Entries Section 3.4.2.1.7	Updated command syntax	April 2010
Managing Beam Forming Parameter Section 3.9.26	New feature	April 2010
Configuring Alarm Threshold Parameters Section 3.9.20.1	Updated description and default value of ul-99prcntnoise.	May 2010
Configuring General Configuration Parameters for the GPS Section 3.4.16.2.2	Added Lassen option to the Type parameter	May 2010
ODUs Section 1.5.3	Updated all power consumption specifications	May 2010
Operating Humidity Section 1.5.9	Updated specifications for outdoor units	May 2010
Macro Outdoor BTS Section 1.5.10.2	Updated unit's dimensions and weights	May 2010
ODUs Section 1.5.3	Updated weights	May 2010
Mechanical and Electrical, Macro Indoor BTS Section 1.5.10.1	Updated weights of Shelf, AVU, PIU, NPU, AU	May 2010
Configuring Logging Section 3.4.13	Updated severity levels for module level logging (Alert, Error and Info levels are supported)	June 2010
Displaying the Current Log Destination Section 3.4.13.1.4	Updated display format	June 2010
Displaying the Current Status of Trace Destinations Section 3.12.1.1.3	Updated display format	June 2010
Configuring the Unique Identifier Section 3.4.16.8.1	Updated range for site id	June 2010
Testing Connectivity to an IP Interface Section 3.4.2.3.8	New command (ping test)	June 2010
Resetting the system Section 3.3.2.1	Updated command syntax and command mode	June 2010

Topic	Description	Date Issued
Configuring Parameters for the PHS Rule Section 3.4.12.12.2	Corrected definition for verify (in Possible Values)	
Displaying System-level Logs Section 3.4.13.1.3	Updated command syntax	
Configuring the Position Section 3.4.16.2.5	Updated command syntax	
Managing Neighbor BSs, Section 3.9.9	In General: Removed srvcsupport, added bsNeighborBsDlDataMIMOMode	
Configuring Feedback Allocation Parameter Section 3.9.5.1	In current release actual value of ir-cdma is always 2	
Configuring Airframe MIMO Parameters Section 3.9.12.2.7	Limitations in functionality of first-zone-min-size and first-zone-max-size	
Configuring Airframe Map Zone Parameters Section 3.9.12.2.2	Updated description of majorgrps.	

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Radio Frequency Interference Statement

The Base Transceiver Station (BTS) equipment has been tested and found to comply with the limits for a class A digital device, pursuant to ETSI EN 301 489-1 rules and Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial, business and industrial environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

FCC Radiation Hazard Warning

To comply with FCC RF exposure requirements in Section 1.1307 and 2.1091 of FCC Rules, the antenna used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meter from all persons.

R&TTE Compliance Statement

This equipment complies with the appropriate essential requirements of Article 3 of the R&TTE Directive 1999/5/EC.

Safety Considerations - General

For the following safety considerations, "Instrument" means the BreezeMAX units' components and their cables.

Grounding

BTS chassis, Power Feeders and Outdoor Units are required to be bonded to protective grounding using the bonding stud or screw provided with each unit.

Safety Considerations - DC Powered Equipment (BTS & Power Feeder)

CAUTION	ATTENTION
Risk of electric shock and energy hazard.Disconnecting one Power Interface Unit (PIU) disconnects only one PIU module. To isolate the BTS completely, disconnect both PIUs	Risque de décharge électrique et d'electrocution. La déconnection d'un seul module d'alimentation (PIU) n'isole pas complètement la Station de Base. Pour cela, il faut impérativement débrancher les deux modules d'alimentation (PIU).

Restricted Access Area: The DC powered equipment should only be installed in a Restricted Access Area.

Installation Codes: The equipment must be installed according to the latest edition of the country national electrical codes. For North America, equipment must be installed in accordance with the US National Electrical Code and the Canadian Electrical Code.

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device, rated 60A for the Macro BTS or 20A for the Power Feeder or 10A for the Micro BTS, must be incorporated in the building wiring.

CAUTION: This equipment is designed to permit connection between the earthed conductor of the DC supply circuit and the grounding conductor at the equipment. See installation instructions.

- The equipment must be connected directly to the DC Supply System grounding electrode conductor.
- All equipment in the immediate vicinity must be grounded in the same way, and not be grounded elsewhere.
- The DC supply system is to be local, i.e. within the same premises as the equipment.
- There shall be no disconnect device between the grounded circuit conductor of the DC source (return) and the point of connection of the grounding electrode conductor.

Lithium Battery

The battery on the NPU card is not intended for replacement.

Caution

To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

Line Voltage

Before connecting this instrument to the power line, make sure that the voltage of the power source matches the requirements of the instrument.

Radio

The instrument transmits radio energy during normal operation. To avoid possible harmful exposure to this energy, do not stand or work for extended periods of time in front of its antenna. The long-term characteristics or the possible physiological effects of radio frequency electromagnetic fields have not been yet fully investigated.

Outdoor Units and Antennas Installation and Grounding

Ensure that outdoor units, antennas and supporting structures are properly installed to eliminate any physical hazard to either people or property. Make sure that the installation of the outdoor unit, antenna and cables is performed in accordance with all relevant national and local building and safety codes. Even where grounding is not mandatory according to applicable regulation and national codes, it is highly recommended to ensure that the outdoor unit and the antenna mast (when using external antenna) are grounded and suitable lightning protection devices are used so as to provide protection against voltage surges and static charges. In any event, Alvarion is not liable for any injury, damage or

regulation violations associated with or caused by installation, grounding or lightning protection.

Disposal of Electronic and Electrical Waste

Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

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damage and/or bodily harm and/or void the user's authority to operate the equipment and/or revoke the warranty provided by such manufacturer.

About This Manual

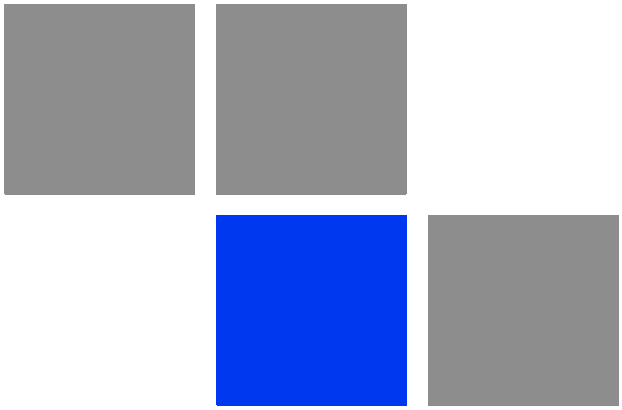
This manual describes the 4Motion solution, and details how to install, operate and manage the BTS system components.

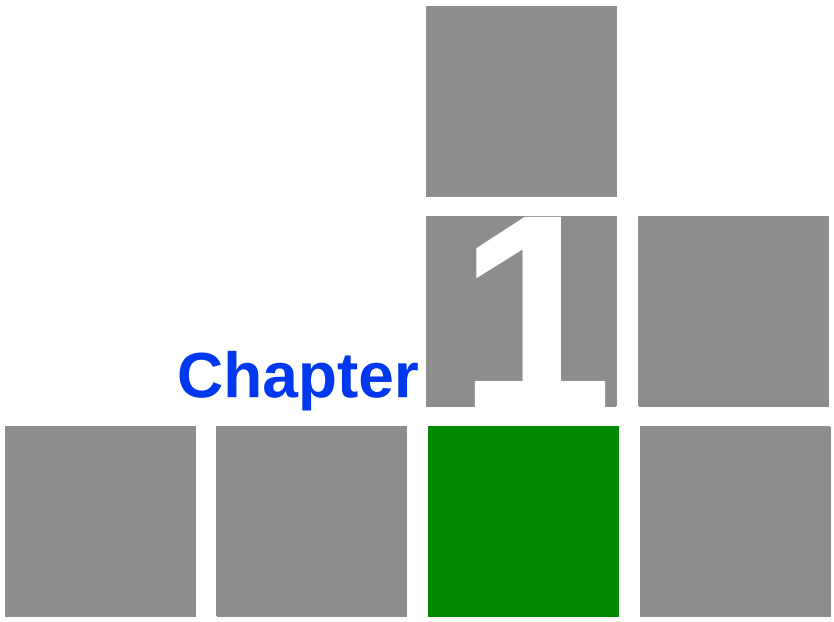
This manual is intended for technicians responsible for installing, setting and operating the 4Motion BTS equipment, and for system administrators responsible for managing the system.

This manual contains the following chapters and appendices:

- **Chapter 1 - System description:** Describes the 4Motion BTS and its components.
- **Chapter 2 - Installation:** Describes how to install the BTS components.
- **Chapter 3 - Commissioning:** Describes how to configure basic parameters and validate units' operation.
- **Chapter 4 - Operation and Administration Using the CLI:** Describes how to use the Command Line Interface (CLI) for configuring parameters, checking system status and monitoring performance.
- **Appendix A - Antenna Configurations: Describes** the proposed antenna configurations that support the different available diversity scenarios.
- **Appendix B - Software Upgrade:** Describes how to load new software files using TFTP, and how to switch to a new software version in 4Motion units.
- **Glossary:** A listing of commonly used terms.

Contents





Chapter 1

System Description

In This Chapter:

1.1 About WiMAX

Emanating from the broadband world and using all-IP architecture, mobile WiMAX is the leading technology for implementing personal broadband services. With huge market potential and affordable deployment costs, mobile WiMAX is on the verge of a major breakthrough. No other technology offers a full set of chargeable and differentiated voice, data, and premium video services in a variety of wireless fashions - fixed, portable and mobile - that increase revenue and reduce subscriber churn.

WiMAX technology is the solution for many types of high-bandwidth applications at the same time across long distances and will enable service carriers to converge the all-IP-based network for triple-play services data, voice, and video.

WiMAX with its QoS support, longer reach, and high data capacity is positioned for fixed broadband access applications in rural areas, particularly when distance is too large for DSL and cable, as well as in urban/suburban areas of developing countries. Among applications for residential are high speed Internet, Voice Over IP telephony and streaming video/online gaming with additional applications for enterprise such as Video conferencing, Video surveillance and secured Virtual Private Network (with need for high security). WiMAX technology allows covering applications with media content requesting more bandwidth.

WiMAX allows portable and mobile access applications, with incorporation in notebook computers and PDAs, allowing for urban areas and cities to become “metro zones” for portable and mobile outdoor broadband wireless access. As such WiMAX is the natural complement to 3G networks by offering higher bandwidth and to Wi-Fi networks by offering broadband connectivity in larger areas.

The WiMAX Forum is an organization of leading operators and communications component and equipment companies. The WiMAX Forum’s charter is to promote and certify the compatibility and interoperability of broadband wireless access equipment that conforms to the Institute for Electrical and Electronics Engineers (IEEE) 802.16 and ETSI HiperMAN standards. The ultimate goal of the WiMAX Forum is to accelerate the introduction of cost-effective broadband wireless access services into the marketplace. Standards-based, interoperable solutions enable economies of scale that, in turn, drive price and performance levels unachievable by proprietary approaches, making WiMAX Forum Certified products.

1.2 4Motion Solution

1.2.1 4Motion Solution Highlights

Leveraging its extensive experience in Broadband Wireless Access (BWA) systems, leading technology and current favorable economics for broadband and mobile services, Alvarion's 4Motion mobile WiMAX solution represents the next evolution in communications.

With 4Motion, Alvarion offers a diversified range of products and services for all operators. Integrating the most advanced and adaptive radio management and control technologies, 4Motion optimizes usage of the operator's spectrum and network resources. At the same time, the solution supports the most stringent quality of service (QoS) requirements for next-generation applications such as video and gaming.

As a mobile solution, 4Motion network can be efficiently integrated with existing networks, including 3G, DSL, satellite, and cable, to provide multiple service applications.

4Motion enables operators and their customers to address the following consumer and enterprise market segments:

- “Best effort" fixed broadband access (DSL equivalent)
- Portable broadband access
- "Personal broadband" (handheld) access
- Mobile broadband (including full handover and roaming support)

4Motion supports the following services:

- IP-based and Ethernet-based services (e.g. VoIP, video streaming, gaming)
- QoS and application-based prioritization and de-prioritization

4Motion is designed as an end-to-end solution based on the following elements:

- BTS (Base Transceiver Station) equipment with an optional localized access service network gateway (ASN-GW):
  - » Indoor modular Macro BTS.
  - » All-outdoor modular Macro BTS.
  - » The all-outdoor single sector Micro BTS
- Optional centralized, fully integrated ASN-GW, which may be offered as a part of an end-to-end solution that includes third-party partners' equipment
- AAA servers provided by either Alvarion or its leading WiMAX partners
- AlvariSTAR Element management system supporting NMS and OSS systems
- Customer premises equipment and handsets

Figure 1-1 illustrates the entire service provider environment and 4Motion solution elements within the radio access network, core network and subscriber environment.

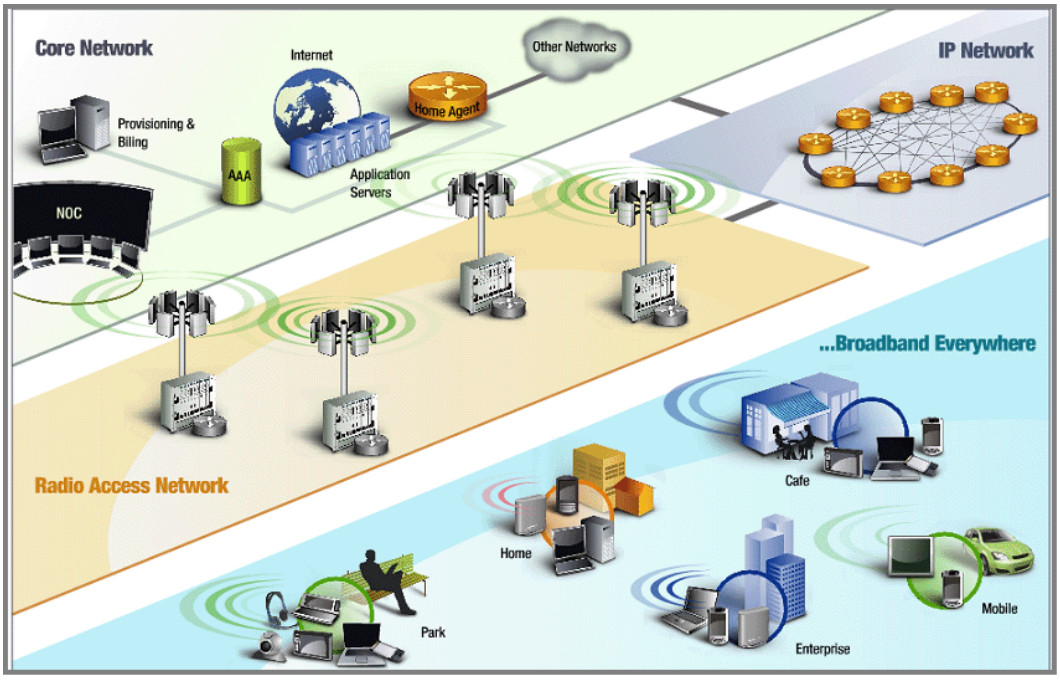


Figure 1-1: 4Motion Solution Elements

Alvarion believes that compliance with standard-driven open architecture protects the infrastructure investment, and opens the system to a variety of fully interoperable end-user devices. As such, 4Motion is designed with open architecture and interfaces according to the WiMAX Forum networking working group (NWG) profile C, which supports openness and enables flat as well as hierarchical topologies. In addition, by keeping the radio resource management functionality in the Base Transceiver Station only, Profile C delivers a faster, optimized handover mechanism.

