interWAVE

Wave2000 BSS Man Machine Interface (MMI) Manual

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TABLE OF CONTENTS

1 Introduction

The Man Machine Interface (MMI) allows an operator to configure the WAVE2000 BSS using a set of MMI commands. The MMI can be used in two ways: a.) through the WAVE2000 serial interface b.) through telnet to the BSS.

This document describes the pre-requisites, setup, invocation and command syntax of the MMI interface. Thereafter, it describes step-by-step instructions to bring up a WAVE2000 BSS thru the MMI interface.

Note: MMI obsoletes the *showConfig* mechanism of configuration.

2 Pre-requisites

If connecting to the BSS using the serial interface you need a PC with serial cable connected to the BSS.
If connecting using the telnet interface you need a computer equipped with a telnet client attached to the RAN (BSS) network.

3 Invocation

3.1 Using Serial Interface to access the MMI

Steps:
1. Make sure the serial line is connected properly at each end (SCON card and the PC serial port).
2. Launch a serial communication utility (such as TeraTerm) on your PC. Select the right COM port to connect.
3. You should see the SCON shell prompt.
4. Run the MMI by typing "mmi" and ENTER, the MMI prompt will appear
   -> mmi
   mmi>

3.2 Using Telnet to access the MMI

Any computer attached to the RAN network equipped with a telnet client can be used to connect to the BSS and run the MMI.
Steps:
1. run the telnet client. On a PC
2. click "Start" then "Run"
3. Type telnet in the run window and click on "OK"
4. Open a telnet session with the BSS
5. In the Telnet window click "Connect" then "Remote System"
6. Enter the IP address of the BSS
7. The BSS vxWorks prompt will be displayed
   ->

8. run the MMI by typing "mmi" and ENTER, the MMI prompt will appear
   -> mmi
   mmi>

9. To see the list of possible MMI commands enter "help" or "?"
   mmi> help

   show <table.?inst?>
   set <table.?inst?> ?col1=value1? ?col2=value2?...
   create <table.inst>
   delete <table.inst>

   where <table.inst> specifies row instance in a table.
   For non-indexed tables the instance need NOT be specified.
   Indexed tables are marked with a *.

   For example:
   show system, show btsConfig.1, show chcRf.1.1
   set system sysName=system1
   create nbrRel.1.2
   delete nbrRel.1.2
   help or ?
   quit

   mmi>

You may now manage the BSS thru MMI.

4   MMI Syntax and Commands

The MMI commands allow creation, modification and deletion of configuration objects. The configuration objects are used by the different BSS sub-system tasks to determine the overall behavior of the system. Some configuration objects classes are singleton (only one instance per class e.g. BSC or AIF) and others can have multiple instances (e.g. btsConfig). Configuration objects have attributes that represent configuration information. Each object also has an instance attribute that uniquely identifies it among other instances of the same configuration object class.

For simplicity the MMI models the configuration objects as tables and rows. Each *table* corresponds to a configuration object *class*, and each *row* within the table corresponds to an object *instance*. The object instance value is available in index column (usually the first column) of the table corresponding to the object.
On MMI a configuration object is uniquely identified by specifying the name of the table suffixed by the instance number, e.g. btsConfig.1, nbrRel.1.1. Most MMI commands take this as the first argument. For simplicity, one does not need to specify the instance part for singleton tables. The syntax of all commands is described in the following table.

Following applies to all MMI Commands:
- All commands are case-insensitive
- <table.instance> specifies a row instance in a table. For non-indexed tables the instance need not be specified. Some tables require either 1 or 2 instances

There are seven mmi commands as shows in the table below.

Command:	Description
? or help	Help, shows this list of commands
show <table.?instance?>	Displays the current values of the parameters in a row instance of a table. *If invoked without any arguments it displays the list of ALL tables.*
set <table.?instance?> ?col1=value1? ?col2=value2? …	Modifies 1 or more columns in a row instance of a table.
create <table.instance>	Creates a row in a table
delete <table.instance>	Deletes a row in a table
quit	Exit the mmi

For example:
   show system,
   show btsConfig.1,
   show chcRf.1.1
   set system sysName=system1
   create nbrRel.1.2
   delete nbrRel.1.2
   help
   quit

To print the list of ALL tables invoke "show" without any arguments:
mmi> show

system	**hwView**	**chassis***	**slot***
sysConCard*	**chc***	**rfCard***	**timingCard***
gpsCard*	**bscSysParams**	**pcfConfig**	**abisLink***
aif	**ss7lite**	**bsc**	**btsConfig***
chcRF*	**accParams***	**nbrRel***	**btsMeas***
alarm*	**bscMeasure**	**bscCallMeas***	**bscHOMeas***

NOTE: Indexed tables are marked with a "*".

