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User Manual: McWiLL BS

（文档版本号：V1.00）

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北京信威通信技术股份有限公司

修订记录

日　期	修订版本	描　述	作　者

目　　录

User Manual: McWiLL BS

1 Declaration

Note: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE：This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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 his own expense.

2 Installation

2.1 Install Cabinets

2.1.1 Cabinet Structure

（1）   Cabinet Structure

The SCDMA wireless BTS is configured with standard 19' cabinets. Their outer dimensions are:

- ◆   Height × width × depth = 1550mm × 600mm × 722mm
- ◆   Height × width × depth = 2000mm × 600mm × 720mm

（2）   Figure 2-1 shows the appearance and accessory of the cabinet：
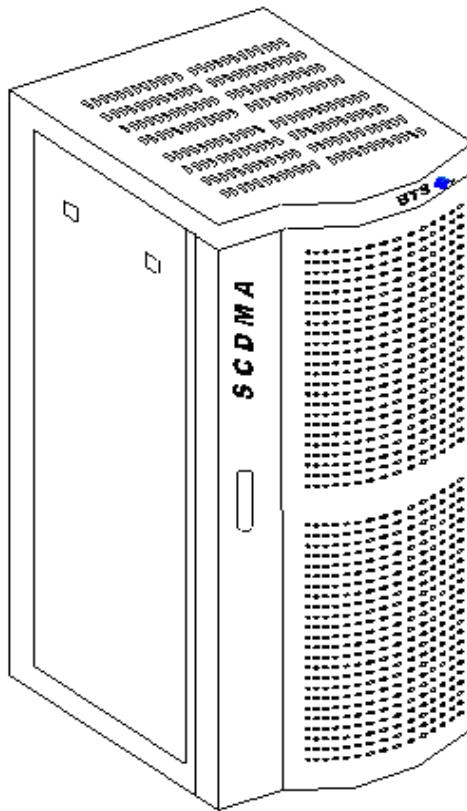
Figure 2-1   Cabinet structure

（3）   Figure 2-2 shows the installation accessory of the cabinet.
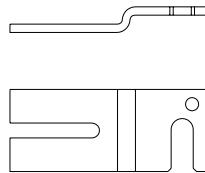
Figure 2-2   Accessory of the cabinet

2.1.2 Position and Install Cabinets

（1）   Layout of cabinet

It is recommended to position cabinet as shown in Figure 2-3 as per the following instructions:：

- ♦   The spacing between the rear side of the cabinets and the wall should be no less than 600mm;
- ♦   The spacing between the rear side of the cabinets and the wall should be no less than 600mm;
- ♦   In front of the cabinets, at least 600mm spacing should be spared out as walkway.；
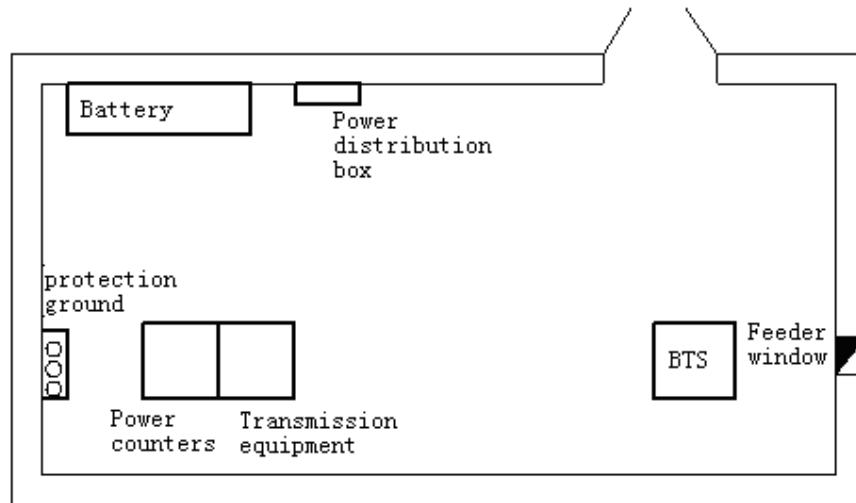
Figure 2-3   Cabinet layout

（2）   Place cabinets based on the engineering design requirements, accurately mark out the positions of the supports on the floor, install the accessories for cabinet installation, mark out the holes for accessories, as shown in Figure 2-4, drill vertical holes with the right punch drill and drill bit, and then install M12 expansion bolts.
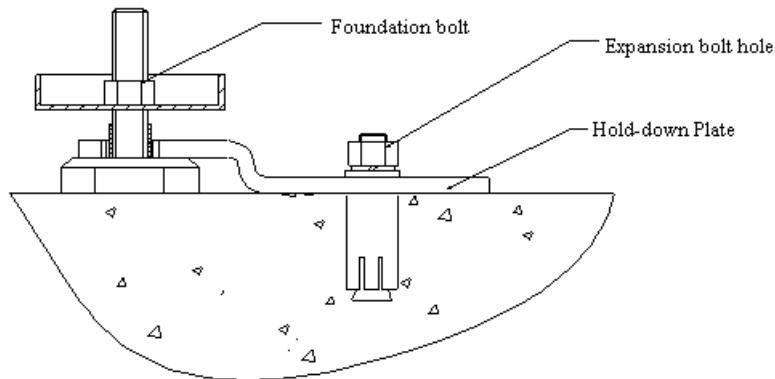
Figure 2-4   Installation of cabinet accessories

（3）   Do not tighten the expansion bolts so that the installation accessories can be moved. Install the cabinet in the preset position, and then rotate the accessories to move the U-shape opening on the corresponding round steel bar of the cabinet support, as show in Figure 2-5.
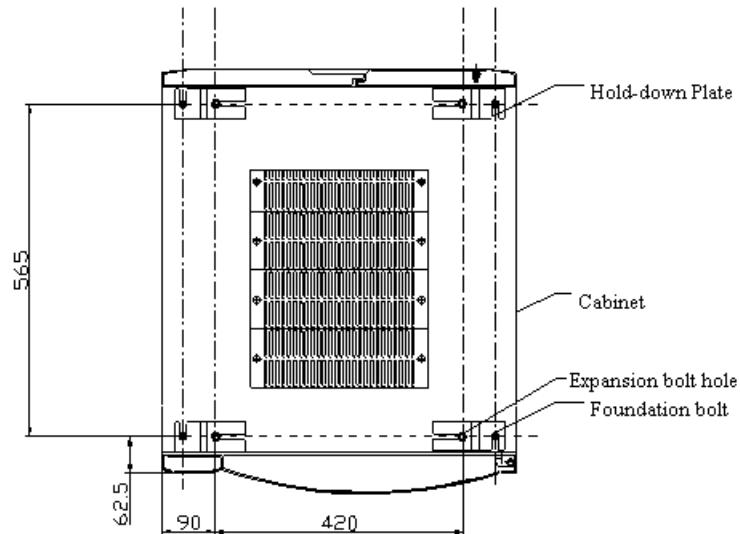
Figure 2-5   Bottom of the cabinet

（4）   Position the cabinet, adjust its levelness and then tighten the expansion bolts.

（5）   Check the insulation impedance with a meg-ohmmeter between the cabinet and the floor and make sure that the value is greater than 5MΩ.