1.2.2 WiMAX Network Reference Model

Figure 1-2 and Figure 1-3 show the basic mobile WiMAX network architecture, with a single ASN-GW and with multiple ASN-GWs, as defined by the WiMAX Forum NWG.

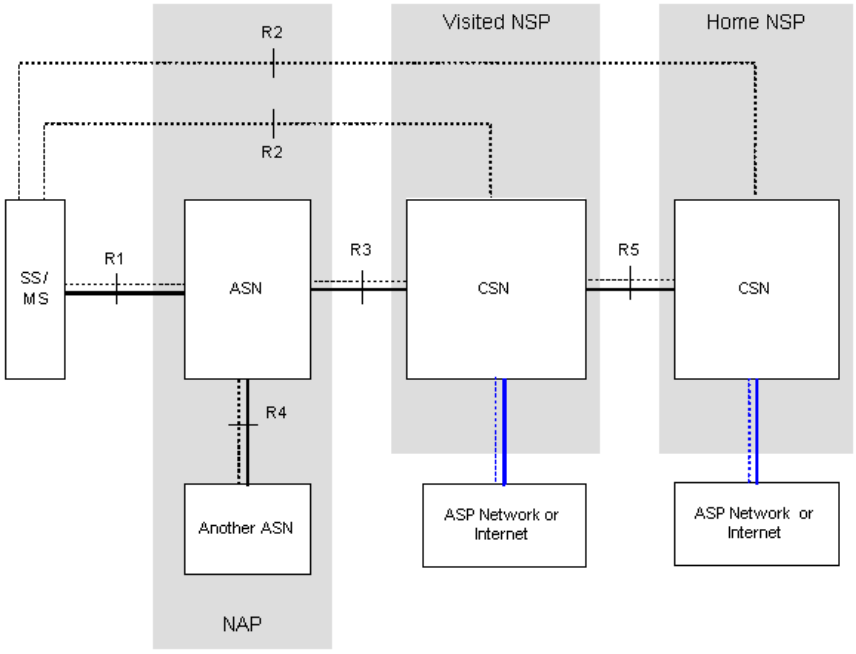


Figure 1-2: Mobile WiMAX Network Reference Model

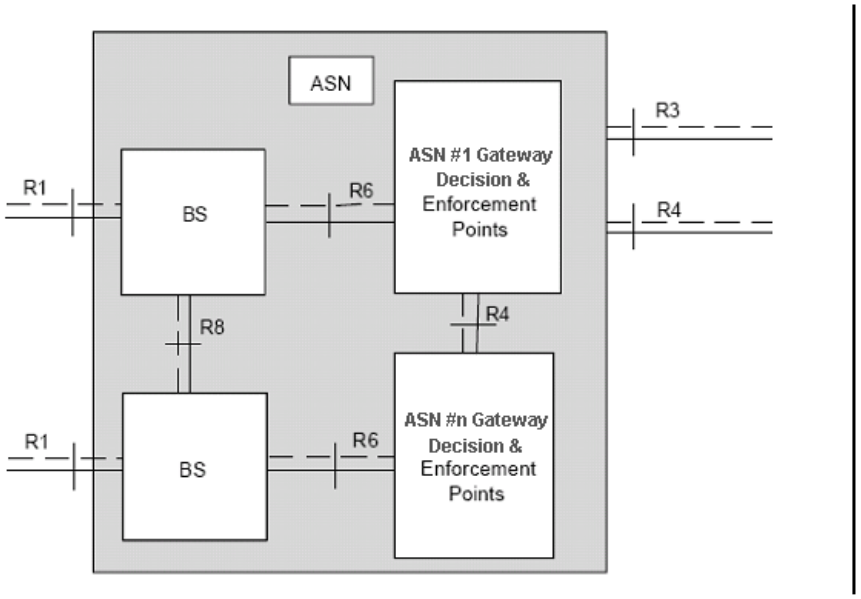


Figure 1-3: ASN Reference Model containing Multiple ASN-GWs

The various components and entities involved in the networking architecture are:

1.2.2.1 Access Service Network (ASN)

An ASN is defined as a complete set of network functions needed to provide radio access to a WiMAX subscriber. The ASN provides the following mandatory functions:

- WiMAX Layer-2 (L2) connectivity with WiMAX mobile station (MS)
- Transfer of AAA messages to the WiMAX subscriber's home network service provider (H-NSP) for authentication, authorization and session accounting for subscriber sessions
- Network discovery and selection of the WiMAX subscriber's preferred NSP
- Relay functionality for establishing Layer-3 (L3) connectivity with a WiMAX MS (i.e. IP address allocation)
- Radio resource management
- ASN-CSN tunneling
- ASN anchored mobility

An ASN is comprised of network elements such as one or more base transceiver stations and one or more ASN gateways. An ASN may be shared by more than one connectivity service network (CSN).

1.2.2.2 Connectivity Service Network (CSN)

A CSN is defined as a set of network functions that provide IP connectivity services to WiMAX subscribers. A CSN may offer the following functions:

- MS IP address and endpoint parameter allocation for user sessions
- Internet access
- AAA proxy or server
- Policy and admission control based on user subscription profiles
- ASN-CSN tunneling support
- WiMAX subscriber billing and inter-operator settlement
- WiMAX services such as location-based services, connectivity for peer-to-peer services, provisioning, authorization and/or connectivity to IP multimedia services, and facilities to support lawful intercept services such as those compliant with Communications Assistance Law Enforcement Act (CALEA) procedures

A CSN is comprised of network elements such as routers, proxy/servers, user databases, and inter-working gateway devices.

1.2.2.3 Network Access Provider (NAP)

An NAP is a business entity that provides WiMAX radio access infrastructure to one or more WiMAX network service providers (NSPs). A NAP implements this infrastructure using one or more ASNs.

1.2.2.4 Network Service Provider (NSP)

An NSP is a business entity that provides IP connectivity and WiMAX services to WiMAX subscribers compliant with the established service level agreement. The NSP concept is an extension of the Internet service provider (ISP) concept, providing network services beyond Internet access. To provide these services, an NSP establishes contractual agreements with one or more NAPs. An NSP may also establish roaming agreements with other NSPs and contractual agreements with

third-party application providers (e.g. ASP, ISP) for the delivery of WiMAX services to subscribers. From a WiMAX subscriber standpoint, an NSP may be classified as a home or visited NSP.

1.2.2.5 Base Station (BS)

The WiMAX BS is an entity that implements the WiMAX MAC and PHY in compliance with the IEEE 802.16e standard. A BS operates on one frequency assignment, and incorporates scheduler functions for uplink and downlink resources.

The basic functionality of the BS includes:

- IEEE 802.16e OFDMA PHY/MAC entity
- R6 and R8 functionality according to NWG definitions
- Extensible Authentication Protocol (EAP) relay
- Control message authentication
- User traffic authentication and encryption
- Handover management
- QoS service flow management entity

1.2.2.6 ASN Gateway (ASN-GW)

The ASN-GW is a network entity that acts as a gateway between the ASN and CSN. The ASN functions hosted in an ASN-GW may be viewed as consisting of two groups - the decision point (DP) and enforcement point (EP). The EP includes bearer plane functions, and the DP includes non-bearer plane functions.

The basic DP functionality of the ASN-GW includes:

- Implementation of EAP Authenticator and AAA client
- Termination of RADIUS protocol against the selected CSN AAA server (home or visited AAA server) for MS authentication and per-MS policy profile retrieval
- Storage of the MS policy profile
- Generation of authentication key material

- QoS service flow authorization entity
- AAA accounting client

The basic EP functionality of the ASN-GW includes:

- Classification of downlink data into generic routing encapsulation (GRE) tunnels
- Packet header suppression functionality
- DHCP functionality
- Handover functionality

The WIMAX Forum NWG has adopted two different approaches for ASN architecture - centralized and distributed: In the centralized approach there is at least one central ASN-GW, and the NPU operates in transparent mode, as shown in Figure 1-4.

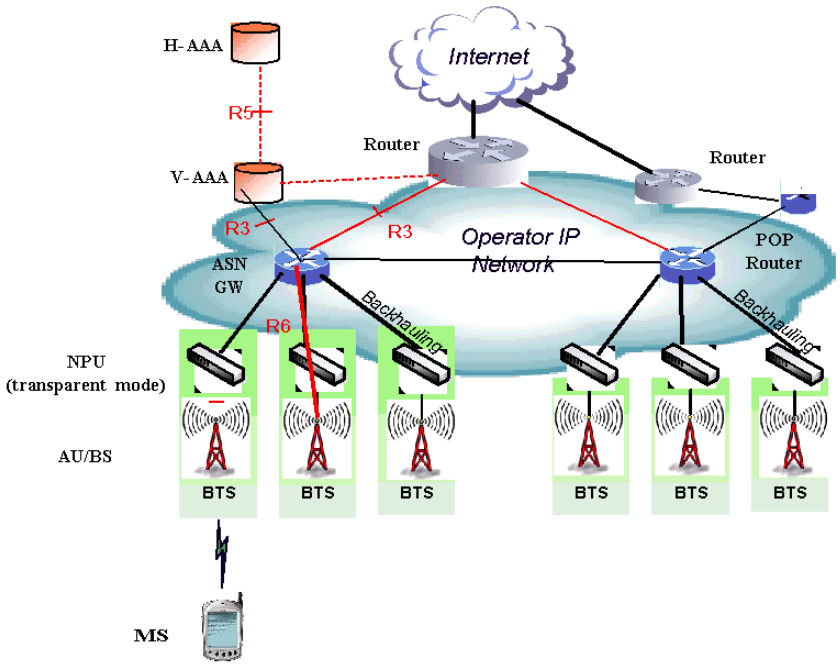


Figure 1-4: Centralized Network Reference Model

In the distributed approach, the NPU operates in ASN-GW mode, as shown in Figure 1-5.

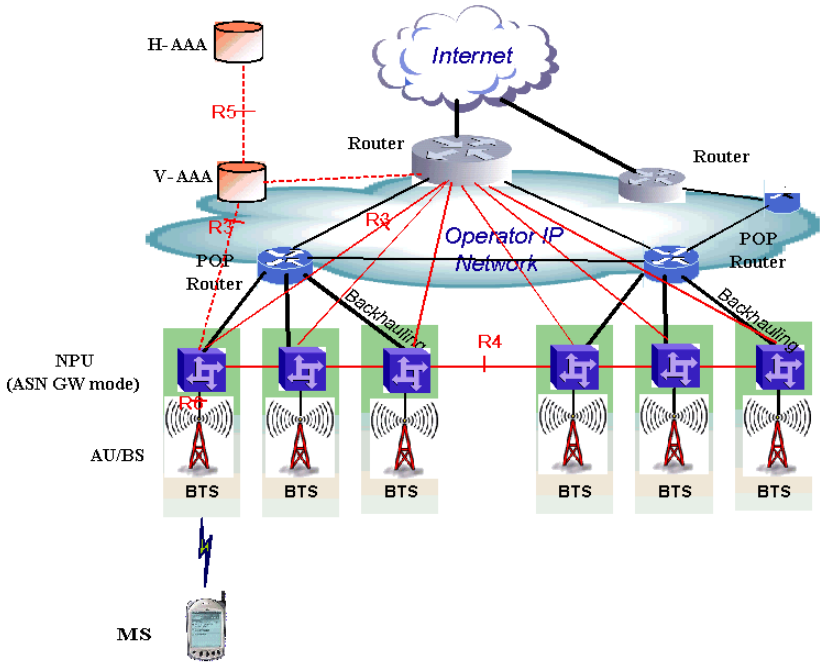


Figure 1-5: Distributed Network Reference Model

Alvarion believes in providing operators with the flexibility to select the mobile WiMAX network topology that best suits their needs and existing network architecture. Therefore, 4Motion is designed to support both distributed and centralized topology approaches according to WiMAX Forum NWG profile C.

1.2.2.7 Reference Points

- **Reference point R1** consists of the protocols and procedures between the MS and ASN as per the air-interface (PHY and MAC) specifications (IEEE 802.16e).

- **Reference point R2** consists of protocols and procedures between the MS and CSN associated with authentication, services authorization and IP host configuration management. This reference point is logical in that it does not reflect a direct protocol interface between the MS and CSN. The authentication part of reference point R2 runs between the MS and CSN operated by the home NSP, however, the ASN and CSN operated by the visited NSP may partially process the aforementioned procedures and mechanisms. Reference point R2 might support IP host configuration management running between the MS and CSN (operated by either the home NSP or visited NSP).

- **Reference point R3** consists of the set of control plane protocols between the ASN and CSN to support AAA, policy enforcement and mobility management capabilities. It also encompasses the bearer plane methods (e.g. tunneling) to transfer user data between the ASN and CSN.

- **Reference point R4** consists of the set of control and bearer plane protocols originating/terminating in various functional entities of an ASN that coordinate MS mobility between ASNs and ASN-GWs. R4 is the only interoperable reference point between similar or heterogeneous ASNs.

- **Reference point R5** consists of the set of control plane and bearer plane protocols for internetworking between the CSN operated by the home NSP and that operated by a visited NSP.

- **Reference point R6** consists of the set of control and bearer plane protocols for communication between the BS and ASN-GW. The bearer plane consists of an intra-ASN data path between the BS and ASN gateway. The control plane includes protocols for data path establishment, modification and release control in accordance with the MS mobility events.

- **Reference point R8** consists of the set of control plane message flows and optional bearer plane data flows between the base stations to ensure a fast and seamless handover. The bearer plane consists of protocols that allow data transfer between base stations involved in the handover of a certain MS.

It is important to note that all reference points are logical and do not necessarily imply a physical or even direct connection. For instance, the R4 reference point between ASN-GWs might be implemented across the NAP internal transport IP network, in which case R4 traffic might traverse several routers from the source to the destination ASN-GW.

1.3 The Base Transceiver Station

The 4Motion solution features a multi-carrier, high-power Base Transceiver Station (BTS). Designed for high availability and redundancy, it utilizes a central networking and management architecture, and a range of diversity schemes.

The BTS main features include:

- R1 support - 802.16e interface handling (e.g. PHY, MAC, CS, Scheduler, ARQ) and processes such as handover, power control and network entry
- R6 support - communication with ASN-GW
- EAP proxy in ASN-GW mode
- Handover triggering for mobility tunnel establishment - R6 (GRE tunnel)
- Local QoS PEP for traffic via air interface (or SFM) and admission control
- Hand-Over (HO) control function
- Radio resource management agent
- Key generation (TEK, KEK) and traffic encryption

The 4Motion Base Transceiver Station equipment includes:

- The indoor modular Macro BTS.
- The all-outdoor modular Macro BTS.
- The all-outdoor single sector Micro BTS.
- Outdoor Radio Units.
- GPS Receiver
- Power-Feeder (optional for the indoor Macro BTS).