5 Provisioning the WAVE2000 BSS Plus

The WAVE2000 creates a default configuration when it is powered up the first time. Most configuration tables are already populated with default values that can be used as it is and therefore only specific attributes need to modified (or new objects created) to complete the system configuration. This makes configuring the system easy as well reduces the time taken to commission the system.

A number of objects also have the Administrative State (*adminState*) and Operational State (*operState*) attributes. The *adminState* is operator specified and can have values: Unlocked, Locked. Locking an object (the resource that it represents) removes it from being used by the system. **It is required that before changing any attributes within an object its administrative state be modified to Locked. After the attributes have been modified, the administrative state should be set to Unlocked to bring the resource associated with the object back into use.**

5.1.1 Provisioning BSS Parameters

The following sections outline the step by step MMI commands needed to provision a WAVE2000 BSS Plus. A complete list of configurable tables and parameters is available in Appendix 1.

5.1.1.1   Configuring System Attributes

The system table should be set to reflect the name of the system, its location and the party responsible for maintenance.

Table	Instance	Parameter	Value	Description
System	N/A	sysContact	String	System Contact Information
		sysName	String	System Name
		sysLocation	String	System Location

Example:
set system sysContact=John_Doe sysName=BSS#105 sysLocation=San_Jose_CA

5.1.1.2   Configuring the AIF

Table	Instance	Parameter	Value	Description
aif	N/A	adminState	Locked/ Unlocked	Administrative State. e.g. **set aif adminState=locked**
		linkType	SS7Lite	Setting this attribute to Reboot reboots this BSC. e.g. **set aif linkType=SS7Lite**
		mscIPAddress	IP address	MSC IP Address
		selfPC	integer	BSC Point Code
		mscPC	integer	MSC Point Code

5.1.1.3 Configuring BSC Attributes

Table	Instance	Parameter	Value	Description
bsc	N/A	adminState	Locked/ Unlocked	Administrative State. e.g. **set bsc adminState=locked**
		Reboot	DoNothing/ Reboot	Setting this attribute to Reboot reboots this BSC. e.g. **set bsc reboot=reboot**

It is important to properly set the network parameters, systemID, networkID, bscMCC and bscMNC. These identify the network to the mobile handset.

Table	Inst	Parameter	Value	Description
bscSysParams	N/A	systemID	0 – 65535	System ID, a 15 bit unique number assigned to each wireless system coverage area.
		networkID	0 – 65535	Network ID, a number that uniquely identifies a network within a cellular or PCS system.
		bscMCC		Mobile Country Code as defined in ITU Rec. E212 Annex A
		bscMNC		Mobile Network Code
		snmpMgrIPAddr		Address that SNMP traps will be sent to
		snmpTrapPort	162	Port number that SNMP traps will be sent to
		snmpRequestPort	161	Address where responses to SNMP gets and sets will be sent
		localTimeOffset		Time Zone
		telsecPresent		Telsec Alarm Unit Present = 1 Telsec Alarm Unit Not Present = 0
		Ssn	252	the IOS Open A-Interface ssn value
		typeOfNwkIf	0-1	0 = No MSC, 1 = Telos
		DayLT	0-1	0 = Standard Time 1 = Day Light Savings Time

Example:
set bscSysParams bscMCC=4

5.1.2 Provisioning the BTS Parameters

BTS parameters include identifying the BTS to the BSC, configuring the air interface, and identifying the neighboring cells. The configuration objects corresponding to these systems are btsConfig, abisLink, chcRF and nbrRel.

NOTE: BTS configuration is Administrative State controlled. You must always lock the btsConfig object before making any changes to any of the tables specified above and subsequently unlock it.