2.2 Install BTS

（1）   The overall structure of the BTS is shown in Figure 2-6;
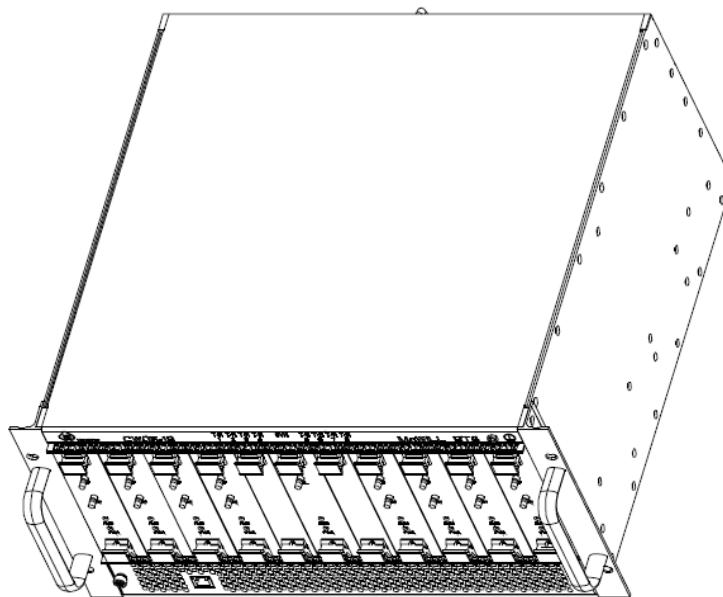
Figure 2-6   BTS structure

（2）   Open the cabinet door, adjust the partition positions, push the BTS into the sub-rack.

（3）   Record the model and Factory No. of the BTS and cable loss data.

（4）   Finally, make sure that any empty slot is filled in with a panel on the BTS.

2.3   Connect Ethernet Cable

2.3.1   Connect BTS and Ethernet Switch
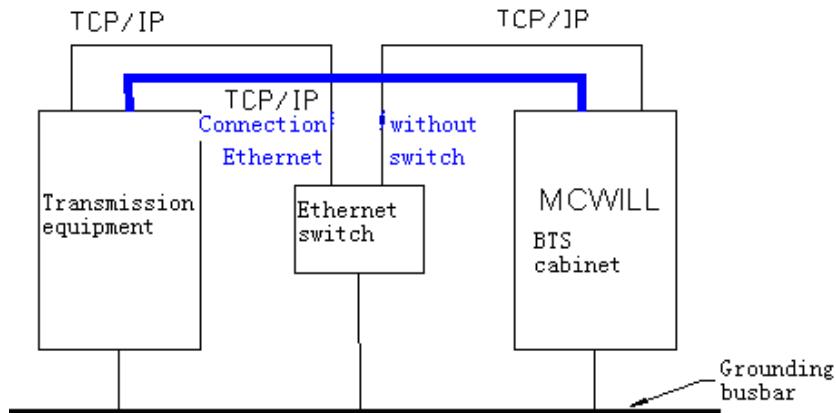
Figure 2-7   Ethernet cable connection for BTS and Ethernet switch

2.3.2   Connect Ethernet Cable

（1）   Fabricate the Ethernet cable connector as describe in Chapter 5.The connector to BTS is RJ45 and the other one must match the connector of the transmission equipment or the Ethernet switch, as shown in Figure 2-8.
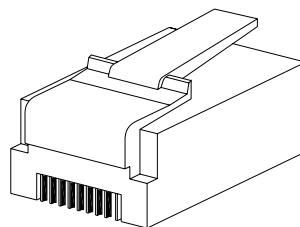
Figure 2-8 RJ45 connector

（2）   Connect one end of the Ethernet cable to MDM of BTS, and the other end to Ethernet switch or fiber Transceiver.

Ethernet cable port
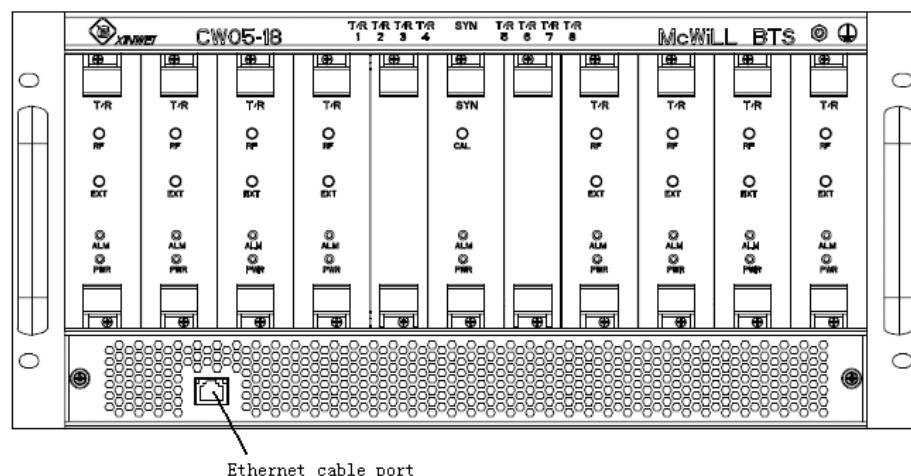
Figure 2-9 Ethernet cable port

2.4 Connect Power Cables

2.4.1 Notice

（1）   V5 base station uses DC+24V power supply. Use 'GuoYao' 220V to 24V AC/DC power supply device equipped by Xinwei to supply power, if the operator can not provide DC +24 V power supply equipment. Use 'GuoYao' -48V to 24V DC/DC equipment whose structure is the same with 'GuoYao' 220V to 24V AC/DC power supply device to supply power, if there is －48V power in the equipment room.

（2）   Power load box should be inserted in the cabinet, with bolts fastening.

Figure 2-10   Power Installation

（3）   Access 220V AC to the equipment's AC input, connect the equipment's DC output to cabinet's circuit breaker, and the grounding to the cabinet's pooling current bar.

Important: AC/DC equipment installation and use must strictly comply with the AC/DC equipment instruction requirements, and reliable grounding must be finished through grounding cable.

2.4.2 Connect Power Cables

（1）   Use flame retardant cable as base station power cable, press it out throughΦ6 copper lug, and screw down on the base station power wire posts, as shown in Figure 2-11.
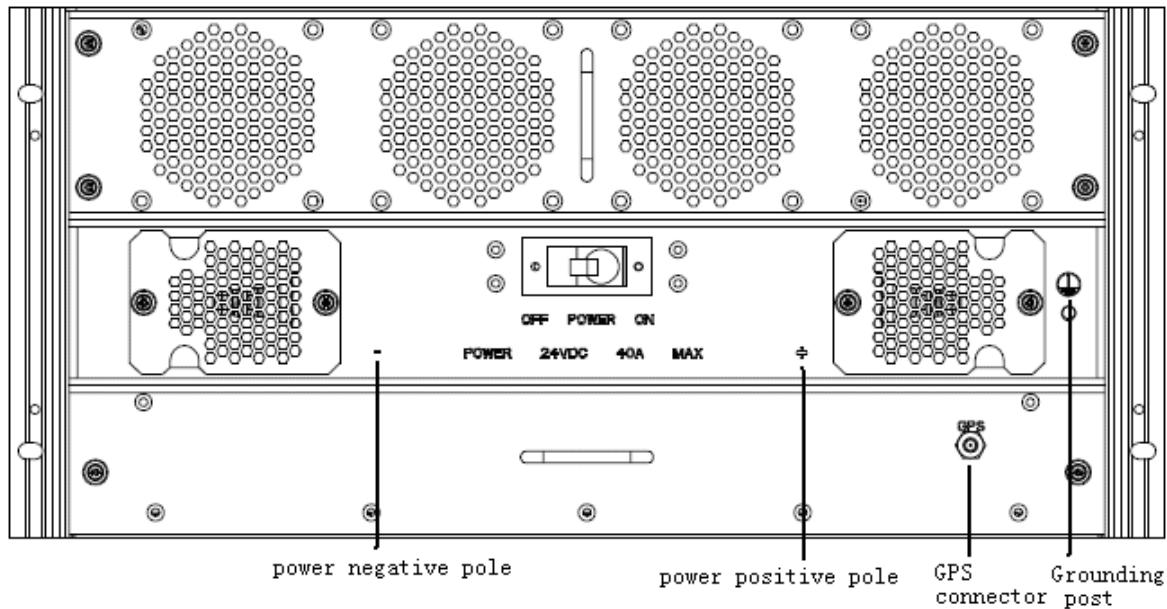
Figure 2-11　Connector for BTS power cable