1.3.1 The Indoor Macro BTS

1.3.1.1 The BreezeMAX Shelf

The BreezeMAX shelf is an indoor -48 VDC powered 8U cPCI PICMG 2.x standard shelf prepared for installation in a 19" or 21" (ETSI) rack. This chassis has a total of nine double-Euro (6U high) slots and six single-Euro (3U high) slots. All the modules are hot swappable, and high availability can be provided through multiple redundancy schemes.

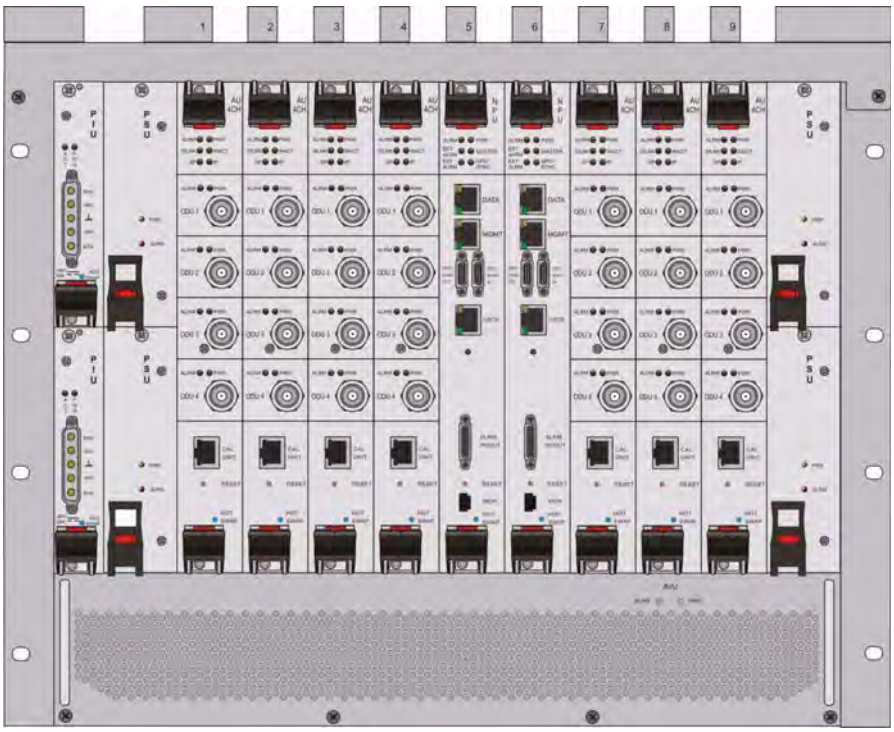


Figure 1-6: BreezeMAX Shelf (with all modules installed)

The shelf modules are:

Table 1-1: BreezeMAX Shelf Modules

Module	Description
PIU	3U high power interface unit, 1+1 redundancy, -48VDC, protection, filters
PSU	3U high power supply unit, up to 3+1 redundancy
NPU	6U high network processing unit with optional ASN-GW functionality, hardware ready for 1+1 redundancy (NPU redundancy is not supported in the current release), 1000/100 Base-T main network interface, 1000/100 Base-T cascade interface and 100/10 Base-T out-of-band management interface

Table 1-1: BreezeMAX Shelf Modules

Module	Description
AU	6U high access unit, 4-channel, 802.16e MAC-modem-baseband IF card
AVU	2U high air ventilation unit, 9+1 redundancy fans with alarm control

The six single-Euro slots are intended for one or two redundant Power Interface Units (PIUs) and up to four redundant Power Supply Units (PSUs). One of the double Euro slots (Slot 5) is dedicated to the NPU module, with interfaces for network backhaul, in-band and out-of-band (OOB) management connections. Another double-Euro slot (Slot 6) is reserved for an optional redundant NPU (the shelf is HW-ready for NPU redundancy). The remaining seven double-Euro slots (1-4, 7-9) are dedicated for Access Unit (AU) modules, thereby enabling various network topologies with up to 6 simultaneously operational AUs, and future redundancy configurations. In addition, the shelf contains an Air Ventilation Unit (AVU).

1.3.1.2 NPU

The Network Processing Unit is the controller of the Base Transceiver Station. Serving as the central processing unit that manages the BTS components, the NPU aggregates traffic to/from the AU modules, and transfers it to/from the IP backbone through a dedicated Gigabit/Fast Ethernet interface. In addition, the NPU can be operated in ASN-GW mode, in which case it also implements ASN-GW functionality.

When operating in ASN-GW mode, the NPU implements the R3 reference point toward the CSN, R4 reference point toward other ASN-GWs, and R6 reference point toward AU/BSs. The R8 reference point traffic is transparently relayed between AU/BSs (intra- or inter-BTS).

When operating in transparent mode, the NPU transparently relays R6 and R8 reference-point traffic between AU/BSs (intra- or inter-BTS).

The BreezeMAX shelf is hardware-ready for 1+1 NPU card redundancy.

The NPU main functions, when operating in transparent mode, are:

- Aggregate backbone Ethernet connectivity for user and control traffic
- Aggregate backbone Ethernet connectivity for management traffic (in-band or out-of-band)
- Connection to a cascaded shelf (future feature)

- L2 switch forwarding capabilities
- Internal and external traffic VLAN encapsulation
- QoS marking
- Overall operation, control and shelf management, including AU diagnostics and control, PSU monitoring, AVU management and redundancy support
- Local and remote extensive management support via CLI (Telnet, SSH) and SNMP, including software download, fault and performance management
- Alarm management, including external alarm inputs and activation of external devices
- Synchronization, including GPS receiver interface, clock and IF reference generation and distribution to the shelf modules, and holdover handling
- Security functionalities such as rate limiting and access control lists

When operating in ASN-GW mode, the following additional ASN-GW functions are supported:

- EAP authenticator
- RADIUS AAA client
- AAA accounting client
- MS policy profile storage
- QoS service flow authorization
- Classification of downlink data into service flows
- Packet header suppression functionality
- Multiple service provider support (multihost) for improved security and wholesale model
- DHCP functionality - internal server, DHCP proxy, DHCP relay (with Option 82 support)

- Handover functionality
- GRE encapsulation/decapsulation
- IP-in-IP encapsulation/decapsulation
- Transparent VLAN (single tag) and QinQ (dual tag) encapsulation
- Fragmentation/reassembly
- R4/R6/R3 interfaces implementation
- Keep-alive signaling towards the relevant BSs and other ASN-GWs for enhanced management of service availability

When several shelves are collocated, the NPU cascade interface can be used for shelf interconnection. In this architecture, the NPU that is directly connected to the backhaul implements a layer-2 connection toward the NPUs in the cascaded shelves. Bearer, control and management traffic is sent over the cascade connection. Synchronization and GPS backup power are sent toward the NPUs in the cascaded shelves through the GPS/SYNC ports.

GPS synchronization cascading will be implemented in a future release.

1.3.1.3 AU

The Access Unit module performs the WiMAX/IEEE 802.16e BS function according to the NWG Profile C definitions via digital signal processors (DSPs) and field-programmable gate array (FPGA) technology. The AU module is designed to support high-traffic throughput and enable diversity, MIMO and AAS, thereby extending capacity and range.

The AU implements the following functionality:

- 802.16e multi-channel OFDMA PHY
- Up to four-channel support (Tx/Rx)
- Diversity and future AAS
- Flexible channel bandwidth - up to 20 MHz
- Flexible FFT size - up to 2048 points

- Wide variety of reuse patterns
- Advanced channel coding (CTC)
- HARQ
- Rate adaptation
- High-performance CDMA detector
- IF interface to RF ODU
- MAC-PHY interface
- Link management (network entry, basic capabilities negotiation, authentication and registration, connection management)
- Fragmentation/ reassembly
- QoS PEP for air interface traffic
- QoS DSCP marking
- Scheduling - connections quota computation for all data delivery types
- Frame/burst building
- Power save
- Handover management
- Power control
- R1/R6/R8 functionality
- Data path mapping between R6 (GRE) and 802.16e interfaces
- Traffic authentication and encryption
- Authentication relay
- Security key receiver

- Context client/server
- ID to IP address resolution for ASN entities
- IP and Ethernet convergence sublayers
- Keep-alive signaling towards the relevant ASN-GWs for enhanced management of service availability

The AU design is based on Alvarion's programmable, off-the-shelf, cutting-edge components, in order to provide a future-proof solution with excellent cost and performance.

The AU card interfaces with the NPU card for R6/R8 functionality, as well as control, synchronization and management between the NPU and AU.

The AU implements four receive and transmit channels, each of them is HW-ready for up to 20 MHz bandwidth.

1.3.1.4 PIU

The single-Euro Power Interface Unit module serves as the interface between the DC power source and both the PSU modules and external ODU radio transceivers.

The PIU filters and stabilizes the input power, and protects the system from power problems such as over-voltage, surge pulses, reverse polarity connection, and short circuits. It filters high-frequency interference (radiated emissions) and low-frequency interference (conducted emissions) at the external power source. Each shelf contains two slots for optional 1+1 PIU redundancy. One PIU is sufficient to support a fully populated shelf, and two modules provide redundant power feeding (i.e. from two input sources), while avoiding current flow between the two input sources.

1.3.1.5 PSU

The single-Euro Power Supply Unit module is a -48 VDC power supply unit that generates low-voltage DC output to comply with PICMG 2.x standard requirements. Each shelf can contain up to four PSU modules supporting N+1 redundancy configuration scheme.

Table 1-2 displays the number of PSU modules (excluding redundant units) required for various Base Station configurations without NPU redundancy (one NPU):

Table 1-2: PSU Requirements, Configurations with one NPU (excluding PSU redundancy)

Number of AUs	Minimum Required Number of PSUs
1 - 4	2
5 - 6	3

1.3.1.6 AVU

The 2U-high AVU includes a 1U-high integral chamber for inlet airflow and a 1U-high fan tray with an internal alarm module. To support high availability, the fan tray includes 10 brushless fans (9 fans are sufficient for cooling a fully-loaded shelf). Fan failure is indicated by both the front panel LEDs and a trap sent to the management system. To further support high availability, the chassis may operate without the hot-swappable fan tray for up to 10 minutes until the AVU is replaced.

1.3.2 The Macro Outdoor BTS

The Macro Outdoor BTS is a modular scalable and reliable all-outdoor platform enabling extended and flexible installation capabilities while sustaining all the features and capabilities of the 4Motion solution.

The All-Outdoor Macro BTS portfolio includes the following system elements:

- NAU (Network Access Unit): A full-size enclosure containing NPU and AU cards.
- DAU (Dual Access Unit): A full-size enclosure containing two AU cards.
- SAU (Single Access Unit): A half-size enclosure containing one AU card.

The full-size enclosure is similar to the enclosure of the 4x2 ODUs (see Section 1.3.4), supporting flexible mounting options for system components, including back-to-back and side-by-side mounting. The units are available with either full (4-channels) AUs or with 2-channels AUs.

The modular architecture and different unit types enable building a variety of configurations using up to six AUs with either 2 or 4 channels, addressing a pay-as-you-grow deployment. The functionality is the same as described for the NPU (see Section 1.3.1.2) and AU (see Section 1.3.1.3) cards of the Indoor Macro BTS, with a few minor exceptions.

1.3.3 The Outdoor Micro BTS

Micro Outdoor BTS is a full-outdoor small form factor WiMAX Base Transceiver Station. The Micro Outdoor BTS complements Macro BTS deployments providing white spots coverage, cell extension and capacity boost. It provides excellent cost/performance in addressing low dense population areas (rural & suburban). It also provides an effective solution for installation constrained areas through light-pole, roof-top or wall mount options.

The Micro BTS comprises a single BS and two integrated radios connected to an external dual-slant antenna. The functionality of the Micro BTS is very similar to that of a two-channel NAU unit (an NPU with a single two-channel AU) operating with an external ASN-GW (Centralized architecture).

Micro BTS systems are currently available in the 2.5 GHz and 3.5 GHz bands.

1.3.4 ODUs for Macro (Indoor/Outdoor) BTS

The outdoor unit (ODU) is a high-power, multi-carrier radio unit that connects to one or more external antennas. It is designed to provide high system gain and interference robustness utilizing high transmit power and low noise figure. It is HW-ready for supporting a bandwidth of up to 20 MHz for the 4x2 ODUs and 30 MHz for the 2x2 ODUs, enabling future options such as increased capacity through the use of a multiplexer or wider frequency channels.

The following ODU port configurations will be available:

- 1x1(1Rx by 1 Tx): One receive port, one transmit port (one Tx/Rx interface)
- 2x2 (2Rx by 2Tx): Two receive ports, two transmit ports (two Tx/Rx interfaces)
- 4x2 (4Rx by 2Tx): Four receive ports, two transmit ports (two Tx/Rx interfaces, two Rx only interfaces)

The wide range of ODU types will enable efficient utilization of various second and fourth order transmit and receive diversity schemes. Some of the 4x2 and all 2x2 ODUs support Beam Forming capabilities for enhanced performance.

The following table provides details on the currently available ODUs following the WiMAX Forum's definitions:

Table 1-3: ODU Types

Band (GHz)	ODU Frequency Range (MHz)	ODU Port Configuration	ODU Bandwidth (MHz)	ODU Max Tx Power (dBm)	BF Support
2.3	2300-2360	1Rx by 1Tx	Up to 10	36	No
	2340-2400	1Rx by 1Tx	Up to 10	36	No
	2305 - 2317, 2348 - 2360 (includes WCS filter)	1Rx by 1Tx	Up to 10	36	No
	2300-2400	2Rx by 2Tx	Up to 30	38	Yes
2.5	2496-2602 (band A)	1Rx by 1Tx	Up to 10	36	No
	2590-2690 (band B)	1Rx by 1Tx	Up to 10	36	No
	2485-2690	2Rx by 2TX	Up to 30	38	Yes
	2496-2602 (band A)	4Rx by 2Tx	Up to 20	38	No
	2590-2690 (band B)	4Rx by 2Tx	Up to 20	38	No
	2485-2690	4Rx by 2Tx	Up to 20	38	Yes
	2560-2570	4Rx by 2Tx	Up to 10	37	No
3.3	3300-3355	1Rx by 1 Tx	Up to 14	32	No
	3345-3400	1Rx by 1Tx	Up to 14	33	No
3.5	3400-3455	1Rx by 1Tx	Up to 14	34	No
	3445-3500	1Rx by 1Tx	Up to 14	34	No
	3500-3555	1Rx by 1Tx	Up to 14	34	No
	3545-3600	1Rx by 1Tx	Up to 14	34	No
	3400-3600	2Rx by 2Tx	Up to 30	37	Yes
	3400-3600	4Rx by 2Tx	Up to 20	37	No
	3400-3600	4Rx by 2Tx	Up to 20	37	Yes
3.6	3650-3700	1Rx by 1Tx	Up to 14	22	No
	3600-3800	4Rx by 2Tx	Up to 20	36	Yes

1.3.5 Power Feeder

The PIU of the indoor Macro BTS can support a maximum current of 58 A (@-40.5 VDC). In certain installations with a relatively high number of ODUs this current may not be sufficient to power the shelf and all the ODUs. In such installations the ODU Power Feeder is used as an additional power source providing power (-48 VDC) to ODUs. It transfers transparently all signals between the AU and the ODU, while injecting DC power received from an external source. Each ODU Power

Feeder unit can serve up to four ODUs. Up to three ODU Power Feeder units can be installed in a 1U high Power Feeder panel.