5.1.2.1 Instance numbering for BTS objects

The BTS configuration objects comprise of the btsConfig, abisLink, chcRF, nbrRel and btsMeas tables. All these tables are indexed by the BTS number. For example:

Table.instance	Description
btsConfig.1	1st BTS
abisLink.1	Abis link for 1st BTS
nbrRel.1.1	1st Neighbor relationship for 1st BTS. NOTE: nbrRel table is a doubly indexed. The first index specifies the BTS id, and the second index specifies the neighbor relationship number within this BTS.
nbrRel.2.3	The 3rd nbr relationship for 2nd BTS.

5.1.2.2 Provisioning the BTS

When configuring the BTS transmit power it is important that the subsystem RF gain be taken into consideration. Follow the values in the table below for setting both the btsRFSubSystemGain in the btsConfig table and the txPower in the chcRF table

BSS Plus	btsConfig btsRFSubSystemGain	chcRF txPower
Indoor Pico	15	26 to 36.5
Outdoor Pico	19	4 to 15
Micro	41	0 to 10.5

The BtsConfig Table Identifies the BTS to the BSC and identifies the amount of gain to be expected from the attached RF subsystem.

Table	Instance	Parameter	Value	Description
btsConfig	1 – 3	btsConfigIndex		
		btsCellId		Uniquely Identifies this cell
		btsRfSubSystem Gain		See Table Above

Example:
Micro BSS Plus
      set btsConfig.1 btsCellId=3 btsRfSubSystemGain=41
Indoor Pico BSS Plus
      set btsConfig.1 btsCellId=3 btsRfSubSystemGain=15

5.1.2.3 Provisioning the Air Interface

Table	Instance	Parameter	Value	Description
chcRF	BTS#.CHC#	chcrfBtsConfigIndex		
		chcrfIndex		
		operFreq		Operating Frequency
		pnOffset	0 - 512	PN Offset
		txPower		See Table Above

5.1.2.4 Provisioning Neighbor Relationships

Table	Instance	Parameter	Value	Description
nbrRel	BTS#.Nbr#	nbrEntrySelfBtsIndex		
		nbrRelIndex		
		nbrCellId		Neighbor Cell Id (From BTS Table)
		nbrFreq		Neighbor Operating Frequency (From ChcRF Table)
		nbrPnOffset		Neighbor PN Offset (From ChcRF Table)
		nbrBTSIPAddress		Neighbor IP Address (From boot parameters)

For example:
To create a new neighbor relationship (number 1) for BTS 2 use:
mmi> create nbrRel.2.1

To delete a neighbor relationship use:
mmi> delete nbrRel.2.1

5.1.3 Provisioning the PDSN Interface

Table	Instance	Parameter	Value	Description
pcfConfig	N/A	pdsnIpAddr	IP Address	The IP Address of the PDSN is entered here.

Appendix 1 – List of MMI tables and attributes

Table	Parameter	Access	Valid Values	Description
abisLink*				ABIS Interface
	abisIndex	R		
	abisAdminState	R/W	1= 2=	Administrative State
	abisOperState	R	1= 2=	Operator State
	btsIPAddress	R/W	Any Valid IP address	The IP address of the CHC which represents this BTS
accParams*				Access Parameters for a logical BTS
	accBtsConfigIndex	R		Row of the table relating to a logical BTS
	accProbeRandom	R/W	0-15	Access Probe Random
	accMaxReq	R/W	0-15	Access Max request
	accMaxRsp	R/W	0-15	Access Max repeat
	accPowerStep	R/W	0-7	Access Power Step
	accNumberStep	R/W	0-15	Access Number of step
	accCapsuleSize	R/W	0-7	Access Capsule size
	accPreambleSize	R/W	0-15	Access Preamble size
	accTimeOut	R/W	0-15	Accsss Time Out value
	accBackOffSeq	R/W	0-15	Access Back Off Seq
	AccBackOffRange	R/W	0-15	Access Back Off Range
	accPersis	R/W		Access Persistence
aif				A-IF
	linkType	R/W	1	Link type
	mscIPAddress	R/W	Any valid IP Address	Address of the controlling MSC
	selfPC	R/W	N/A	SS7 point code of the BSS
	mscPC	R/W	N/A	SS7 point code of the MSC
	aifAdminState	R/W	N/A	Administrator State
	aifOperState	R/W	N/A	Operator State
	BSMC	R/W	N/A	
	MarketID	R/W	N/A	
	SOC	R/W	N/A	
	StackType	R/W	N/A	System Stack Type
	netInd	R/W	N/A	
alarm*				Alarms
	alarmSequenceNumber	R	N/A	
	alarmManagedObjClass	R	N/A	
	alarmManagedObjInst	R	N/A	
	alarmSeverity	R	N/A	
	alarmProbableCause	R	N/A	
	alarmSpecificProblem	R	N/A	
	alarmEventTime	R	N/A	
	alarmEventType	R	N/A	
	alarmNotificationID	R	N/A	
	alarmCorrNotificationID	R	N/A	