（2）　　Connect DC+24V power cable's one end to the air switch at the cabinet's bottom, the red is connected to the positive pole, and the blue is connected to the negative pole. Connect the other end to DC power cabinet's output terminal correspondingly, the red is connected to the positive pole (the working ground), and the blue is connected to the negative pole. The greenish yellow's one end is connected to the pooling current bar of the base station cabinet, and the other end is connected to the protection grounding bus bar in the equipment room, as shown in Figure 2-12
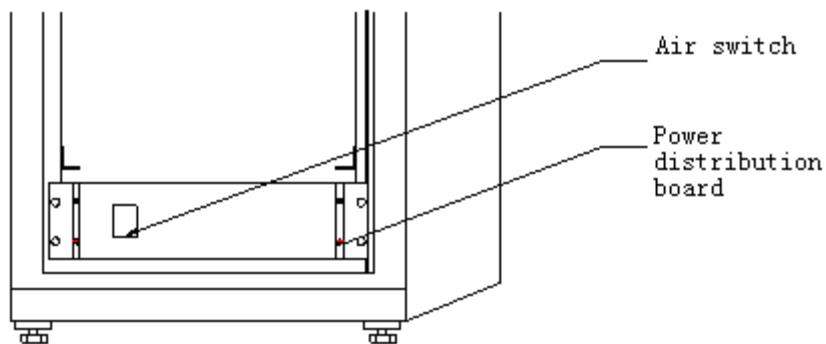

Figure 2-12　Power distribution board

（3）　　Connect the power cable's one end to the power distribution board underneath the rear of the cabinet, and the other end to base station power wire posts. Complete the connection for the air switch and the power distribution board as shown in Figure 2-13.
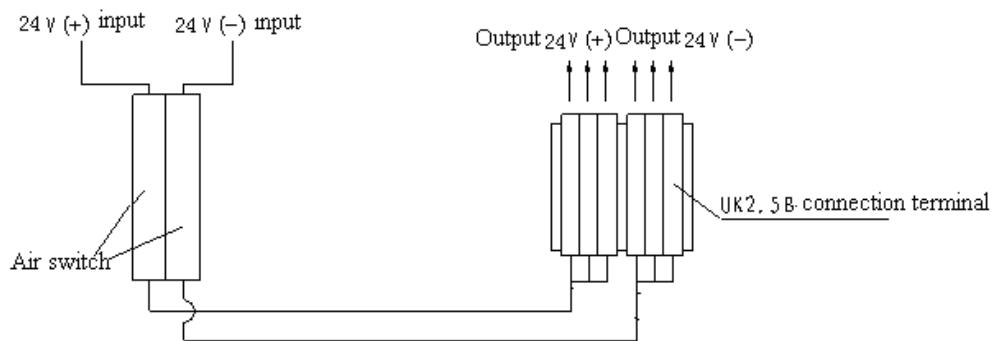
Figure 2-13　Connection map of the power

（4）　　Connect the power cables to the connection at the side of electric power distribution cabinet and label the connection as well. Connect the grounding bus bar to grounding cable via connection and tighten it with bolts. The carrier's staff are required to cooperate on the scene when connect power cable to power distribution cabinet, connecting the cables after having cut designated branch switch. After connection, close the branch switch (make sure to close the air switch firstly), then connect the black pen of the multi-meter with voltage grade to air switch working grounding and the red pen to air switch +24V end, if measurement value shows 24（±3）V, connection is correct. And then close designated branch switch.

（5）　　Do not bundle power cables with other cables. They must be cabled separately.

2.5　Cabling Requirement in Equipment Room

（1）　　In the equipment room, transmission cables on the cable ladder should be cabled separately from power cables and grounding wires, without any cross connection. The cabling should be done in a tidy and nice order. Excessive cables should be bundled up with cable ties and then placed on the cable ladder in the equipment room. Attached white cable ties should be used in an internal less than 400mm.

（2）　　The RF feeders between the cable ladder and the RF feeder, any elbow should be kept smooth without cross connection. The elbow angle should be ≥90º;

（3）　　Some cables, such as the GPS cable from the cable ladder to the cabinet, 7D-FB feeder, Ethernet cable,　power cables of the BTS and the cabinet's grounding wires, should be vertically led into the cabinet's cabling holes from the cable ladder;

（4）　　Both ends of Ethernet cable should be labeled clearly. Make sure to check the Ethernet cable to ensure good contact;

（5）　　Both ends of the ground wire should be connected with specific connectors (copper lug). After checking the connectors, wrap the connection between the grounding wire and the connector with insulation tape. On the grounding wire provided upon delivery, no connection is allowed in the middle. Both ends should be tightened with bolts;

（6）　　On the power cables configured along with delivery, no connection is allowed in the middle. After connection, label the power cables clearly close to the switch. Close the branch switch on the power distribution cabinet to check the power to be connected to the BTS. If the power is correct, switch it off and connect it to the BTS.

（7）　　Power cable and signal cable in the cabinet should be distributed separately, leading power cable (connect to circuit breaker) and protection grounding cable should be laid in the

cabling troughs' outboard on the left of the cabinet (see behind), GPS cable should be laid in the cabling troughs' middle, and Ethernet cable should be laid in the cabling troughs' indoor. Base station power cable should be laid in the cabling troughs on the right of the cabinet.

3   Startup

3.1   Base station overview

As the core element in McWiLL V5 system, base station is the bridge between wireless transmission and wired backbone network. After high-low level signal of packet data message is received at the base station from backbone network, the message is mapped with EID of the terminal and then forwarded to MDM board. After digital modulation at the DMD board, the modulated signal undergoes channel packing and processing at the CHP board and is converted into base-band signal, which is received by IF board from CHP board. Then the signal transformed to intermediate frequency and transmitted to RFC board. The signal, after transformation, is converted by RFC board to radio frequency, forwarded to TTA and transmitted after amplification. In the same way, the uplink signal is transmitted to cable backbone network via base station in a reverse order.

The routine operation of base station mainly focuses on the power and system capacity of the base station system.

3.2   EMS configuration

Before power-on the base station, some basic parameters have to be input to substations through serial port on the main board. These configuration parameters are often used as "boot parameters", with which the base station can establish communication with EMS server so that all configuration parameters can be downloaded to base station from EMS.

To maintain normal communication links, EMS server is usually connected to the main board of the base station through hub or switcher(10/100 Base-T), while the debugging computer is connected to the serial port on the main board through RS-232 serial cable. The serial ports on the main board and debugging computer should be available at this time. After this, the base station is initialized and configured through some general communication software, such as HyperTerminal, the standard terminal emulation software.

3.2.1   Basic procedures

（1）   Make sure that all RF cables connected to the base station are correctly connected.

（2）   Connect the Ethernet interface on the main board of base station to HUB or switcher with Ethernet cable, and then connect hub or switcher to the PC with EMS SERVER installed with another Ethernet cable.

（3）   Connect the serial port on the main board of BTS to the serial port of debugging computer through RS-232 cable(DB-9 male-female).

（4）   Power-on EMS SERVER and start debugging computer.

（5）   Configure FTP server tool. It can be installed on any computer that can communicate with BTS or EMS.

（6）   Configure HyperTerminal.

（7）   Start EMS server and client in EMS SERVE computer. The precondition for this step is that EMS server and client application are installed and configured.