1.3.6 Antenna

In the 4Motion architecture, the antenna is approached as an independent element. This provides the operator with the flexibility to select the antennas source according to its supplier policy. To ensure the availability of antennas that complement the 4Motion solution, Alvarion works closely with several antenna suppliers to ensure availability of antennas that comply with its requirements.

In cases where the operator prefers other antenna vendors, Alvarion can provide a recommended antenna specification based on the required antennas types.

For more information on recommended antenna configurations and required antennas refer to “Sector Connections Schemes” on page 744.

1.3.7 GPS

GPS is used to synchronize the air link frames of Intra-site and Inter-site located Base Transceiver Stations to ensure that in all Base Stations the air frame will start at the same time, and that all Base Stations will switch from transmit (downlink) to receive (uplink) at the same time. This synchronization is necessary to prevent Intra-site and Inter-site interference and Base stations saturation (assuming that all Base Stations are operating with the same frame size and with the same DL/UL ratio).

In order for the system to be synchronized, the GPS have to first acquire at least 4 satellites. After that the GPS reception can be reduced to 1 satellite. If no satellite is received the BTS will go to holdover state where internal clock is provided to synchronize the BTS.

1.3.7.1 Outdoor GPS Receiver for the Macro BTS

The all-outdoor GPS Receiver is a pole mountable GPS receiver and antenna in a single environmentally protected enclosure. The receiver is powered from the NPU, and it can be installed at a distance of up to 100m from the NPU. In the BMAX-Timing GPS-OGR model, a special adaptor cable is required between the GPS cable and the NPU. When available, no adaptor cable will be required for the BMAX-4M-GPS.

1.3.7.2 GPS Antenna Kit for the Micro BTS

The Micro BTS includes an internal GPS receiver with hold over mechanism in case GPS is lost or satellites synchronization was not reached.

Alvarion offers the miniature GPS antenna that can be installed at a distance of up to 3m from the BTS.

1.4 Element Management Systems

The end-to-end IP-based architecture of the system enables full management of all components, using standard management tools. An SNMP agent in the NPU implements proprietary MIBs for remote setting of operational modes and parameters of the Base Transceiver Station equipment. Security features incorporated in the equipment restrict the access for management purposes.

Alvarion offers the following management tool:

1.4.1 AlvariSTAR

AlvariSTAR is a comprehensive carrier-class Element Management System (EMS) for Alvarion's Broadband Wireless Access systems. AlvariSTAR is designed for today's most advanced Network Operation Centers (NOCs), providing the network Operation, Administration and Maintenance (OA&M) staff and managers with all the network surveillance, monitoring and configuration and service provisioning capabilities required to effectively manage the network while keeping the resources and expenses at a minimum.

AlvariSTAR offers the network's OA&M staff with a unified, scalable and distributable management system. Utilizing distributed client-server architecture, the user is provided with a robust, scalable and fully redundant management system in which all single points of failure can be avoided.

AlvariSTAR provides the following management functionality:

- Device Discovery
- Device Inventory
- Topology
- Fault Management
- Configuration Management
- Service Management
- Data Collection
- Performance Monitoring

- Device embedded software upgrade
- BTS duplication and template-based configuration modification of multiple BTS simultaneously.
- Security Management
- Event Forwarding to other Network Management Systems.

1.5 Specifications

1.5.1 Modem & Radio

Table 1-4: General Modem & Radio Specifications

Item	Description
Operation Mode	TDD
Channel Bandwidth	■ 5 MHz ■ 7 MHz (not applicable for the 2.x GHz band) ■ 10 MHz
Central Frequency Resolution	0.125 MHz (actual configurable frequencies depend on the local radio regulations and allocated spectrum)
Modulation	OFDM modulation, 1024/512 FFT points; QPSK, QAM16, QAM64
Access Method	OFDMA
FEC	Convolutional Turbo Coding: 1/2, 2/3, 3/4, 5/6

1.5.2 Sensitivity (per channel)*

Table 1-5: Per Channel Sensitivity, AWGN @ PER=1%

Modulation & Coding	Sensitivity (dBm), 5 MHz Bandwidth	Sensitivity (dBm), 7 MHz Bandwidth	Sensitivity (dBm), 10 MHz Bandwidth
QPSK 1/2	-97.3	-95.8	-94.2
QPSK 3/4	-94.9	-93.4	-91.8
16QAM 1/2	-92.2	-90.7	-89.1
16QAM 3/4	-88.3	-86.8	-85.2
64QAM1/2	-86.8	-85.3	-83.7
64QAM2/3	-83.0	-81.5	-79.9
64QAM3/4	-82.2	-80.7	-79.1
64QAM5/6	-81.0	-79.5	-77.9

* For second order receive diversity configurations sensitivity is improved by 3 dB.

For fourth order receive diversity configurations sensitivity is improved by 6 dB.

1.5.3 ODUs

1.5.3.1 2.3 GHz Band

1.5.3.1.1 2.3 GHz Band 1x1 ODUs

Table 1-6: 2.3 GHz Band 1x1 ODUs Specifications

Item	Description
Frequency Band	ODU-HP-2.3: 2300-2360 MHz ODU-HP-2.3-WCS: 2305 - 2317, 2348 - 2360 MHz (includes WCS filter) ODU-HP-2.3b: 2340-2400 MHz
Ports Configuration	1x1 (1Rx, 1Tx)
Bandwidth Support	Up to 10 MHz, 5 & 10 MHz SAW filters
Maximum Tx Power)	36 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.6 dB typical, 6.0 dB maximum
Dimension	ODU-HP-2.3-WCS: 329 x 157 x 209 mm Other ODUs: 329 x 157 x 169 mm
Weight	ODU-HP-2.3-WCS: 8.6 Kg Other ODUs: 6.1 Kg
Connectors	ANT: N-Type jack, 50 Ohm, lightning protected IF: TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 90W maximum Receive - 20W maximum

1.5.3.1.2 2.3 GHz Band 2x2 ODU

Table 1-7: 2.3 GHz Band 2x2 ODU Specifications

Item	Description
Frequency Band	ODU-2300-2400-000N-38-2X2-N-0: 2300-2400 MHz*
Ports Configuration	2x2 (2Rx, 2Tx)
Bandwidth Support	Up to 30 MHz
Beam Forming Support	Yes
Maximum Tx Power)	38 dBm*
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 2 x N-Type jack, 50 Ohm, lightning protected IF: 2 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 40W maximum

* With the optional external WCS filter, the frequency range is 2305-2315, 2350-2360 MHz, and Tx power is reduced by 1 dB.

1.5.3.2 2.5 GHz Band

1.5.3.2.1 2.5 GHz Band 1x1 ODUs

Table 1-8: 2.5 GHz Band 1x1 ODUs Specifications

Item	Description
Frequency Band	ODU-HP-2.5A: 2496-2602 MHz (Band A) ODU-HP-2.5B: 2590-2690 MHz (Band B)
Ports Configuration	1x1 (1Rx, 1Tx)
Bandwidth Support	Up to 10 MHz
Maximum Tx Power)	36 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.6 dB typical, 6.0 dB maximum
Dimension	329 x 157 x 209 mm
Weight	6.1 Kg
Connectors	ANT: N-Type jack, 50 Ohm, lightning protected IF: TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 90W maximum Receive - 20W maximum

1.5.3.2.2 2.5 GHz Band 2x2 ODUs

Table 1-9: 2.5 GHz Band 2x2 ODUs Specifications

Item	Description
Frequency Band	ODU-2485-2690-000N-38-2X2-N-0: 2485-2690 MHz
Ports Configuration	2x2 (2Rx, 2Tx)
Bandwidth Support	Up to 30 MHz
Beam Forming Support	Yes
Maximum Tx Power)	38 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 2 x N-Type jack, 50 Ohm, lightning protected IF: 2 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 40W maximum

1.5.3.2.3 2.5 GHz Band 4x2 ODUs

Table 1-10: 2.5 GHz Band 4x2 ODUs Specifications

Item	Description
Frequency Band	ODU-2496-2602-000N-38-4x2-N-0: 2496-2602 MHz (Band A) ODU-2590-2690-000N-38-4x2-N-0: 2590-2690 MHz (Band B) ODU-2485-2690-000N-38-4X2-N-0: 2485-2690 MHz ODU-2560-2570-000N-37-4X2-N-0: 2560-2570 MHz
Ports Configuration	4x2 (4Rx, 2Tx)
Bandwidth Support	Up to 20 MHz
Beam Forming Support	ODU-2485-2690-000N-38-4X2-N-0
Maximum Tx Power)	38 dBm For ODU-2560-2570-000N-37-4X2-N-0: 37 dBm.
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 4 x N-Type jack, 50 Ohm, lightning protected IF: 4 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 50W maximum

1.5.3.2.4 Compliance with ETSI Regulations

For compliance with ETSI regulations for the 2.5 GHz Band A such as limiting the Tx power to a maximum of 33dBm, one of the following must be done:

1. Use a suitable external filter.
2. Configure the required ODU type as follows:
   a. If you use ODU-2496-2602-000-N-38-4x2-N-0: Configure oDU24962602000N334by2EtsiNO as the required type. This will create a “virtual” ODU supporting the frequency range 2496-2602 MHz with a

maximum Tx power of 33 dBm and without support of beam forming capability.

b If you use ODU-2485-2690-000-N-38-4x2-N-0: Configure oDU24962602000N334by2EtsiBFN0 as the required type. This will create a “virtual” ODU supporting the frequency range 2496-2602 MHz with a maximum Tx power of 33 dBm and support of beam forming capability.

c If you use ODU-2485-2690-000-N-38-2x2-N-0: Configure oDU24962602000N332by2EtsiBFN0 as the required type. This will create a “virtual” ODU supporting the frequency range 2496-2602 MHz with a maximum Tx power of 33 dBm and support of beam forming capability.

1.5.3.3 3.3 GHz Band

1.5.3.3.1 3.3 GHz Band 1x1 ODUs

Table 1-11: 3.3 GHz Band 1x1 ODUs Specifications

Item	Description
Frequency Band	ODU-3300-3355-000N-32-1x1-N-0: 3300-3355 MHz ODU-3345-3400-000N-33-1x1-N-0: 3345-3400 MHz
Ports Configuration	1x1 (1Rx, 1Tx)
Bandwidth Support	Up to 14 MHz
Maximum Tx Power	32 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	329 x 157 x 169 mm
Weight	6.1 Kg
Connectors	ANT: N-Type jack, 50 Ohm, lightning protected IF: TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 90W maximum Receive - 20W maximum

1.5.3.4 3.5 GHz Band

1.5.3.4.1 3.5 GHz Band 1x1 ODUs

Table 1-12: 3.5 GHz Band 1x1 ODUs Specifications

Item	Description
Frequency Band	ODU-HP-TDD-3.4a: 3400-3455 MHz ODU-HP-TDD-3.4b: 3445-3500 MHz ODU-HP-TDD-3.5a: 3500-3555 MHz ODU-HP-TDD-3.5b: 3545-3600 MHz
Ports Configuration	1x1 (1Rx, 1Tx)
Bandwidth Support	Up to 14 MHz
Maximum Tx Power	34 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	329 x 157 x 169 mm
Weight	6.1 Kg
Connectors	ANT: N-Type jack, 50 Ohm, lightning protected IF: TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 90W maximum Receive - 20W maximum

1.5.3.4.2 3.5 GHz Band 2x2 ODUs

Table 1-13: 3.5 GHz Band 2x2 ODUs Specifications

Item	Description
Frequency Band	ODU-3400-3600-000N-37-2x2-N-0: 3400-3600 MHz
Ports Configuration	2x2 (2Rx, 2Tx)
Bandwidth Support	Up to 30 MHz
Beam Forming Support	Yes
Maximum Tx Power)	37 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 2 x N-Type jack, 50 Ohm, lightning protected IF: 2 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 40W maximum

1.5.3.4.3 3.5 GHz Band 4x2 ODUs

Table 1-14: 3.5 GHz Band 4x2 ODUs Specifications

Item	Description
Frequency Band	ODU-3400-3600-000N-37-4x2-N-0: 3400-3600 MHz ODU-3400-3600-000N-37-4x2-BF-N-0: 3400-3600 MHz
Ports Configuration	4x2 (4Rx, 2Tx)
Bandwidth Support	Up to 20 MHz
Beam Forming Support	ODU-3400-3600-000N-37-4x2-BF-N-0
Maximum Tx Power)	ODU-3400-3600-000N-37-4x2-N-0: 37 dBm ODU-3400-3600-000N-37-4x2-BF-N-0: 37 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 4 x N-Type jack, 50 Ohm, lightning protected IF: 4 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 50W maximum

1.5.3.5 3.6 GHz Band

1.5.3.5.1 3.6 GHz Band 1x1 ODU

Table 1-15: 3.6 GHz Band 1x1 ODU Specifications

Item	Description
Frequency Band	ODU-3650-3700-000N-22-1x1-N-0: 3650-3700 MHz
Ports Configuration	1x1 (1Rx, 1Tx)
Bandwidth Support	Up to 14 MHz
Maximum Tx Power	22 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	315 x 157 x 86 mm
Weight	2.9 Kg
Connectors	ANT: N-Type jack, 50 Ohm, lightning protected IF: TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 32W maximum Receive - 13W maximum

1.5.3.5.2 3.6 GHz Band 4x2 ODU

Table 1-16: 3.6 GHz Band 4x2 ODU Specifications

Item	Description
Frequency Band	ODU-3600-3800-000N-36-4x2-N-0: 3600-3800 MHz
Ports Configuration	4x2 (4Rx, 2Tx)
Bandwidth Support	Up to 20 MHz
Beam Forming Support	Yes
Maximum Tx Power)	36 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Maximum Input Power @ antenna port	-60 dBm before saturation, -8 dBm before damage
Noise Figure	4.5 dB typical, 5.5 dB maximum
Dimension	420 x 340 x 270 mm
Weight	17 Kg
Connectors	ANT: 4 x N-Type jack, 50 Ohm, lightning protected IF: 4 x TNC jack, 50 Ohm, lightning protected
Power Source	-40.5 to -60 VDC over the IF cable
Power Consumption	Transmit - 180W maximum Receive - 50W maximum