bsc				BSC
	protocolRevision	R/W	6	L3 Protocol revision
	minProtocolRevision	R/W	1	L3 min protocol revision
	softwareVerison	R	N/A	Software version
	adminState	R/W	N/A	Administaion state
	operState	R	N/A	Operation state
bscCallMeas*				BSC Call Measurement
	bscCallMeasIndex	R	0 - 12	
	origCallAttempts	R	N/A	
	termCallAttempts	R	N/A	
	origCallSuccesses	R	N/A	
	termCallSuccesses	R	N/A	
	origCallFailures	R	N/A	
	termCallFailures	R	N/A	
	avgOrigCallTraffic	R	N/A	
	avgTermCallTraffic	R	N/A	
	callFailuresInBts	R	N/A	
	tchSeizureAttempts	R	N/A	
	tchSeizureSuccesses	R	N/A	
	tchSeizureFailures	R	N/A	
	pagingMsgTransmissionAttempts	R	N/A	
	pagingMsgTransmissionSuccesses	R	N/A	
	pagingMsgTransmissionFailures	R	N/A	
	bscCallMeasTimeStamp	R	N/A	
bscHOMeas*			0 - 12	BSC Handover Measurement
	bscHOMeasTimeStamp	R	N/A	
	bscHOMeasIndex	R	N/A	
	intraBSCsoftHOAttempts	R	N/A	
	intraBSCsoftHOSuccesses	R	N/A	
	intraBSCsoftHOFailures	R	N/A	
	interBSCsoftHOAsTargetAttempts	R	N/A	
	interBSCsoftHOAsTargetSuccesses	R	N/A	
	interBSCsoftHOAsTargetFailures	R	N/A	
	interBSCsoftHOAsAnchorAttempts	R	N/A	
	interBSCsoftHOAsAnchorSuccesses	R	N/A	
	interBSCsoftHOAsAnchorFailures	R	N/A	
	interBSChardHOAsTargetAttempts	R	N/A	
	interBSChardHOAsTargetSuccesses	R	N/A	
	interBSChardHOAsTargetFailures	R	N/A	

	interBSChardHOAsAnchorAttempts	R	N/A	
	interBSChardHOAsAnchorSuccesses	R	N/A	
	interBSChardHOAsAnchorFailures	R	N/A	
bscMeasure				
	bscMeasStartTime	R	N/A	
	bscMeasCntrl	R	N/A	
bscSysParams				BSC System parameter
	systemID	R/W	N/A	System ID
	NetworkID	R/W	N/A	Network ID
	mscID	R/W	N/A	MSC ID
	bscID	R/W	1	BSC ID
	bscMCC	R/W	1023	BSC MCC
	bscMNC	R/W		BSC MNC
	snmpMgrIPAddr	R/W	Valid IP	SNMP Manager IP Address
	snmpTrapPort	R/W	162	SNMP Trap Port Number
	snmpRequestPort	R/W	161	SNMP Request Port Number
	l3RegTimerValue	R/W	N/A	L3 Registation Timer
	localTimeOffset	R/W	N/A	Local Time Offset from GPS
	alarmDelay	R/W	4 - 20	Alarm Delay Value
	disableCheck	R/W	0 - 1	Disable check flag
	keepAliveTx	R/W	1 - 1000	Keep alive transmit timer
	keepAliveRx	R/W	1 - 1000	Keep alive Receive timer
	telsecPresent	R/W	0 - 1	Telsec Alarm system present
	mscPort	R/W	5000	MSC Port number
	maxTIARTimeOut	R/W		
	timingCardDelay	R/W	N/A	Timing Card Delay
	ssn	R/W	252	SSN
	mscPresent	R/W	0 - 1	MSC Present
	typeofNwIf	R/W		Network Interface Type
	LP_SEC	R/W	13	
	DayLT	R/W	0 - 1	
	Pilot_INC	R/W	0 – 1	
	SDU delay	R/W	1 - 5	SDU delay time value
	DisableHO	R/W	0 – 1	Disable Handoff flag
btsConfig*	btsConfigIndex	R	1 – MAX BTSs	
	btsAdminState	R/W	N/A	BTS administration state
	btsOperState	R	N/A	BTS operation state
	btsSoftwareVersion	R	N/A	Software version
	btsCellId	R/W	N/A	BTS Cell ID
	btsLAC	R	N/A	LAC
	btsRfSubSystemGain	R/W	0 – 50	RF Subsysterm Gain
	btsForSID	R/W		SID
	btsForNID	R/W		NID
	btsHomeReg	R/W	1	Home registration
	btsRegZone	R/W		Registration zone
	btsZoneTimer	R/W		Zone timer
	btsParamReg	R/W		