（8）   Enter EMS SERVER IP and port in IE address bar to enter EMS client GUI interface. Please see EMS installation manual for how to use it.

（9）   Input user name and password in EMS client login screen. The default user name is: Admin and default password is: xinwei.

3.2.2 Ftp Server Configuration

（1）   Add base station load program to the server with FTP server and make sure of the interlink between ftp server, EMS server and BTS as shown in the following picture.

（2）   Start installed FTP server software, such as serv-u, sonicftp, etc.

（3）   Add user after staring and specify the path for user to read as the path where Load programs are located, for example, user name: emstest, path: d:\release0.3.2.1.
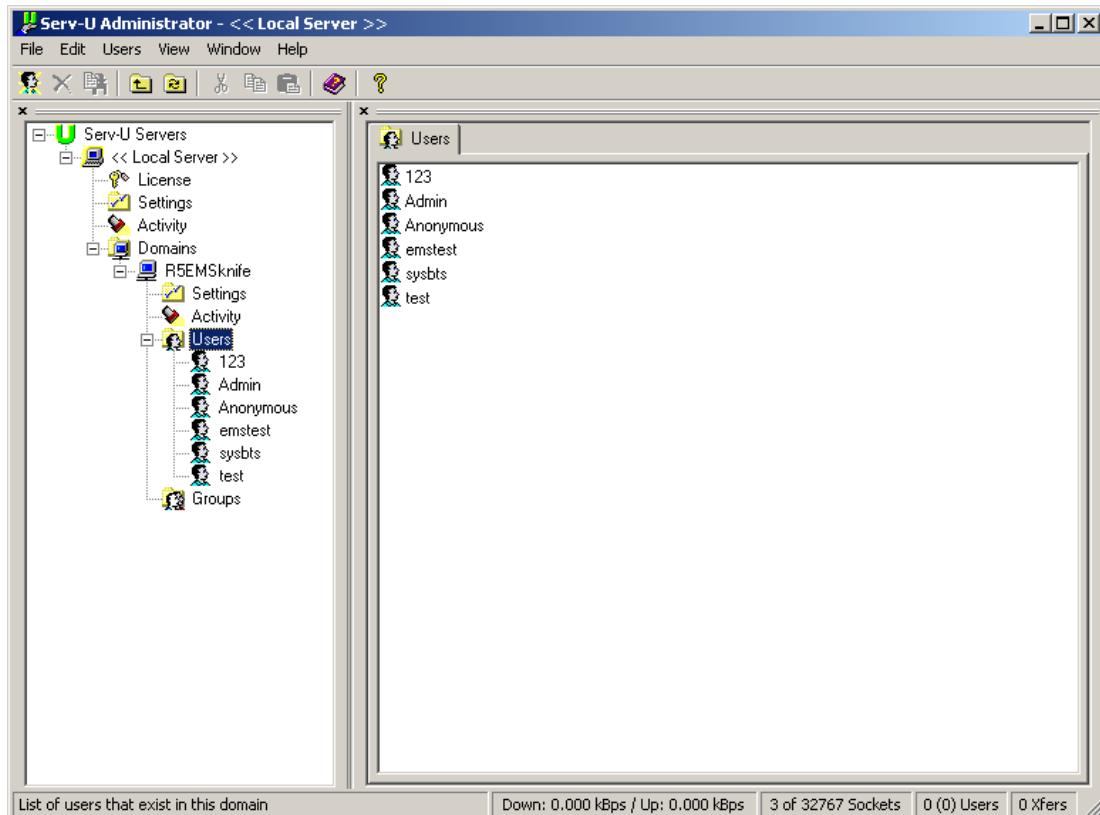

Fig 3-1   Add user
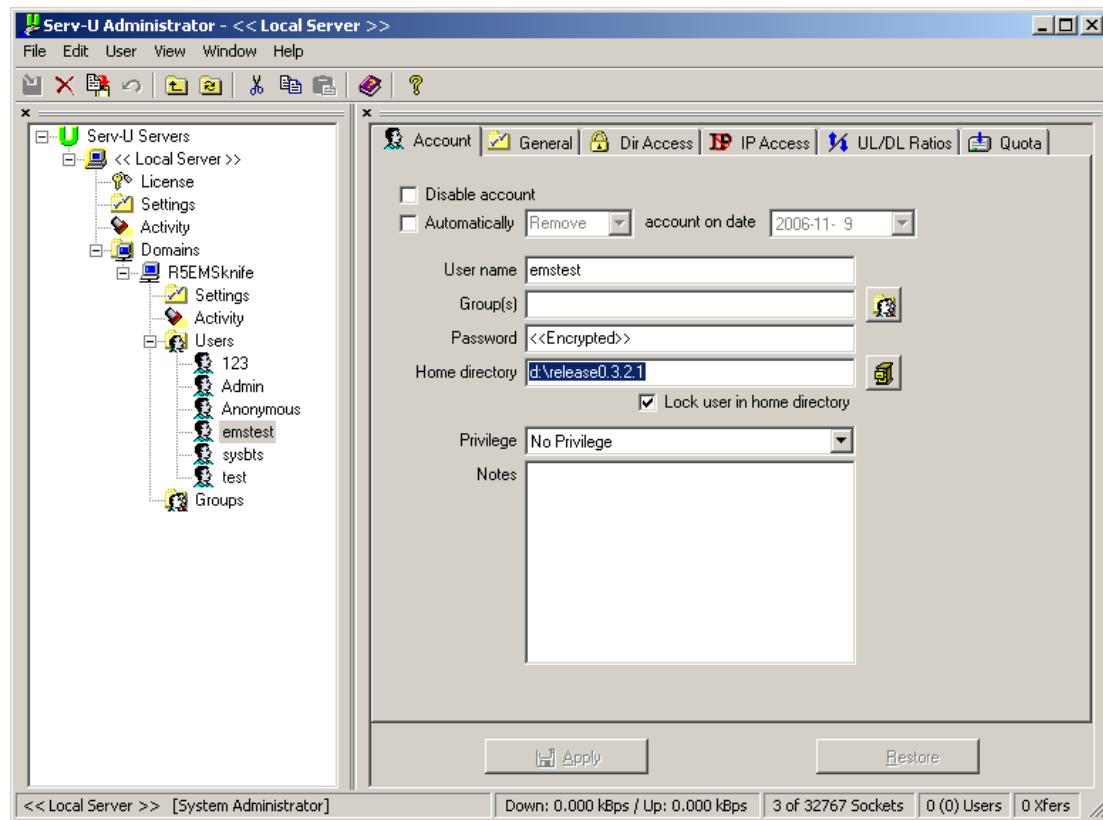
Fig 3-2   Specify path

3.2.3   HyperTerminal configuration

Make sure that the debugging computer is furnished with HyperTerminal software, e.g. the HyperTerminal in OS, but Tera Term Pro software is recommended

（1）   Click desktop shortcut to run HyperTerminal software.