1.5.4 Micro Outdoor BTS

Table 1-17: Micro Outdoor BTS Specifications

Item	Description
Frequency	2.5 GHz Band: 2485-2690 MHz 3.5 GHz Band: 3400-3600 MHz
Bandwidth Support	Up to 20 MHz
Maximum Tx Power	36 dBm
Tx Power Control Range	10 dB, in 1 dB steps
Tx Power Accuracy	+/- 1 dB
Max. Input Power (at antenna port)	-40 dBm before saturation -10 dBm before damage
Dimensions (H x W x D)	511 x 280 x 216 mm
Weight (kg)	17.5
Power Source	-40.5 to -60 VDC
Connectors	PWR: SAMTEC Mini Fit 6 pins. DATA: RJ-45, lightning protected. Supports Ethernet+PoE Out. GPS: TNC jack, 50 ohm, lightning protected. MON: 3-pin low profile jack ANT: 2 x N-Type jack, 50 Ohm, lightning protected.
Power Consumption	Average:180W Peak: 255W

1.5.5 AU - ODU Communication (Macro BTS)

Table 1-18: AU - ODU Communication

Item	Description
IF Frequency	■ Tx: 240 MHz ■ Rx: 140 MHz
Ref Synchronization Frequency	64 MHz
Bi-Directional Control Frequency	14 MHz
IF cable Impedance	50 Ohm
Maximum IF cable Attenuation	10 dB @ 240 MHz 7.5 dB @ 140 MHz 8 dB @ 64 MHz
Minimum IF cable Shielding Effectiveness	90 dB in the 10-300 MHz band
Maximum IF cable Return Loss	20 dB in the 10-300 MHz band
Maximum IF cable DC Resistance	1x1 ODUs, 2.x GHz 4x2 ODUs: 1.5 Ohm 3.x GHz 4x2 ODUs: 1 Ohm

1.5.6 Data Communication (Ethernet Interfaces)

Table 1-19: Data Communication (Ethernet Interfaces)

Item		Description
Standard Compliance		IEEE 802.3 CSMA/CD
Macro BTS	NPU Data Port	10/100/1000 Mbps, Full Duplex with Auto Negotiation
	NPU Management Port	10/100 Mbps, Half/Full Duplex with Auto Negotiation
	NPU Cascade Port (not applicable for NAU)	100/1000 Mbps, Full Duplex with Auto Negotiation
	AU Calibration Port (not applicable for Macro Outdoor BTS components, not used in current release)	10/100 Mbps, Half/Full Duplex with Auto Negotiation
Micro BTS	Data Port	10/100 Mbps, Half/Full Duplex with Auto Negotiation

1.5.7 Configuration and Management

Table 1-20: Configuration and Management

Item	Description
Out Of Band (OOB) Management (For Micro only Monitor port is applicable)	■ Telnet via Management port ■ SSH via Management port ■ SNMP via Management port ■ Telnet via Cascade port (not applicable for NAU) ■ SSH via Cascade port (not applicable for NAU) ■ SNMP via Cascade port (not applicable for NAU) ■ Monitor port (serial interface)
In Band (IB) Management via Data Port	■ SNMP ■ Telnet ■ SSH
SNMP Agents	SNMP Ver. 2 client MIB II (RFC 1213), Private MIBs
Software Upgrade	Using TFTP
Configuration Upload/Download	Using TFTP

1.5.8 Standards Compliance, General

Table 1-21: Standards Compliance, General

Type	Standard
EMC	■ ETSI EN 301 489-1/4 ■ FCC Part 15
Safety	■ EN60950-1 ■ UL 60950-1
Environmental	ETS 300 019: ■ Part 2-1 T 1.2 & part 2-2 T 2.3 for indoor & outdoor ■ Part 2-3 T 3.2 for indoor ■ Part 2-4 T 4.1E for outdoor
Radio	■ ETSI EN 302 326 ■ ETSI EN 302 544 ■ FCC part 15, part 27, part 25

1.5.9 Environmental

Table 1-22: Environmental Specifications

Type	Unit	Details
Operating Temperature	Outdoor units	AU-ODU-HP-2.3-WCS: -52°C to 55°C All other ODUs, Micro Outdoor BTS and Macro Outdoor BTS units: -40°C to 55°C Outdoor GPS Receiver and Antennas: -40°C to 85°C
	Indoor equipment	0°C to 40°C
Operating Humidity	Outdoor units	5%-95%, weather protected
	Indoor equipment	5%-95% non condensing

1.5.10 Mechanical and Electrical

1U = 44.45 mm (1.75”).

1HP = 5.08 mm (0.2”)

1.5.10.1 Macro Indoor BTS

1.5.10.1.1 BreezeMAX Shelf

Table 1-23: BreezeMAX Shelf, Mechanical & Electrical Specifications

Item	Description
Dimensions	8U ETSI type shelf, 8U x 43.2 x 24 cm
Weight	6.5 Kg (including AVU)

1.5.10.1.2 AVU

Table 1-24: AVU, Mechanical & Electrical Specifications

Item	Description
Dimensions	2U x 84HP x 16 cm
Weight	1.64 Kg
Power Consumption	40W maximum, 23W typical

1.5.10.1.3 PIU

Table 1-25: PIU, Mechanical & Electrical Specifications

Item	Description
Dimensions	3U x 5HP x 16 cm
Weight	0.35 Kg
Power Source	-40.5 to -60 VDC
Power Dissipation	35W maximum (active PIU)
Maximum Supplied Current	58A
-48V Connector	5 pin/40A D-Type plug

1.5.10.1.4 PSU

Table 1-26: PSU, Mechanical & Electrical Specifications

Item	Description
Dimensions	3U x 5HP x 16 cm
Weight	0.7 Kg
Power Output	300W maximum output power Efficiency: 80% minimum

1.5.10.1.5 NPU

Table 1-27: NPU, Mechanical & Electrical Specifications

Item		Description
Dimensions		6U x 7HP x 16 cm
Weight		0.55 Kg
Power Consumption		68W maximum, 61W typical
Connectors	DATA	100/1000Base-T (RJ-45) with 2 embedded LEDs
	MGMT	10/100Base-T (RJ-45) with 2 embedded LEDs
	GPS/SYNC IN	15-pin micro D-Type jack
	GPS/SYNC OUT	15-pin micro D-Type jack
	CSCD	100/1000Base-T (RJ-45) with 2 embedded LEDs
	ALRM IN/OUT	25-pin micro D-Type jack
	MON	3-pin low profile jack

1.5.10.1.6 AU

Table 1-28: AU, Mechanical & Electrical Specifications

Item		Description
Dimensions		6U x 7HP x 16 cm
Weight		0.95 Kg
Power Consumption		74W maximum, 66W typical
Connectors	ODU1 - ODU4	4 x TNC jack, lightning protected
	CAL UNIT	10/100Base-T (RJ-45) with 2 embedded LEDs

1.5.10.2 Macro Outdoor BTS

1.5.10.2.1 NAU

Table 1-29: NAU, Mechanical & Electrical Specifications

Item		Description
Dimensions		420 x 340 x 270 mm
Weight		17 Kg (excluding mounting kit)
Power Source		-40.5 to -60 VDC
Power Consumption		140W maximum
NPU Connectors	DATA	RJ-45, lightning protected
	MNG	RJ-45, lightning protected
	GPS	RJ-45, lightning protected
	ETH (x5)	5 x RJ-45, lightning protected
	SYNC (x3)	3 x RJ-45, lightning protected
AU Connectors	POWER	SAMTEC Mini Fit 6 pins
	IF1-IF4	4 x TNC jack, lightning protected
	SYNC	-
	ETH	RJ-45, lightning protected (not used)
	MON	RJ-45, lightning protected

1.5.10.2.2 SAU

Table 1-30: SAU, Mechanical & Electrical Specifications

Item		Description
Dimensions		420 x 340 x 135 mm
Weight		8.5 Kg (excluding mounting kit)
Power Source		-40.5 to -60 VDC
Power Consumption		75W maximum
Connectors	POWER	SAMTEC Mini Fit 6 pins
	IF1-IF4	4 x TNC jack, lightning protected
	SYNC	RJ-45, lightning protected
	ETH	RJ-45, lightning protected
	MON	Not used

1.5.10.2.3 DAU

Table 1-31: DAU, Mechanical & Electrical Specifications

Item		Description
Dimensions		420 x 340 x 270 mm
Weight		17 Kg (excluding mounting kit)
Power Source		-40.5 to -60 VDC
Power Consumption		150W maximum
Master* AU Connectors	POWER	SAMTEC Mini Fit 6 pins
	IF1-IF4	4 x TNC jack, lightning protected
	SYNC	RJ-45, lightning protected
	ETH	RJ-45, lightning protected
	MON	Not used
Slave* AU Connectors	POWER	SAMTEC Mini Fit 6 pins
	IF1-IF4	4 x TNC jack, lightning protected
	SYNC	-
	ETH	RJ-45, lightning protected
	MON	Not used

* Master AU is with a SYNC connector (in the Slave AU there is no SYNC connector)

1.5.10.3 High-Power AC/DC Power Supply for Micro BTS

Table 1-32: High-Power AC/DC Power Supply Specifications

Item	Description
Input Voltage	90 ~ 132 / 180 ~ 264 VAC (selection by switch), 47 ~ 63 Hz.
Input AC Current (typical)	8A/115 VAC, 3.2A/230VAC
Efficiency	89% typical
Output Voltage	54 VDC
Output Current	Up to 10A
Dimensions (H x W x D)	110 x 303 x 240 mm
Weight	4.75 kg

1.5.10.4 GPS Receiver for Macro BTS

1.5.10.4.1 BMAX-Timing GPS-OGR Specifications

Table 1-33: BMAX-Timing GPS-OGR GPS Receiver, Mechanical & Electrical Specifications

Item	Description
Dimensions	Tubular enclosure, 15.5 D x 12.7 H cm
Weight	0.363 Kg
Power Source	12 VDC from the NPU
Power Consumption	6W maximum
Connector	12-pin round plug

1.5.10.4.2 BMAX-4M-GPS Specifications

Table 1-34: BMAX-4M-GPS Receiver, Mechanical & Electrical Specifications

Item	Description
Dimensions	8.8 x 10.4 x 16 cm
Weight	0.38 Kg
Power Source	12 VDC from the NPU
Power Consumption	2W maximum
Connector	RJ-45

1.5.10.5 GPS Antenna Kit for Micro BTS

Table 1-35: GPS Antenna Kit for Micro BTS Specifications

Item	Description
Basic Miniature Antenna	21 mm high, 60 mm diameter, 50 g, ¾” thru-hole or bracket mount, ROHS compliant, IP 67. 28 dB gain, power consumption 15 mA max. @ 3.3 VDC. Cable length (RG-6) up to 3m.

1.5.10.6 ODU Power Feeder

Table 1-36: ODU Power Feeder, Mechanical & Electrical Specifications

Item	Description
Dimensions	15.7 x 14.6 x 3.17 cm
Weight	0.6 Kg

Table 1-36: ODU Power Feeder, Mechanical & Electrical Specifications

Item		Description
Power Source		-40.5 to -60 VDC
Power Dissipation		2W per channel
Connectors	ODU 1 - ODU 4	4 x TNC jack, lightning protected
	IDU 1 - IDU 4	4 x TNC jack, lightning protected
	Power	3 pin/20A D-Type plug

1.5.11 Antennas

1.5.11.1 2.x GHz Antennas

Table 1-37: BS-RET-DP-ANT 2.3-2.7 Specifications

Item	Description
Frequency Band (MHz)	2300-2700
Number of Elements	2
Polarization	Linear, +/-45°
Gain (dB)	17.3 @ 2.4 GHz 18 @ 2.6 GHz
Azimuth Beamwidth (degrees)	65
Elevation Beamwidth (degrees)	6.5
Elevation Side Lobe Level (dB)	<-18
Maximum Power (W)	250
Cross-polarization Discrimination (dB)	>15
Front-to-Back Ratio (dB)	>30
Electrical Downtilt Range (degrees)	0-10
Remote Electrical Downtilt Support	Internal motor, AISG version 2 compliant
Isolation Between Ports (dB)	>30
Return Loss (dB)	>15
RF Interface Impedance (Ohm)	50
RF Connectors	2 x N-Type jack
RET Connector	8-pin IEC 60130-9
Dimensions (mm)	1060 x 126 x 69
Weight (Kg)	6
Wind Load (Kg)	0.24 @ 160 km/h
Maximum Wind Velocity (km/h)	200

Table 1-38: BS-RET-DDP-ANT 2.3-2.7 and BS-EDT-DDP-ANT 2.3-2.7 Specifications

Item	Description
Frequency Band (MHz)	2300-2700
Number of Elements	4
Polarization	Linear, 2 x +/-45°
Gain (dB)	17.3 @ 2.4 GHz 18 @ 2.6 GHz
Azimuth Beamwidth (degrees)	65
Elevation Beamwidth (degrees)	6.5
Elevation Side Lobe Level (dB)	<-18
Maximum Power (W)	250
Cross-polarization Discrimination (dB)	>15
Front-to-Back Ratio (dB)	>30
Electrical Downtilt Range (degrees)	0-10
Remote Electrical Downtilt Support	BS-RET-DDP-ANT 2.3-2.7: Internal motor, AISG version 2 compliant BS-EDT-DDP-ANT 2.3-2.7: None
Isolation Between Ports (dB)	>30
Return Loss (dB)	>15
RF Interface Impedance (Ohm)	50
RF Connectors	4 x N-Type jack
RET Connector	8-pin IEC 60130-9
Dimensions (mm)	1070 x 300 x 110
Weight (Kg)	13
Wind Load (Kg)	0.48 @ 160 km/h
Maximum Wind Velocity (km/h)	200

Table 1-39: ANT.2.3-2.7GHz, D/S,65°,16±0.5dBi Specifications

Item	Description
Frequency Band (MHz)	2300-2700
Number of Elements	2
Polarization	Linear, +/-45°
Gain (dB)	16 +/- 0.5
Azimuth Beamwidth (degrees)	65 +/-5
Elevation Beamwidth (degrees)	8 +/-2
Elevation Side Lobe Level (dB)	<-18
Maximum Power (W)	50
Cross-polarization Discrimination (dB)	-15
Front-to-Back Ratio (dB)	>28
Isolation Between Ports (dB)	>25
RF Interface Impedance (Ohm)	50
RF Connectors	2 x N-Type jacks
Mechanical Downtilt Range (degrees)	0-15
Dimensions (mm)	711 x 171 x 90
Weight (Kg)	2.6
Maximum Wind Velocity (km/h)	Survival: 200 Operation: 160
Regulatory Compliance	ETSI EN 302 326-3 V1.2.1 class CS RoHS Compliance