	btsMaxSlotCycle	R/W		Max Slot Cycle index
	btsLatitude	R/W		
	btsLongitude	R/W		
	btsTADD	R/W	0 – 63	Add Time
	btsTDROP	R/W	0 – 63	Drop time
	btsTCOMP	R/W	0 – 15	
	btsTDROPTimer	R/W	0 – 15	
	btsWinA	R/W	0 – 15	Win A
	btsWinN	R/W	0 – 15	Win N
	btsWinR	R/W	0 – 15	Win R
	btsMaxNbrAge	R/W	0 – 15	BTS MAX Neighbour AGE
	btsPowerRptThresh	R/W	0 – 15	Power report thresh
	btsPowerRptDelay	R/W	0 – 15	Power report delay time
	btsPowerRptFrames	R/W	0 – 15	Power report frames
	btsPowerUpReg	R/W	0 – 15	Power up registartion
	btsPowerDownReg	R/W	0 – 31	Power down registration
	btsPowerStep	R/W	0 – 31	Power step
	btsNumberStep	R/W	0 – 15	
	maxAltServiceOpt	R/W	N/A	
	packetZoneID	R/W	N/A	
	softSlope	R/W	N/A	
	addIntercept	R/W	N/A	
	dropIntercept	R/W	N/A	
	auth	R/W	N/A	
	broadcastIndex	R/W	N/A	
	PRAT	R/W	N/A	
	sector	R/W	N/A	
	random	R/W	N/A	
	pcsMode	R/W	0 – 1	1 = PCS mode
	newRFM	R/W	0 – 1	1 = new RF Module
	accSrchWindow	R/W	1 – 32	Access search window size
	rvsSrchWindow	R/W	1 – 32	Reverse traffic window size
	rc3MaxPwr	R/W	131 - 211	RC3 max forward power
	rc2MaxPwr	R/W	167 –223	RC2 max forward power
	rc1MaxPwr	R/W	191 – 215	RC1 max forward power
	SchMaxPwr	R/W	131 – 232	SCH max forward power
	EnSrch	R/W	0 – 1	Enable Search
	PilotGain	R/W	227	Pilot gain
	SyncGain	R/W	202	Sync gain
	PageGain	R/W	266	Page gain
	SectorGAin	R/W	0 – 4095	Sector gain
	NumofRevsch	R/W	0 – 31	Number of revese
	EnableCAC	R/W	0 – 1	Enable Call admission control
	BestEffort	R/W	0 – 1	Best Effort enable flag
	Users_16x	R/W	0 – 4	Number of 16x user
	Users_8x	R/W	0 – 4	Number of 8x user
	MaxDemod	R/W	0 – 31	Each Chc Max. Demod channel element
	MaxMod	R/W	0 – 60	Each Chc Max. Moduation channel element
BtsMeas**				
	btsMeasbtsConfigIndex	R	1 – MAX BTSs	
	btsMeasIndex	R	1 -12	
	btsMeasTimeStamp	R	N/A	