（2）   The following screen will show upon startup:
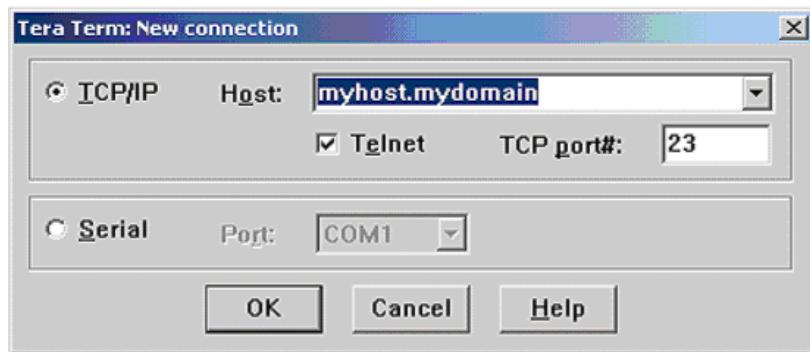
Fig 3-3   HyperTerminal configuration (1)

（3）   Select "serial", "COM1" port and click [OK] button.
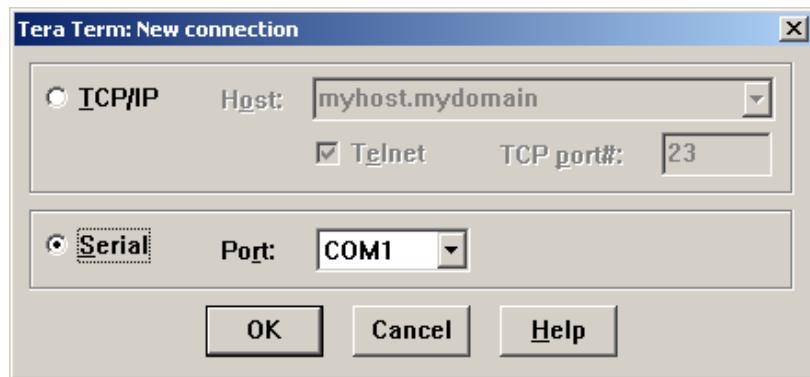
Fig 3-4   HyperTerminal configuration (2)

（4）   After the following screen is shown, select [Setup—Serial Port].
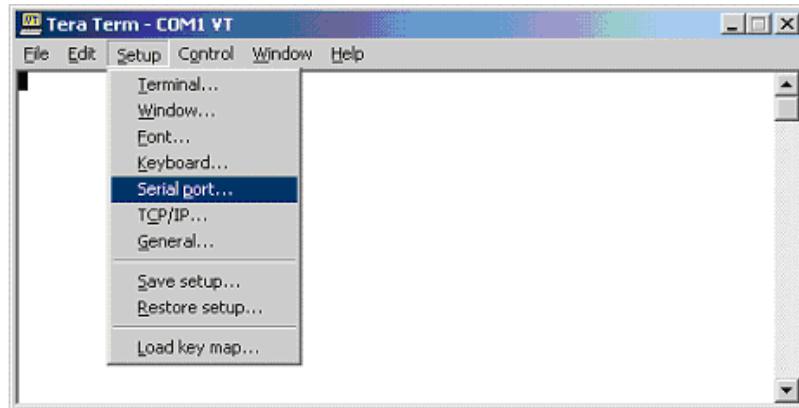
Fig 3-5   HyperTerminal configuration (3)

（5）   Set baud rate of the serial port. Here 19200 is selected. If it is not selected, the serial port display may be crumbled.
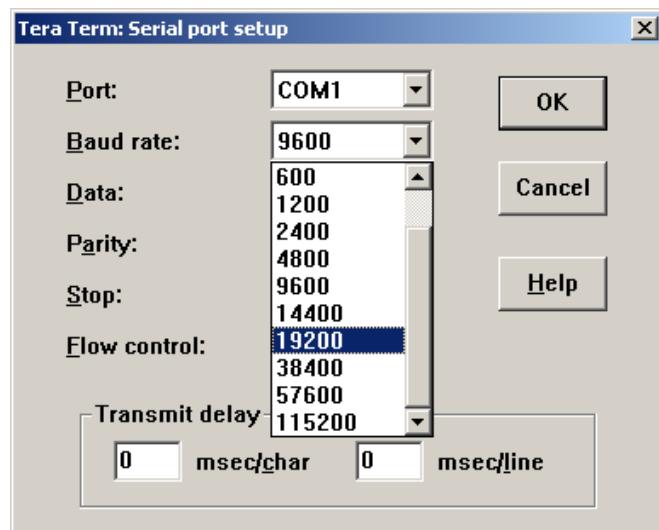
Fig 3-6   HyperTerminal configuration (4)

By now the serial port is successfully configured and can be used for configuring information (such as IP address) for connected base station so that the base station is linked to server.

3.3   Add BTS in EMS

If the client program is running in EMS Server computer, click [Resource Management] to add new base station. Here only some necessary configurations are required, such as base station name, ID, IP address, subnet mask and network gateway, etc, which should be filled in according to system network plan design.
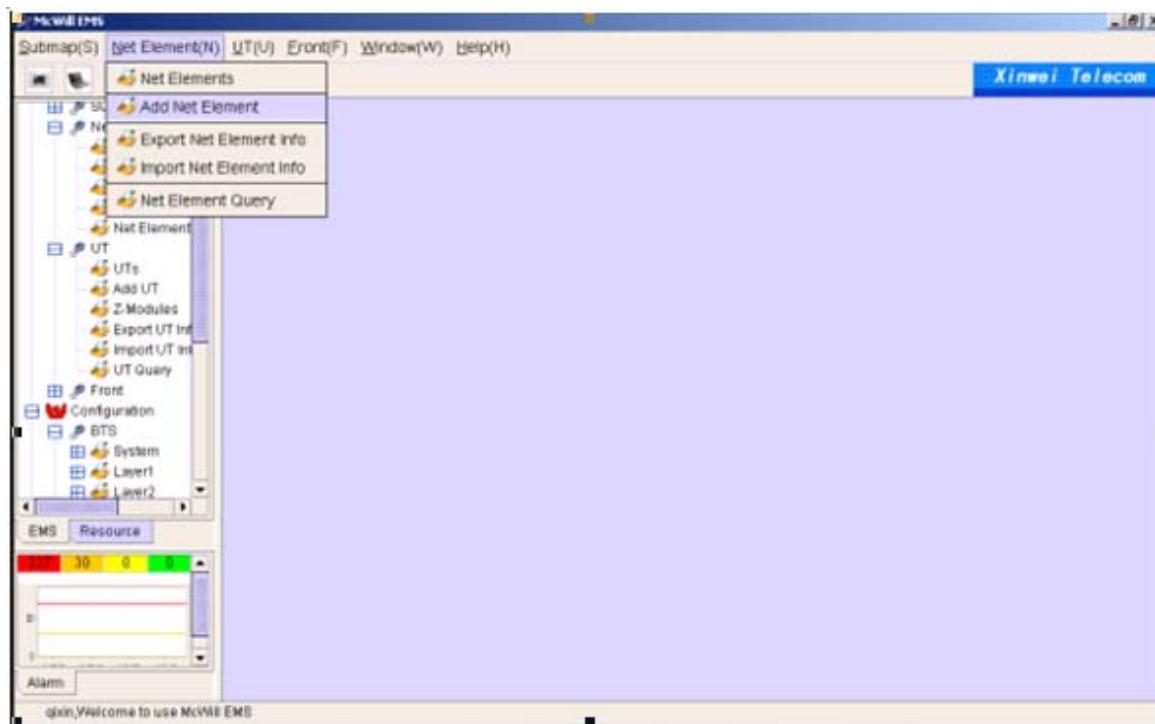
Fig 3-7   Add base station (1)
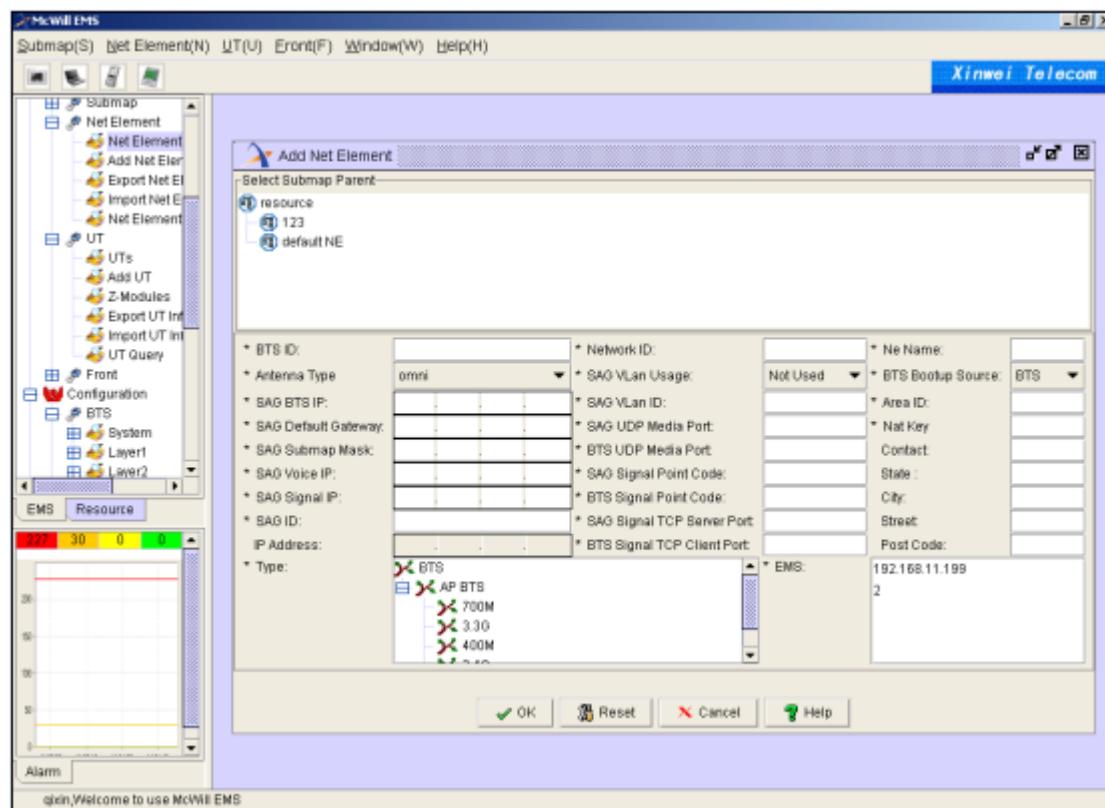
Fig 3-8   Add base station (2)