1.5.11.2 3.5 GHz Antennas

Table 1-40: BS-RET-DP-ANT 3.3-3.8 Specifications

Item	Description
Frequency Band (MHz)	3300-3800
Number of Elements	2
Polarization	Linear, +/-45°
Gain (dB)	18
Azimuth Beamwidth (degrees)	65
Elevation Beamwidth (degrees)	6.5
Elevation Side Lobe Level (dB)	<-18
Maximum Power (W)	200
Cross-polarization Discrimination (dB)	>15
Front-to-Back Ratio (dB)	>30
Electrical Downtilt Range (degrees)	0-10
Remote Electrical Downtilt Support	Internal motor, AISG version 2 compliant
Isolation Between Ports (dB)	>30
Return Loss (dB)	>15
RF Interface Impedance (Ohm)	50
RF Connectors	2 x N-Type jack
RET Connector	8-pin IEC 60130-9
Dimensions (mm)	760 x 126 x 69
Weight (Kg)	4.5
Wind Load (Kg)	0.17@ 160 km/h
Maximum Wind Velocity (km/h)	200

Table 1-41: BS-RET-DDP-ANT 3.3-3.8 Specifications

Item	Description
Frequency Band (MHz)	3300-3800
Number of Elements	4
Polarization	Linear, 2 x +/-45°
Gain (dB)	18
Azimuth Beamwidth (degrees)	65
Elevation Beamwidth (degrees)	6.5
Elevation Side Lobe Level (dB)	<-18
Maximum Power (W)	200
Cross-polarization Discrimination (dB)	>15
Front-to-Back Ratio (dB)	>30
Electrical Downtilt Range (degrees)	0-10
Remote Electrical Downtilt Support	Internal motor, AISG version 2 compliant
Isolation Between Ports (dB)	>30
Return Loss (dB)	>15
RF Interface Impedance (Ohm)	50
RF Connectors	4 x N-Type jack
RET Connector	8-pin IEC 60130-9
Dimensions (mm)	750 x 300 x 110
Weight (Kg)	10.5
Wind Load (Kg)	0.34 @ 160 km/h
Maximum Wind Velocity (km/h)	200

Table 1-42: ANT.3.5GHz, D/S,65°,16±0.5dBi Specifications

Item	Description
Frequency Band (MHz)	3300-3800
Number of Elements	2
Polarization	Linear, +/-45°
Gain (dB)	16 +/- 0.5
Azimuth Beamwidth (degrees)	65 +/-5
Elevation Beamwidth (degrees)	6 +/-1
Elevation Side Lobe Level (dB)	<-14
Maximum Power (W)	50
Cross-polarization Discrimination (dB)	-15
Front-to-Back Ratio (dB)	>25
Isolation Between Ports (dB)	>25
RF Interface Impedance (Ohm)	50
RF Connectors	2 x N-Type jacks
Mechanical Downtilt Range (degrees)	0-15
Dimensions (mm)	711 x 171 x 90
Weight (Kg)	2.6
Maximum Wind Velocity (km/h)	Survival: 200 Operation: 160
Regulatory Compliance	RoHS Compliance

Chapter 2

Commissioning of the Macro BTS

In This Chapter:

2.1 Initial NPU Configuration

2.1.1 Introduction

After completing the installation process, as described in the preceding chapter, some basic NPU parameters must be configured locally using the CLI via the MON port of the NPU.

Refer to “Using the Command Line Interface” on page 73 for information on how to access the CLI either via the MON port or via Telnet and how to use it.

The following sections describe the minimum mandatory configuration actions required to allow remote configuration of the site and to enable discovery by the EMS system:

1 ”NPU Local Connectivity”

2 ”Site Connectivity”

3 ”Static Route Definition”

4 ”SNMP Manager Definition”

5 ”Mapping the AU Software Version”

6 ”Site ID Definition”

”Saving the Configuration”

2.1.2 NPU Local Connectivity

Refer to “Accessing the CLI from a Local Terminal” on page 75 for details on connecting locally to the NPU.

Clear existing site configuration (must be executed for "used” NPUs). Restore to factory default and reboot using the following command:

npu# restore-factory-default

The system will reset automatically.

2.1.3 Site Connectivity

2.1.3.1 Connectivity Mode

The connectivity mode determines how traffic is to be routed between the NPU and the BSs, AAA server and external Management System servers.

The default connectivity mode is In-Band (IB) via the Data port. Alternatively, the NPU can be managed Out-Of-Band (OOB) via the dedicated Management port.

To view the current and configured connectivity mode, use the command:
npu# show connectivity mode

To change the connectivity mode to Out-Of-Band, use the command:
npu(config)# connectivity mode outband (for details refer to "Configuring the IP Connectivity Mode" on page 125).

2.1.3.2 VLANs Translation (Inband Connectivity Mode)

The Data port operates in VLAN-aware bridging mode (tagged-trunk mode). The values configured for VLAN ID(s) used on this port are the VLAN IDs used internally. These are the VLAN ID for the bearer IP interface (the default is 11) and, in In-Band Connectivity mode, the VLAN ID of the external-management IP interface (the default is 12).

When using In-Band connectivity via the Data port, if the value of the VLAN ID used for management in the backbone differs from the value configured for the external-management interface, the external-management VLAN ID should be translated accordingly. It is recommended to configure also VLAN translation for the bearer interface.

To enable VLAN translation and configure the required VLANs translation, run the following commands (the examples are for backhaul Data VLAN ID 30 and Management VLAN ID 31, assuming the default VLAN IDs for external-management and bearer interfaces):

1. Enable the Data port configuration mode (for details refer to "Enabling the Interface Configuration Mode" on page 129):
   npu(config)# interface gigabitethernet 0/10
2. Enable VLAN translation (for details refer to "Enabling/Disabling VLAN Translation" on page 136): *npu(config-if)# vlan mapping enable*
3. Translate external-management VLAN 12 to the backhaul management VLAN 31: *npu(config-if)# vlan mapping 12 31* (for details refer to "Creating a VLAN Translation Entry" on page 137)
4. Translate data VLAN 11 to the backhaul data VLAN 30:
   npu(config-if)# vlan mapping 11 30
5. Exit the interface configuration mode: *npu(config-if)# exit*
6. To view the VLAN mapping parameters, run the command:
   npu# show interface gigabitethernet 0/10 vlan mapping

2.1.3.3 External Management Interface

To configure the necessary parameters of the External Management interface used for connectivity with the EMS system, run the following commands:

1. Enable the External Management interface configuration mode (for details refer to "Enabling the Interface Configuration Mode" on page 129):
   npu(config)# interface external-mgmt
   (there is no need to shut down the interface for configuring its parameters)
2. Configure the IP address (x.x.x.x) and subnet mask (y.y.y.y). For details refer to "Assigning an IP address to an interface" on page 146:
   npu(config-if)# ip address x.x.x.x y.y.y.y
3. Exit the interface configuration mode: *npu(config-if)# exit*
4. Exit the configuration mode: *npu(config)# exit*

2.1.3.4 Save and Apply Changes in Site Connectivity Configuration

1. Save the configuration: *npu# write* (otherwise, after the next time reset you will lose the configuration changes).
2. If you changed the Connectivity Mode, reset the system to apply the changes: *npu# reset*

2.1.4 Static Route Definition

Static Route must be configured whenever the EMS server and the NPU are on different subnets. For more details refer to "Adding a Static Route" on page 193.

Run the following command: *npu(config)# "ip route x.x.x.x y.y.y.y z.z.z.z"*
(x.x.x.x y.y.y.y is the network segment of the EMS server, z.z.z.z is the next-hop IP address that should be in the segment of the external-management interface.

2.1.5 SNMP Manager Definition

To define the communities to be used by the SNMP manager, run the command: *npu(config)# snmp-mgr ReadCommunity public ReadWriteCommunity private*.
For more details refer to "Adding an SNMP Manager" on page 406.

For proper operation of the manager you should configure also the Trap Manager parameters and enable sending traps to the defined Trap Manager (this can also be done later via the management system):

1. *npu(config)# trap-mgr ip-source x.x.x.x port 162 TrapCommunity public*
   (x.x.x.x is the IP address of the EMS server). For more details refer to "Adding/Modifying a Trap Manager entry" on page 409

2 *npu(config)# trap-mgr enable ip-source x.x.x.x*

Note that if the management system is behind a NAT router, the NAT Outside IP address (the IP of the router's interface connected in the direction of the managed device LAN) must be defined in the device as a Trap Manager, with traps sending enabled. In the NAT router, Port Forwarding (NAT Traversal) must be configured for UDP and TCP ports 161 and 162 from Outside IP (connected to the managed device's LAN) to Inside IP (connected to the management system's LAN).

2.1.6 Mapping the AU Software Version

To define the software version to be used by all AUs run the command: *npu(config)# map au default <image name>*, where image name is the required AU software version (to view the AU software versions available in the NPU run the command *npu# show au image repository*).

2.1.7 Site ID Definition

To define the site ID (Site Number): *npu(config)# site identifier x*
(x is the unique site identifier, a number in the range from 1 to 999999)

For more details refer to "Configuring the Unique Identifier for the 4Motion Shelf" on page 447.

2.1.8 Saving the Configuration

To save the configuration run the command: *npu# write* (otherwise, after the next time reset you will lose the configuration changes).

2.2 Completing the Site Configuration Using AlvariSTAR

2.2.1 Introduction

After completion of the initial configuration you should be able to manage the new Site using AlvariSTAR and continue configuring (at least) all mandatory parameters to enable the necessary services.

For details on how to use AlvariSTAR for managing 4Motion sites refer to the AlvariSTAR and 4Motion Device Manager User Manuals.

Verify that the Site is included in the list of devices that can be managed by AlvariSTAR. It can be added to the list of managed devices either through the Equipment Manager (by creating a New managed device) or through the Managed Network window (by inclusion in a range to be discovered and activation of the Network Scan Task from the Task Manager).

To complete the minimal configuration, open the Site's Device Manager from the Equipment Manager and perform the following configuration steps:

1 "Site Configuration" on page 64

2 "Connectivity Configuration (optional)" on page 64

3 "Equipment Configuration" on page 64

4 "ASNGW Configuration" on page 66 (only for Distributed ASNGW topology)

5 "BS Configuration" on page 68

6 "Site Sector Configuration" on page 69

7 "Apply All Changes" on page 70

NOTE

The following sections list the minimum actions that must be performed for completing basic configuration of the Site. Additional parameters may also be configured in order to complete the entire configuration of the Site.

After configuring the mandatory parameters in each screen, click on the Apply button. Click Apply even if you did not change any of the screen's default parameters.

In some of the screens in the following sections there are no mandatory parameters but still you must click on the Apply button to activate the default values.

2.2.2 Site Configuration

2.2.2.1 General Tab

ASN Topology - the default is Distributed ASNGW.

If you change it to Centralized ASNGW click Apply for the device to accept the change.

2.2.3 Connectivity Configuration (optional)

2.2.3.1 IP Interface Screen

Configure the IP address of the Bearer interface:

1 Change the IP and/or any other parameter value, except VLAN ID.

2 Click on Apply to accept the changes.

2.2.3.2 IP Routing Screen

The IP Routing screen is used to define the static routes for traffic originating from the NPU.

The static route for management traffic was already configured (see "Static Route Definition" on page 61).

If necessary (depending on your specific backhaul network) you may configure additional static route(s) for Bearer Traffic and/or Control Traffic. If additional static routes were defined (or if you made any changes in the already configured static route), click on the Apply button.

2.2.4 Equipment Configuration

2.2.4.1 AU

AU entities must be created for all installed AUs (you may create an AU entity also for AUs that are not installed yet).

To create a new AU entity:

1 Right click on the AU node in the Navigation Pane and select Create. The New AU definition window will open. You can also double-click on an empty slot in the Site Equipment View Page to open the New AU window for the selected slot.

2 In the New AU definition window, define the following:

» AU number (AU Slot)

» Type (in current release only AU 4x4 Modem is applicable)

3 Click Apply.

4 Repeat the process for all required AU entities.

2.2.4.2 ODU

ODU entities must be created for all installed ODUs (you may create an ODU entity also for ODUs that are not installed yet).

To create a new ODU entity:

1 Right click on the ODU node in the Navigation Pane and select Create. The New ODU definition window will open.

2 In the New ODU definition window, define the following:

» ODU number

» ODU Type

3 Click Apply.

4 In the ODU General screen of the applicable ODU, in the Ports Configuration section, configure the Tx Power for the relevant Tx/Rx port(s). Click on the Apply button for the device the accept the configuration.

5 Repeat the process for all required ODU entities.

2.2.4.3 Antenna

Antenna entities must be created for all installed and connected antennas (you may create an Antenna entity also for antennas that are not installed/connected yet).

To create a new Antenna entity:

1 In the Antenna screen, click on the Add New Antenna button.

2 In the Antenna Parameters section, define Antenna Product Type

3 Click Apply.

4 Repeat the process for all required Antenna entities.

2.2.4.4 GPS

The default GPS Type is Trimble. If there is no GPS, the value should be changed to None.

Click Apply for the device to accept the change.

2.2.5 ASNGW Configuration

NOTE

ASNGW screens are available only for Distributed ASNGW topology (see also "Site Configuration" on page 64.

2.2.5.1 AAA Screen

1 Configure the following mandatory parameters:

- Primary Server IP Address
- RADIUS Shared Secret
- ASNGW NAS ID

2 Click Apply for the device to accept the configuration.

2.2.5.2 Service Screen

2.2.5.2.1 Service Interface Tab

At least one Service Interface for data must be defined. If a dedicated management station for CPEs is being used, a suitable Service Interface for management must also be defined.

1 Click on the Add Service Interface button and configure the following mandatory parameters:

- Service Interface Name
- Type
- Tunnel Destination IP (IP-in-IP Service Interface)
- Service VLAN ID (VLAN Service Interface)
- Default Gateway IP Address (VLAN Service Interface)

2 Click Apply for the device to accept the configuration.

2.2.5.2.2 Service Groups Tab

At least one Service Group associated with a defined Service Interface for data must be defined. If a dedicated management station for CPEs is being used, a suitable Service Group associated with the defined Service Interface for management must also be defined.

1 Click on the Add Service Group button and configure at least the following mandatory parameters:

- Name
- Type
- Service Interface Name
- DHCP Function Mode
- DHCP Own IP Address
- External DHCP Server IP Address (Relay mode)
- IP Address Pool From (Server mode)
- IP Address Pool To (Server mode)
- Subnet Mask (Server mode)
- DNS Server IP Address (Proxy mode)

2 Click Apply for the device to accept the configuration.

2.2.5.3 SFA Screen -Classification Rules Tab

Create the necessary Classification Rule(s) according to the relevant type of traffic, and click Apply.

2.2.5.4 Service Profiles

At least one Service Profile must be defined and associated with an already defined Service Group.

1 Right-click on the Service Profile node and select **Create**. The New Service Profile window is displayed.

2 Define the Name of the New Service Profile and click Apply.

3 The new Service Profile added to the list of available Service Profiles in the navigation tree. Select it to continue the configuration process.