	btsTchSeizureAttempts	R	N/A	
	btsTchSeizureSuccesses	R	N/A	
	btsTchSeizureFailures	R	N/A	
	btsCallFailuresInBts	R	N/A	
chassis*			1 – MAX BTSs	
	chIndex	R	N/A	
	chassisType	R	N/A	
	chassisVer	R	N/A	
	chassisRev	R	N/A	
chc*			1 – MAX CHCs	
	chcIndex	R	N/A	
	chcSerialNo	R	N/A	
	chcRevNo	R	N/A	
	chcAdminState	R	N/A	
	chcOperState	R	N/A	
	chcSlotOid	R	N/A	
chcRF**				
	chcrfBtsConfigIndex	R	1 – MAX BTSs	
	chcrfIndex	R	1-MAX CHCs	
	chcrfAdminState	R/W	N/A	
	chcrfOperState	R	N/A	
	operFreq	R/W	Valid frequency	RF Card operating frequency
	pnOffset	R/W	0 - 511	PN offset
	txPower	R/W		Transmit Power
gpsCard*				
	gpsCardIndex	R	N/A	GPS card index number
	gpsCardSerialNo	R	N/A	GPS card serial number
	gpsCardRevNo	R	N/A	GPS card revision number
	gpsCardAdminState	R/W	N/A	GPS card administartion state
	gpsCardOperState	R	N/A	GPS card operation state
	gpsCardIpAddress	R	N/A	GPS card IP address
	gpsCardSlotOid	R	N/A	GPS card Slot OID
hwView				
	productID	R	N/A	Product ID
NbrRel**				
	nbrEntrySelfBtsIndex	R	1 – MAX BTSs	
	nbrRelIndex	R	1 – MAX NBRs	
	nbrRowStatus	R	N/A	
	nbrMCC	R/W		Neighbour System MCC
	nbrMNC	R/W		Neighbour System MNC
	nbrLAC	R/W		Neighbour System LAC
	nbrCellId	R/W	N/A	Neighbour System Cell ID
	nbrFreq	R/W		Neighbour System Operating Frequency

	nbrPnOffset	R/W	N/A	Neighbour System PN Offset
	nbrBTSIPAddress	R/W	Valid IP	Neighbour System BTS IP Address
	mscId	R/W	N/A	MSC ID
	typeofHO	R/W	0 - 1	0 = soft HO, 1 = hard HO
pcfConfig				
	pdsnIpAddr	R/W	Valid IP	PDSN IP Address
	pcfAdminState	R/W	N/A	PDSN Administration State
	pcfOperSate	R	N/A	PDSN Operation State
rfCard*				
	rfCardIndex	R	1 – MAX RFs	Radio Card Index Number
	rfCardSerialNo	R	N/A	Radio Card Serial Number
	rfCardRevNo	R	N/A	Radio Card Revision Number
	rfCardAdminState	R/W	N/A	Radio Card Administration State
	rfCardOperState	R	N/A	Radio Card Operation State
	rfCardBand	R	N/A	Radio Frequency Band
	rfCardSlotOid	R	N/A	Radio Card Slot OID
slot*				
	chassisIndex	R	1 – MAX Slots	Chassis Index Number
	slotIndex	R	N/A	Slot Index
	shelfNo	R	N/A	Shelf Number
	cardPresent	R	N/A	Card Present
	cardOid	R	N/A	Card OID
ss7lite				
sysConCard*				
	sysConIndex	R	N/A	Scon card index number
	sysConSerialNo	R	N/A	Scon card serial number
	sysConRevNo	R	N/A	Scon card revision number
	sysConAdminState	R/W	N/A	Scon card Administration state
	sysConOperState	R	N/A	Scon card Operation state
	sysConSlotOid	R	N/A	Scon card Slot OID
system				
	sysContact	R/W	N/A	System Contact information
	sysName	R/W	N/A	System Name
	sysLocation	R/W	N/A	System Location
TimingCard*				
	timingCardIndex	R	N/A	Timing card index number
	timingCardSerialNo	R	N/A	Timing card serial number
	timingCardRevNo	R	N/A	Timing card revision number
	timingCardAdminState	R/W	N/A	Timing card administration state
	timingCardOperState	R	N/A	Timing card operation state
	timingCardSlotOid	R	N/A	Timing card slot OID