All entries with "*" are required according to the parameters below (content and writing specifications).

♦   BTS ID: in digits, the id assigned to the BTS

♦   SAG signal IP：IP address of sag signaling connected to the BTS

♦   SAG voice IP：IP address of sag voice connected to the BTS

♦   SAG ID: sag id connected to bts in digits

♦   Signaling sending port: signaling sending port specified

♦   Sag media port: media port specified

♦   Sag signaling code: manner of signaling coding

♦   Antenna type: omni-direction or directional

♦   Network element type: the frequency range used by network elements; at present 4 types are available: 3.3 G, 2.4G, 1.8G and 400M

♦   Network element name: name specified for BTS, with digits, letters and Chinese characters acceptable

♦   Network element ip: ip address specified to the base station

♦   Network id: id assigned by carrier

♦   Region id: in digits

♦   Signaling receiving port: signaling receiving port specified

♦   BTS media port: media port specified

♦   BTS signaling coding: manner of signaling coding

♦   EMS: name of the front-end processor connected to the base station
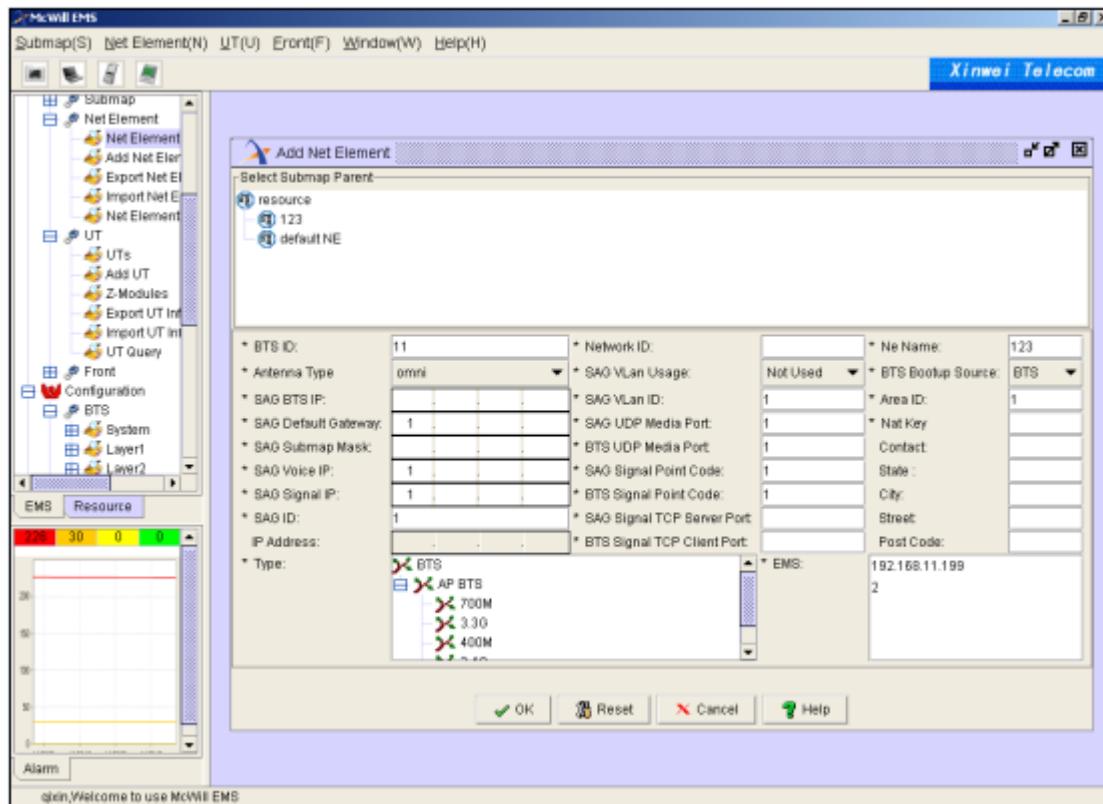
Fig 3-9   Add base station (3)

After such configuration, click [OK] and a network element is added to EMS.
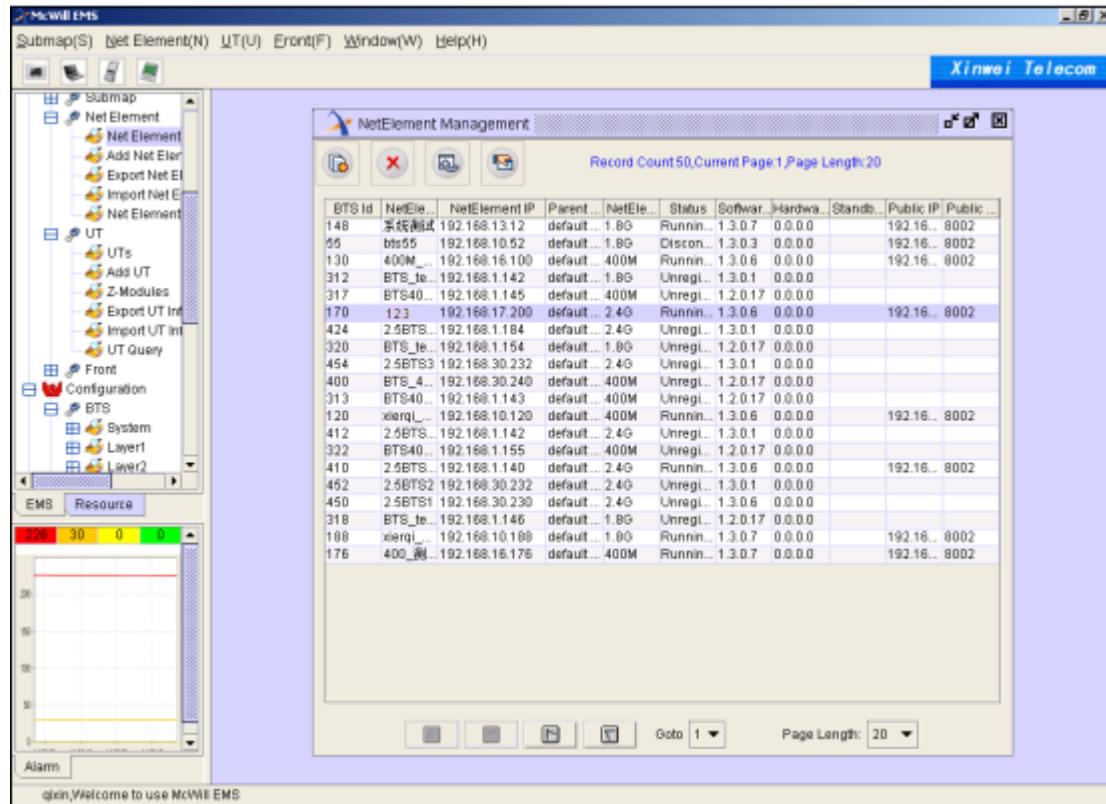