4 Click Add in the Service Flow area.

5 Configure the applicable general parameters of the Service Flow.

6 Configure the applicable QoS parameters of Service Flow for UL and DL (for Data delivery type=BE it will be Maximum Sustained Traffic Rate and Traffic Priority)

7 Associate this Service Flow with previously created Classification Rule(s).

8 Change the Profile Status to Enable

9 Click Apply for the device to accept the configuration.

2.2.6 BS Configuration

2.2.6.1 Creating a New BS Entity

To create a new BS entity:

1 Right click on the BS level entry in the Navigation Pane. The New BS definition window will open.

2 In the New BS definition window, define the following:

» BS ID LSB

» Operator ID

3 Click Apply.

4 Complete the BS configuration as described in the following sections.

2.2.6.2 Radio

2.2.6.2.1 Basic Screen

2.2.6.2.1.1 General Tab

1 Configure the following mandatory parameters:

» Name

» Bandwidth

» Center Frequency

2 Click Apply for the device to accept the configuration.

3 You will be prompted to properly configure some additional parameters.

4 Click Apply for the device to accept the configuration.

5 Select the Radio Advanced screen and click Apply to complete the configuration.

2.2.6.3 R6/R8 Bearer Interface

2.2.6.3.1 Bearer Tab

1 Configure the following mandatory parameters:

- » IP Address
- » IP Subnet Mask
- » Default Gateway

2 Enable/Disable ASN-GW Pools

2.2.6.3.2 Authentication Tab

1 Configure the mandatory Default Authenticator IP Address parameter.

2 Click Apply for the device to accept the configuration.

2.2.7 Site Sector Configuration

To create a new Site Sector entity:

1 Right click on the Site Sector level entry in the Navigation Pane. The New Site Sector definition window will open.

2 In the New Site Sector definition window, define the Site Sector Number

3 Click Apply.

4 At least one Site Sector Association must be defined for each Site Sector. Click on the Add Sector Association button and configure all the parameters in the applicable line of the Sector site Association table:

- BS ID LSB
- AU Slot Number
- AU Port Number
- ODU Number
- ODU Port Number
- Antenna Number
- Antenna Port Number

5 Click Apply for the device to accept the configuration.

2.2.8 Apply All Changes

If you changed any of the parameters that are applied only after reset of the NPU such as ASN Topology or Configured GPS Type (indicated by a pop-up message after applying the change), you must reset the NPU (in the NPU screen select the Reset option in the Shutdown Operation parameter). This will cause also automatic reset of all AUs

To fully apply all the Site Sector configuration changes, reset all the relevant AUs (in the Control tab of each applicable AU screen select the Reset option in the Shutdown Operation parameter). It is not necessary to reset each of the AUs if you reset the NPU.

Chapter 3

Operation and Administration of the Macro BTS

In This Chapter:

3.1 Using the Command Line Interface

All 4Motion system components are managed via the NPU module. The AU is not accessed directly: any configuration change or status enquiry is sent to the NPU that communicates with other system components.

The following system management options are available:

- Accessing the Command Line Interface (CLI) locally via the MON port
- Using Telnet/Secure Shell (SSH) to access the CLI

The CLI is a configuration and management tool that you can use to configure and operate the 4Motion system, either locally or remotely, via Telnet/SSH. The following are some administrative procedures to be executed using the CLI:

- Specifying the boot mode to be used at the next system reset
- Selecting the connectivity mode
- Shutting down/resetting 4Motion
- Configuring and operating 4Motion
- Monitoring hardware and software components
- Executing debug procedures
- Executing software upgrade procedures

This section provides information about:

- “Accessing the CLI” on page 75
- “Command Modes” on page 78
- “Interpreting the Command Syntax” on page 79
- “Using the CLI” on page 80
- “Managing Users and Privileges” on page 83

- "Managing Secure Shell (SSH) Parameters" on page 92
- "Managing the Session" on page 94

3.1.1 Managing the Macro Outdoor BTS

The following section describe the CLI when using it to manage the Indoor Macro BTS equipment. The same CLI is used also to manage the Macro Outdoor BTS equipment, with the following changes:

3.1.1.1 CSCD Port and Local Management

There is no CSCD port in the Macro Outdoor BTS. Local Management may be supported only on the Management port (in in-band or unified connectivity mode). It should be noted that local management will be blocked if connectivity mode is set to out-of-band.

3.1.1.2 Management Port

In the Macro Outdoor BTS the management port is marked MNG, while in the Indoor BTS it is marked MGMT. All references to MGMT port are applicable to the MNG port of the Macro Outdoor BTS.

3.1.1.3 AVU, PIU and PSU

AVU and its Fans, PIUs and PSUs do not exist in the Macro Outdoor BTS. These shelf components cannot be manage and the status of all the following is indicated as existing and healthy:

- 2 PIUs
- 4 PSUs
- AVU
- 10 AVU Fans

3.1.1.4 Alarm In/Out Connectors and Dry-Contacts Management

Alarm In-Out connectors do not exist in the Macro Outdoor BTS. All commands related to dry-contact in/out are not applicable.

3.1.1.5 Power Feeder

Power Feeders are not applicable for the Macro Outdoor BTS

3.1.1.6 AUs

Up to a maximum of six AUs can be supported in the Macro Outdoor BTS. The following table details the mapping of Macro Outdoor BTS AUs to Slot numbers:

Table 3-1: Mapping of Macro Outdoor BTS AUs to Slot #

AU	Slot #
AU of NAU	7
SAU	1
Master AU of DAU 1	3 (This is the AU with the Sync connector)
Slave AU of DAU 1	2
Master AU of DAU 2	9 (This is the AU with the Sync connector)
Slave AU of DAU 2	8

3.1.1.7 ODUs and Antennas

Up to a maximum of 24 ODUs and 24 Antennas can be defined for the Macro Outdoor BTS.

3.1.2 Accessing the CLI

You can access the CLI, locally, via an ANSI ASCII terminal or PC that is connected via the DATA port of the NPU. You can also use Telnet/SSH to remotely access the CLI.

This section describes the procedures for:

- "Accessing the CLI from a Local Terminal" on page 75
- "Accessing the CLI From a Remote Terminal" on page 76

3.1.2.1 Accessing the CLI from a Local Terminal

To access the CLI via the MON connector:

1. Use the MON cable to connect the MON connector of the NPU to the COM port of your ASCII ANSI terminal or PC.
2. Run a terminal emulation program, such as HyperTerminal™.
3. Set the communication parameters listed in the following table:

Table 3-2: COM Port Configuration

Parameter	Value
Baud rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow control	Xon/Xoff
Port	Connected COM port

4 The login prompt is displayed. (Press Enter if the login prompt is not displayed.) Enter your login ID and password to log in to the CLI.

NOTE

The default login ID and password are:
Login ID: admin
Password: admin123

After you provide your login information, the following command prompt is displayed:

npu#

This is the global command mode. For more information about different command modes, refer to Section 3.1.3.

3.1.2.2 Accessing the CLI From a Remote Terminal

The procedure for accessing the CLI from a remote terminal differs with respect to the IP connectivity mode. The Ethernet port and IP interface you are required to configure for enabling remote connectivity is different for each connectivity mode. For more information about connectivity modes, and Ethernet ports and IP interface used for operating the 4Motion system, refer “Managing the IP Connectivity Mode” on page 123.

To access the CLI from a remote terminal, execute the following procedure:

IMPORTANT

The in-band connectivity mode is the default connectivity mode; the DATA port and external-management VLAN are the default Ethernet port and IP interface that are configured for the in-band connectivity mode. The following procedure can be used for accessing the CLI when the in-band connectivity mode is selected. This procedure is identical for all other connectivity modes. However, the Ethernet port, VLAN, and IP interface to be configured will differ for the out-of-band and unified connectivity modes, as listed in Table 3-9.

1 Assign an IP address to the external-management interface. For this, execute the following procedure. (Refer Table 3-9 for more information about the IP interface to be configured for the connectivity mode you have selected).

   a Run the following command to enable the interface connectivity mode for the external-management interface:

   ```
   npu(config)# interface external-mgmt
   ```

   b Run the following command to assign an IP address to this interface:

   ```
   npu(config-if)# ip address <ip-address> <subnet-mask>
   ```

2 Connect the Ethernet cable to the DATA connector on the front panel of the NPU. (Refer Table 3-9 for more information about the Ethernet port to be used for the connectivity mode you have selected).

3 To enable exchange of packets, create IP-level connectivity between the remote machine and the external-management interface. Typically, the DATA port should be connected to a switch port operating in trunk mode, and the remote machine is connected to another port of the same switch that is configured to operate in access mode with the external-management VLAN ID (default is 12).

4 From the remote terminal, execute the following command to use Telnet/SSH to access the IP address of the external-management interface:

   telnet <ip address of external-management interface>

   ssh <ip address of external-management interface>

   Refer to “Managing Secure Shell (SSH) Parameters” on page 92 for details on managing SSH parameter.

5 At the prompt, enter your login ID and password.

NOTE

The default login ID and password are:
Login ID: admin
Password: admin123

After you provide your login information, the following command prompt is displayed:

npu#

This is the global command mode. For more information about different command modes, refer to Section 3.1.3.

3.1.3 Command Modes

The CLI provides a number of command modes, some of which are listed in the following table for executing different types of commands:

Table 3-3: CLI Command Modes

Mode	Used for...	Command Prompt
Global configuration mode	Executing all configuration commands	npu(config)#
Global command mode	Executing all other commands such as show and delete commands	npu#
Interface configuration mode	Executing all commands for configuring physical and IP interfaces.	npu(config-if)#
Standard/extended ACL mode	Executing commands for configuring standard and extended ACLs	npu(config-std-nacl)# npu(config-ext-nacl)#

The following table lists the commands to be executed for entering/exiting a particular command mode:

Table 3-4: Commands to Enter/Exit a Command Mode

To...	Run the Command...	The Command Mode is Now...
Enter the global configuration mode	npu# config terminal	npu(config)#

Table 3-4: Commands to Enter/Exit a Command Mode

Enter the interface configuration mode	npu(config)# interface {<interface-type> <interface-id> |internal-mgmt |external-mgmt | bearer | local-mgmt | npu-host | all-au}	npu(config-if)#
Exit the configuration mode and enter the global command mode.	npu(config)# end npu (config-if)# end	npu# npu#
Exit the current configuration mode by one level	npu (config-if)# exit	npu(config)#

3.1.4 Interpreting the Command Syntax

The following table lists the conventions used in the command syntax for all 4Motion commands:

Table 3-5: Conventions Used in the 4Motion Command Syntax

Convention	Description	Example
{ }	Indicates that the parameters enclosed in these brackets are mandatory, and only one of these parameters should be specified.	**npu(config)# limit** {**cpu** | **memory**} ([**softlimit** <limit>] [**hardlimit** <limit>]) This command is used for specifying the soft and hard limits for memory and CPU utilization. The cpu/memory parameters are enclosed within {} brackets, indicating that their presence is mandatory, and that only one of these parameters is required.
( )	Indicates that one or all parameters enclosed within these brackets are optional. However, the presence of at least one parameter is required to successfully execute this command.	**npu(config)# limit** {**cpu** | **memory**} ([**softlimit** <limit>] [**hardlimit** <limit>]) This command is used for specifying the soft and hard limits for memory and CPU utilization. The softlimit and hardlimit parameters are enclosed within () brackets, indicating that you are required to specify the value of at least one of these parameters to successfully execute this command.

Table 3-5: Conventions Used in the 4Motion Command Syntax

[ ]	Indicates that the parameter enclosed within these brackets is optional.	**npu(config)# reboot from shadow** [<shadow image name>] This command is used to reboot the system with the shadow image. The shadow image name parameter is enclosed with the [ ] brackets, indicating that it is optional. If you do not specify the value of this parameter, the system automatically boots up with the last downloaded shadow image.
< >	Indicates that the parameter is mandatory and requires a user-defined value (and not a discrete value).	**npu(config)# load to shadow** <shadow image name> This command is used to load the system with a particular shadow image. It is mandatory to specify a value for the shadow image name parameter; otherwise an error is raised by the system. The value of this parameter is not a discrete value; you are required to specify a value for this parameter.
|	Indicates the OR conditional operator that is used between two or more parameters. The presence of this parameter indicates that only one of the parameters separated by the I conditional parameter should be specified in the command.	**npu(config)# pm-group enable npu {R6InterfaceTotal | R6InterfaceBs | ProvisionedQOS | R3Interface | LoadBalancing | InitialNe | ServiceFlow}** This command is used to specify the group for which performance data collection and storage is to be enabled. The | conditional operator indicates that only one parameter should be specified.

NOTE

In this document, all discrete values are specified in boldface, and all user-defined values are not bold.

3.1.5 Using the CLI

To help you use the CLI, this section provides information about:

- "Using Control Characters" on page 81
- "Using the CLI Help" on page 81
- "Using the History Feature" on page 82

■ “Using Miscellaneous Commands” on page 82

■ “Privilege Levels” on page 82

3.1.5.1 Using Control Characters

Control characters refer to special characters that you can use to recall or modify previously-executed commands. The following table lists the control characters to be used for executing commands on the CLI:

Table 3-6: Control Characters for Using the CLI

Press	To...
Up/Down arrow keys	Scroll the previously executed CLI commands. Press Enter if you want to select and execute a particular command.
Right/Left arrow keys	Navigate to the right/left of the selected character in a command.
Home key	Navigate to the first character of a command.
End key	Navigate to the last character of a command.
Backspace key	Delete the characters of a command.
TAB key	Prompt the CLI to complete the command for which you have specified a token command. Remember that the CLI that is the nearest match to the token command that you have specified is displayed.
? key	View the list of commands available in the current mode. If you press ? after a command, a list of parameters available for that command is displayed.

3.1.5.2 Using the CLI Help

The CLI provides help that you can access while using the CLI. Execute the following command to obtain help for a specific command:

`help` `[“<text>”]`

Specify the command name as the parameter to view help for this command. For example, to obtain help for the **`show resource limits`** command, run the following command:

`npu# help “show resource limits”`

The help for the **`show resource limits`** command is displayed.

If you do not provide the command name as the parameter, all commands that can be executed in the current command mode are displayed.

3.1.5.3 Using the History Feature

The history feature of the CLI maintains a sequential list of all previously executed commands. The following table lists the commands that you can run to access, edit or execute a command from the command history list:

Table 3-7: Commands for Using the History Feature

Run the command...	To...
show history	Obtain a list of previously executed commands (up to 14).
!!	Execute the last command displayed in the list of previously executed commands.
!<n>	Execute the nth command in the list of previously-executed commands.
!<string>	Execute the most recent command in the CLI history that starts with the string entered as the value for the `string` parameter.

3.1.5.4 Using Miscellaneous Commands

The following table lists other miscellaneous commands that you can execute in any mode while using the CLI:

Table 3-8: Miscellaneous Commands

Enter the command...	To...
exit	Exit the current configuration mode. In global command mode this command will cause termination of the session.
clear screen	Clear the screen.

3.1.5.5 Privilege Levels

All commands that can be executed using the CLI are assigned privilege levels between 1 and 10, where 1 is the lowest, and 10 is the highest. In addition, each user is assigned a privilege level; the user can access only those commands for which the privilege level is the same or lower than the user's privilege level.

The default user, admin, is assigned privilege level 10. However, if you are logging in as admin, you can execute certain additional commands for managing users and enabling passwords for privilege levels. For more information about managing users and privileges, refer to Section 3.1.6.