Fig 3-10   Add base station (4)

3.4 Base Station Startup

3.4.1 Base station normal startup

3.4.1.1 Base station power-on

For startup, the base station power, RF cables, calibration cable and GPS etc. must be correctly connected. In particular make sure that the L3 network cable is connected. Also the serial port cable of the base station can be connected to PC to update BTS IP information or view startup message, etc. When everything is connected, switch on the power, then switch on the main switch at the back of BTS and the base station will enter startup.

3.4.1.2 Base station boot

The following is the content displayed and to be configured in HyperTerminal window during base station startup.

```
bootrom booting!!!!!!!
                    VxWorks System Boot
Copyright 1984-2002  Wind River Systems, Inc.
CPU: Mc_Will  7447A Power PC
Version: VxWorks5.5.1
BSP version: 1.0/0
Creation date: Aug  4 2006, 13:44:28
Press any key to stop auto-boot...
```

3.4.1.2.1 Configure parameters

Press any key on the keyboard to stop automatic startup and input configuration information

to configure base station:

Now there will be a boot message in HyperTerminal screen: [VxWorks Boot]:

This message provides some operations of simple commands. Input "?" or "h" and press [Enter] to display a set of commands (and examples). To use any command, just input character command with optional parameters and press [Enter].

```
示例：Boot Commands
[VxWorks Boot]: ?
 ?                     - print this list
 @                     - boot (load and go)
 p                     - print L3 boot params
 P                     - print L2 boot params
 c                     - change L3 boot params
 C                     - change L2 boot params
 l                     - load boot file
 g adrs                 - go to adrs
 d adrs[,n]              - display memory
 m adrs                  - modify memory
 f adrs, nbytes, value - fill memory
 t adrs, adrs, nbytes  - copy memory
 e                     - print fatal exception
 v                     - print boot logo with version
 n netif               - print network interface device address
 $dev(0,procnum)host:/file h=# e=# b=# g=# u=usr [pw=passwd] f=#
                      tn=targetname s=script o=other
 boot device: ata=ctrl,drive            file name: /ata0/vxWorks
 Boot flags:
   0x02  - load local system symbols
   0x04  - don't autoboot
   0x08  - quick autoboot (no countdown)
   0x20  - disable login security
   0x40  - use bootp to get boot parameters
   0x80  - use tftp to get boot image
   0x100 - use proxy arp

 available boot devices:Enhanced Network Devices
  mv0 ata
```

Explanations of all commands:

♦ @-Used when all parameters are set as required. This command will continue to execute previously cancelled boot initialization process.

♦ p- This command will display a brief description of L3 parameters in current boot configuration.

♦ P- This command will display a brief description of L2 parameters in current boot configuration.

♦ c—This command can be used to change current L3 boot parameters. Once this command is selected, a detailed option list will be displayed. Modify and overwrite it. When all options are modified, the system will return to [VxWorks Boot]: message. During these processes, press [Enter] to accept current parameters value or input new parameters value and press [Enter] to confirm. Besides, input "." and press [Enter] to clear current value of this entry and restore it to default. If any error occurs, process "-(hyphen)" and [Enter] to return to previous option. Or you can continue this erroneous entry and modify it when returning to [VxWorks Boot]:   command line.

♦ C—This command can be used to change current L2 boot parameters. Once this command is

selected, a detailed option list will be displayed. Modify and overwrite it. When all options are modified, the system will return to [VxWorks Boot]: message. During these processes, press [Enter] to accept current parameters value or input new parameters value and press [Enter] to confirm. Besides, input "." and press [Enter] to clear current value of this entry and restore it to default. If any error occurs, process "-(hyphen)" and [Enter] to return to previous option. Or you can continue this erroneous entry and modify it when returning to [VxWorks Boot]:　command line.

♦　d—display memory usage; the user-defined base station memory to be displayed can be viewed here. This operation can only be conducted by Xinwei certified technical support engineer.

♦　m—modify memory. This option allows the user to change allocation of base station memory as per the user's requests. This operation can only be conducted by Xinwei certified technical support engineer.

♦　f—fill memory. This option allows changing BTS memory with a set mode. This operation can only be conducted by Xinwei certified technical support engineer.

♦　t—fill memory. This option allows changing BTS memory with a set mode from other memory area. This operation can only be conducted by Xinwei certified technical support engineer.

3.4.1.2.2　Input "c" to configure L3.

```
[VxWorks Boot]: c

'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device         : mv0              : Boot BTS from ftp server
processor number    : 0
host name           : hy               : host username
file name           : l3_image      : filename of  L3 startup
inet on ethernet (e) : 192.168.17.160:ffffff00  : IP and subnet mask
of L3
inet on backplane (b): 10.0.0.1                    : IP of L3's BP
host inet (h)       : 192.168.11.199               : IP of ftp server
gateway inet (g)    : 192.168.17.1                 : IP of L3's gatewa
y
user (u)            : emstest                       : username of ftp
server
ftp password (pw) (blank = use rsh): emstest     : FTP password
flags (f)           : 0x0
target name (tn)    :
startup script (s)  :
other (o)           :

 [VxWorks Boot]:
```

3.4.1.2.3　Input "C" to configure L2.

```
[VxWorks Boot]: C

'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device         : mv0                  : Boot BTS from ftp server
processor number    : 0
host name           : hy                   : host username
file name           : l2_image.bin         : filename of  L2 startup
inet on ethernet (e) : 192.168.17.161:ffffff00      : IP and subnet
```

```
mask of L2
   inet on backplane (b): 10.0.0.2                    : IP of L2's BP
   host inet (h)        : 192.168.11.199             : IP of ftp server
   gateway inet (g)     : 192.168.17.1               : IP of L3's gateway
   user (u)             : emstest                     : username of ftp server
   ftp password (pw) (blank = use rsh): emstest        : FTP password
   flags (f)            : 0x0
   target name (tn)     :
   startup script (s)   :
   other (o)            : 0.250.0.37
```

   [VxWorks Boot]:

3.4.1.2.4 Input "p" to view L3 configuration.

```
   [VxWorks Boot]: p

   boot device         : mv
   unit number         : 0
   processor number    : 0
   host name           : hy
   file name           : l3_image
   inet on ethernet (e) : 192.168.17.160:ffffff00
   inet on backplane (b): 10.0.0.1
   host inet (h)        : 192.168.11.199
   gateway inet (g)     : 192.168.17.1
   user (u)            : emstest
   ftp password (pw)    : emstest
    flags (f)               : 0x0
```