3.1.6 Managing Users and Privileges

To enable multi-level access to the CLI, you can create and manage multiple users, and assign privilege levels for each user. The privilege level determines whether a user is authorized to execute a particular command. The privilege level is pre-configured for each command, and can be between 1 and 10, where 1 is the lowest and 10 is the highest. The user can execute all commands for which the privilege level is equal to or lower than the default privilege level assigned to the user.

IMPORTANT

By default, the privilege level of users logging in with admin privileges is 10. However, the admin user can execute some additional commands for adding users and enabling passwords for different privilege levels.

You can also configure passwords for each privilege level. Users with lower privilege levels can enter this password to enable higher privilege levels.

This section describes the commands for:

- "Managing Users" on page 83
- "Managing Privileges" on page 86
- "Enabling/Disabling Higher Privilege Levels" on page 88
- "Displaying Active Users" on page 90
- "Displaying All Users" on page 91
- "Displaying the Privilege Level" on page 91

3.1.6.1 Managing Users

You can add/modify/delete one or more users for accessing the CLI either through a local or remote terminal.

IMPORTANT

Only users who have logged in as admin can add/modify/delete users.

This section describes the commands for:

- "Adding/Modifying Users" on page 84

■ “Deleting a User” on page 85

3.1.6.1.1 Adding/Modifying Users

IMPORTANT

Only users who have logged in as admin can execute this task.

To add/modify a user, and assign a username, password, and privilege level, run the following command:

```
npu(config)# username <user-name> password <passwd> privilege <1-10>
```

IMPORTANT

An error may occur if:

- You are not logged in as the admin.
- The username or password that you have specified is more than 20 characters.
- The privilege level that you have specified is not within the range, 1-10.

Command Syntax

npu(config)# username <user-name> password <passwd> privilege <1-10>

Privilege Level

10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
username <user-name>	Indicates the user name of the user to be added.	Mandatory	N/A	String (up to 20 characters and case-sensitive)
password <passwd>	Indicates the password to be assigned to the user to be added.	Optional	password	String (up to 20 characters and case-sensitive)

	privilege <1-10>	Indicates the privilege level to be assigned to a user. The user will be permitted to execute all commands for which the privilege level is equal to or lower than the value of this parameter.	Mandatory	N/A	1-10

Command Modes	Global configuration mode

3.1.6.1.2 Deleting a User

IMPORTANT

Only users who have logged in as admin can execute this task.

To delete a user, run the following command:

```
npu(config)# no user <username>
```

IMPORTANT

An error may occur if:

- You are not logged in as admin user.
- The username that you have specified does not exist. Remember that user names are case-sensitive.
- You are trying to delete an active user or the admin user.

Command Syntax	`npu(config)# no user <username>`
Privilege Level	10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
username <name>	Indicates the username of the user to be deleted.	Mandatory	N/A	String (upto 20 characters and case-sensitive)

Command Modes

Global configuration mode

3.1.6.2 Managing Privileges

To enable users to execute commands that require a higher privilege level (than their currently configured default level), you can configure a password for each privilege level. Other users can then use the password you have specified to enable a higher privilege level.

IMPORTANT

Only users who have logged in as admin can assign or delete passwords for any privilege level.

This section describes the commands for:

- "Assigning a Password for a Privilege Level" on page 86
- "Deleting a Password for a Privilege Level" on page 87

3.1.6.2.1 Assigning a Password for a Privilege Level

IMPORTANT

Only users who have logged in as admin can execute this command.

To assign a password for a privilege level, run the following command:

```
npu(config)# enable password  [Level <1-10>] <password>
```

IMPORTANT

After you execute this command, any user can use this password to enable the (higher) privilege level for which you have configured the password. For more information about using passwords for enabling higher privilege levels, refer Section 3.1.6.3.

IMPORTANT

An error may occur if:

- You are trying to configure a password for a privilege level that is higher than your default privilege level.
- The password that you have specified is more than 20 characters.
- The privilege level that you have specified is not within the range, 1-10.

Command Syntax

```
npu(config)# enable password  [Level <1-10>] <password>
```

Privilege Level

10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`[Level <1-10>]`	Indicates the privilege level for which a password is to be enabled.	Optional	10	1-10
`<password>`	Denotes the password to be assigned for the current privilege level.	Mandatory	N/A	String (up to 20 characters and case-sensitive)

Command Modes

Global configuration mode

3.1.6.2.2 Deleting a Password for a Privilege Level

IMPORTANT

Only users who have logged in as admin can execute this command.

To delete a password for a privilege level, run the following command:

`npu(config)# no enable password` `[Level <1-10>]`

IMPORTANT

An error may occur if:

- The privilege level that you have specified is not within the range, 1-10.
- You are trying to delete a password for a privilege level that is higher than your default privilege level.

Command Syntax

```
npu(config)# no enable password [Level <1-10>]
```

Privilege Level

10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`[Level <1-10>]`	Indicates the privilege level for which a password is to be disabled.	Optional	10	1-10

Command Syntax

Global configuration mode

3.1.6.3 Enabling/Disabling Higher Privilege Levels

You can execute commands that require higher privilege levels. If the admin user has configured a password for that level, you can use that password to enable higher privilege levels.

For example, if your privilege level is 1, you can provide the password configured for privilege level 10 to execute all commands that require privilege level 10.

This section describes the commands for:

- "Enabling a Higher Privilege Level" on page 89
- "Returning to the Default Privilege Level" on page 90

3.1.6.3.1 Enabling a Higher Privilege Level

To enable a higher privilege level:

1 Log in to the CLI.

2 Run the following command to specify the privilege level and password:

```
npu(config)# enable [Level <1-10>]
```

3 At the password prompt, specify the password configured for the privilege level that you have specified.

If you specify the correct password, you are logged in to the CLI with the privilege level that you had specified. You can now execute all commands that require the current privilege level.

NOTE

You can display your current privilege level, using the following command:
npu# show privilege

You can, at any time, return to your default privilege level. For details, refer Section 3.1.6.3.2.

NOTE

An error may occur if:

- You have specified an incorrect password. Remember that all passwords are case-sensitive.
- No password is not configured for the privilege level you are trying to access.

Command Syntax	npu(config)# enable [Level <1-10>]
Privilege Level	10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
[Level <1-10>]	Indicates the privilege level you want to enable.	Mandatory	N/A	1-10

Command Modes

Global configuration mode

3.1.6.3.2 Returning to the Default Privilege Level

Run the following command to disable the current privilege level, and return to your default privilege level:

```
npu(config)# disable [Level <1-10>]
```

After you run this command, you automatically return to your default privilege level. You can display your current privilege level, using the following command:

```
npu# show privilege
```

Command Syntax

npu(config)# disable [Level <1-10>]

Privilege Level

1

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
[Level <1-10>]	Indicates the privilege level you want to disable.	Mandatory	N/A	1-10

Command Modes

Global command mode

3.1.6.4 Displaying Active Users

To display all active users, run the following command:

```
npu# show users
```

Command Syntax	npu# show users
Privilege Level	1
Display Format	Line User Peer Address 0 con <user name> <value>
Command Syntax	Global command mode

3.1.6.5 Displaying All Users

To display all users, run the following command:

npu# listuser

Command Syntax	npu# listuser
Privilege Level	1
Display Format	User Mode User 1 <value> User 2 <value> User 3 <value>
Command Syntax	Global command mode

3.1.6.6 Displaying the Privilege Level

To display your current privilege level, run the following command:

npu# show privilege

Command Syntax	npu# show privilege
Privilege Level	1
Display Format	Current privilege level is <value>
Command Syntax	Global command mode

3.1.7 Managing Secure Shell (SSH) Parameters

The SSH parameters define the parameters used for establishing remote secure access to the device using SSH protocol rather than the plaintext-based insecure Telnet protocol.

This section includes:

3.1.7.1 Configuring SSH Parameters

To configure SSH parameters, run the following command:

```
npu(config)# ip ssh {version compatibility | cipher ([des-cbc]
[3des-cbc]) |  auth ([hmac-md5] [hmac-sha1]) }
```

Command Syntax	`npu(config)# ip ssh {version compatibility | cipher ([des-cbc] [3des-cbc]) |  auth ([hmac-md5] [hmac-sha1]) }`
Privilege Level	10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`version compatibility`	The SSH version that can be used: The default is SSH version 2. The command **npu(config)# ip ssh version compatibility** enables compatibility with both SSH version 1 and SSH version 2.	Optional	SSH2	version compatibility
`cipher ([des-cbc] [3des-cbc])`	The encryption algorithm used by the SSH protocol: DES-CCBC or 3DES-CBC.	Optional	des-cbc	■ des-cbc ■ 3des-cbc
auth ([hmac-md5] [hmac-sha1])	The authentication mechanism used by the SSH protocol: HMAC-MD5 or HMAC-SHA1.	OPtional	hmac-sha1	■ hmac-md5 ■ hmac-sha1

Command Modes: Global configuration mode

3.1.7.2 Restoring the Default Values of SSH Parameters

To restore the default value of one or more SSH parameters, run the following command:

`npu(config)# no ip ssh {version compatibility | cipher ([des-cbc] [3des-cbc]) | auth ([hmac-md5] [hmac-sha1]) }.`

To restore the default values of all SSH parameters run the following command:

`npu(config)# no ip ssh`

Command Syntax:

```
npu(config)# no ip ssh {version compatibility | cipher ([des-cbc]
[3des-cbc]) |  auth ([hmac-md5] [hmac-sha1]) }
```

Privilege Level: 10

Command Modes: Global configuration mode

3.1.7.3 Displaying the SSH Parameters

To display the current configuration of the SSH parameters, run the following command:

npu# show ip ssh

Command Syntax	npu# show ip ssh
Privilege Level	1
Display Format	Version : <value> Cipher Algorithm : <value> Authentication : <value>
Command Modes	Global command mode

3.1.8 Managing the Session

This section includes:

3.1.8.1 Locking the Session

To lock the session, run the following command:

npu# lock

This will prevent unauthorized persons from using the CLI without terminationg the session. The following message will be displayed:

CLI console locked

Enter Password to unlock the console:

```
To resume the session, you must enter the password used for
initiating it.
```

Command Syntax	`npu# lock`
Privilege Level	10
Command Modes	Global command mode

3.1.8.2 Managing the Session Timeout

The session timeout parameter defines the maximum allowed inactivity time after which the session will be terminated automatically. The default timeout is 1800 seconds. You can define a different value for the current Telnet/SSH session. You can also change the timeout value for the MON port sessions, that will apply also to future sessions via the MON port.

This section includes:

3.1.8.2.1 Enabling the Line Configuration Mode

To enable the line configuration mode, run the following command:

```
npu(config)# line {console | vty}
```

IMPORTANT

An error will occur if you select console when using Telnet/SSH or vice versa. In this case the following error message will be displayed:

Cannot configure for other terminals

After enabling the line configuration mode you can execute any of the following tasks:

- "Configuring the Session Timeout" on page 96
- "Restoring the Default Value of the Session Timeout" on page 97

Command Syntax	`npu(config)# line {console | vty}`
Privilege Level	10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`console | vty`	The terminal running the session to be managed: Select console if you are connected via the MON port. Select vty if you are connected via Telnet/SSH.	Mandatory	N/A	■ console ■ vty

Command Modes	Global configuration mode

3.1.8.2.2 Configuring the Session Timeout

To configure the session timeout, run the following command:

`npu(config-line)# exec-timeout <integer (1-18000)>`

IMPORTANT

For Telnet/SSH sessions, the modified timeout is applicable only for the current session. Whenever you start a new session the default timeout (1800 seconds) will apply.

Command Syntax	`npu(config-line)# exec-timeout <integer (1-18000)>`
Privilege Level	10

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`<integer (1-18000)>`	The session timeout, in seconds.	Mandatory	N/A	1-18000 (seconds)

Command Modes

Line configuration mode

3.1.8.2.3 Restoring the Default Value of the Session Timeout

To restore the default value of 1800 seconds for the current session timeout, run the following command:

`npu(config-line)# no exec-timeout`

Command Syntax

```
npu(config-line)# no exec-timeout
```

Privilege Level

10

Command Modes

Line configuration mode

3.1.8.2.4 Displaying a Session Timeout

To display the current configuration of a session timeout, run the following command:

`npu# show line {console | vty <line>}`

Command Syntax

```
npu# show line {console | vty <line>}
```

Privilege Level

1

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
`console | vty <line>`	The session for which the timeout should be displayed: console: a session via the MON port (even if there is currently no active session via the MON port). vty #: An active Telnet/SSH session number #. To view currently active sessions refer to Section 3.1.6.4.	Mandatory	N/A	■ console ■ vty #, where # is the number of a currently active Telnet/SSH session.

Display Format

Current Session Timeout (in secs) = <value>

Command Modes

Global command mode

3.2 Managing Software Upgrade

This section includes:

3.2.1 Before You Start

To load new NPU/AU software files to the unit's flash memory, you are required to execute a simple loading procedure using a TFTP application.

Before performing the upgrade procedure, ensure that you have the most recent instructions, and that the correct software files are available on your computer.

The NPU flash stores two NPU software files (Operational and Shadow) and three AU software files. When you download a new NPU software file to the NPU flash, the shadow file is overwritten with the newly downloaded file. When loading a new AU software file, the oldest file among the AU software files that are not mapped to any AU slot is overwritten. If all AU software files in the NPU flash are mapped to AU slots - a new AU SW file cannot be loaded.

NOTE

To view the current NPU software files, refer to "Displaying the Operational, Shadow, and Running Versions" on page 103.

To view the current AU software files, refer to "Displaying Images Residing in the Flash" on page 118. To view which files are mapped to AU slot(s), refer to "Displaying the AU-to-Image Mapping" on page 115.

3.2.2 Upgrading the NPU

To upgrade the NPU, first configure the TFTP server that you want to use for the software version download, and then download the image to the NPU flash. You can then reboot the NPU with the downloaded image. After you have tested and verified that the NPU is functioning properly with the shadow image, you can make the shadow image as the operational image.

NOTE

The operational image is the default image used for rebooting the NPU after system reset. The shadow image is the downloaded image that you can use to boot up the NPU. However, the next time the system is reset, it is the operational image that is used to boot up the NPU.

3.2.2.1 Executing the Upgrade Procedure

To execute the upgrade procedure:

- "Step 1: Configuring the TFTP Server"
- "Step 2: Triggering Software Download"
- "Step 3: Resetting and Booting the NPU Using the Shadow Image"
- "Step 4: Making the Shadow Version Operational"

3.2.2.1.1 Step 1: Configuring the TFTP Server

To initiate the NPU software upgrade procedure, start with configuring the TFTP server to be used for the software version download.

To configure the TFTP server, run the following command:

```
npu(config)# software version server <server ip>
```

IMPORTANT

An error may occur if you execute this command when another software download is already in progress.

Command Syntax

```
npu(config)# software version server <server ip>
```

Syntax Description

Parameter	Description	Presence	Default Value	Possible Values
<server ip>	Denotes the IP address of the TFTP server to be used for the software version download.	Mandatory	N/A	Valid IP address