3.4.1.2.5 Input "P" to view L2 configuration.

```
   [VxWorks Boot]: P

   boot device         : mv
   unit number         : 0
   processor number    : 0
   host name           : hy
   file name           : l2_image.bin
   inet on ethernet (e) : 192.168.17.161:ffffff00
   inet on backplane (b): 10.0.0.2
   host inet (h)        : 192.168.11.199
   gateway inet (g)     : 192.168.17.1
   user (u)            : emstest
   ftp password (pw)    : emstest
   flags (f)           : 0x0
   other (o)            : 0.250.0.37
```

3.4.1.2.6 Boot process

```
   [VxWorks Boot]: @

   boot device         : mv
   unit number         : 0
   processor number    : 0
   host name           : hy
   file name           : l3_image
   inet on ethernet (e) : 192.168.17.160:ffffff00
```

```
   inet on backplane (b): 10.0.0.1
   host inet (h)        : 192.168.11.199
   gateway inet (g)     : 192.168.17.1
   user (u)             : emstest
   ftp password (pw)    : emstest
   flags (f)            : 0x0

   Attached TCP/IP interface to mv0.
   Attaching network interface lo0... done.
   Loading... 4365424
   Starting at 0x10000...

   ataDrv returned ERROR from usrRoot.
   ataDrv returned ERROR from usrRoot.
   Error during ataDevCreate: d0003
   Attached TCP/IP interface to mv unit 0
   Attaching interface lo0...done

   Adding 8580 symbols for standalone.

     ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]
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    ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]          VxWorks version 5.5.1
    ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]          KERNEL: WIND version 2.6
    ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]          Copyright Wind River Systems, Inc.,
1984-2003

                         CPU: Mc_Will  7447A Power PC.  Processor
#0.
                         Memory Size: 0xe000000.  BSP version 1.0/
0.
                         WDB Comm Type: WDB_COMM_END
                         WDB: Ready.
```

Now input "mcwill" to configure information such as base station ID and server IP, etc.

⌂   Note that there are only 3 seconds to modify configuration: if the first letter is not "m", the system

will automatically start up, causing configuration failure.

```
McWill L3 booting (Enter "mcwill" to config)...   3mcwill
 c -config, p - display, b -boot parameter, h/? - help, @ boot
[Mcwill BOOT]: c
'.' = clear field;  '-' = go to previous field;  ^D = quit
btsId                  : 160            : Configure base station ID specifi
ed in EMS
 vlanId (0~4095)          : 0                                : Configure vlan port
dataSource(0-bts/1ems): 0       : Configure base station startup sour
ce
ems IP               : 192.168.17.125 192.168.11.199    : Configure EMS
 server IP
emsRcvPort(D=3999)   : 3999               : EMS port number, usually d
efault
btsRcvPort(D=8002)   : 8002               : bts port number, usually d
efault
rtc year           : 2006                    : Configure year
rtc month          : : 11                    : Configure month
rtc day            : 8                       : Configure date
rtc hour           : 11                      : Configure hour
rtc minute         : : 11                    :  Configure minute
rtc second         : : 2                     : Configure second

[Mcwill BOOT]:BS booting
[Mcwill BOOT]: @
 L3 Application booting............................. Done
Now bts is successfully started.
bts(160) L3->3b55bae0    tCleanUp:0000        L3DataEB.cpp( 840) :
CleanUp sta
rt monitoring.
SatellitesVisible      = 0
StatellitesTrack       = 0
BootSrc            = 0
RfMask             = 0X00FF
SyncCardTemperature    = 0
DigitalBoardTemperature = 0
TimePassedSinceBtsBoot  = 0 seconds
[2006/11/08 11:11:0] [tSys] BTS software version: McWill 0.3.2.1
 : Display BTS software version
[2006/11/08 11:11:0] [tSys] BTS boot normal!
[2006/11/08 11:11:0] tSys create ok!
[2006/11/08 11:11:0] tEmsRx create ok!
[2006/11/08 11:11:0] tEmsTx create ok!
[2006/11/08 11:11:0] [tDiagL2L3EMS] create m_sfdl2l3[15] ok!
[2006/11/08 11:11:0] [tDiagL2L3EMS] create m_sfdl3ems[16] ok!
[2006/11/08 11:11:0] tDiagL2L3Ems create ok!
[2006/11/08 11:11:0] [tDiagEMSL3L2] create m_sfdemsl3[17] ok!
[2006/11/08 11:11:0] [tDiagEMSL3L2] create m_sfdl3l2[18] ok!
[2006/11/08 11:11:0] tDiagEmsL3L2 create ok!.
[2006/11/08 11:11:0] tAlarm create ok!
[2006/11/08 11:11:0] tCfg create ok!
[2006/11/08 11:11:0] mode = tFileM create ok!
0
[2006/11/08 11:11:0] tFtpC create ok!
[2006/11/08 11:11:0] tCpeM create ok!.
```

```
     mode 0: no hold; 1: enable position hold; 2:enable altitude hold; 3:
autosite survey
   [2006/11/08 11:11:0] tGps create ok!
   [2006/11/08 11:11:0] tPM create ok!
   [2006/11/08 11:11:0] [tSys] All OAM tasks create ok!    : system  se
lf-test over
   [2006/11/08 11:11:0] [tSys] Send Register Notify to EMS[192.168.11.
199] @state[0] bts send register message to ems server
   [2006/11/08 11:11:0] [BTS boot] ==> BTS booting from FTP server
   [2006/11/08 11:11:0] [tSys] BTS send to EMS register response, stat
e[0]
   [2006/11/08 11:11:0] [tSys] BTS register SUCCEED.      Bts register
 succeed


   [2006/11/08 11:11:0] [BTS boot] ==> Download file :l2_image.bin fin
ished
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :app_mcp.out fini
shed
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :app_aux.out fini
shed
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :app_fep.out fini
shed
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :fpga_L2.out fini
shed
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :fpga_L1.out fini
shed
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :fpga_FEP0.out fi
nished
   [2006/11/08 11:11:0] [BTS boot] ==> Download file :fpga_FEP1.out fi
nished


   Download booting file completed.


   [2006/11/08 11:11:0] [BTS boot] ==> FPGA download started
   [2006/11/08 11:11:0] [BTS boot] ==> FPGA download succeed
   [2006/11/08 11:11:0] [BTS boot] ==> Reset FPGA
    Start FPGA circuit module.


   [2006/11/08 11:11:0] [BTS boot] ==>  Reset AUX        : Start AUX cir
cuit module.


   [2006/11/08 11:11:0] [BTS boot] ==> Reset L2 PowerPC system
   [2006/11/08 11:11:0] [BTS boot] ==> L2 PreLoader is ready to accept
L2 Image
   [2006/11/08 11:11:0] [BTS boot] ==> L2 PPC image download finished
   [2006/11/08 11:11:0] L2 PCI interface is ready for message exchange
   [2006/11/08 11:11:0] [tSys] BTS L2 boot up SUCCESS
    BTS L2 boot completed


   [2006/11/08 11:11:0] [BTS boot] ==> MCP 0 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 1 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 2 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 3 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 4 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 5 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 6 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> MCP 7 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> AUX Reset, start AUX code downlo
```

ad
```
   [2006/11/08 11:11:0] [tSys] BTS MCP[0] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[1] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[2] boot up SUCCESS
   [2006/11/08 11:11:0] [tCpeM] receive msg[0x3706] from task[57]
   [2006/11/08 11:11:0] [tSys] BTS MCP[3] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[4] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[5] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[6] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS MCP[7] boot up SUCCESS
    MSP circuit module boot completed


   [2006/11/08 11:11:0] [tSys] BTS AUX boot up SUCCESS
   [2006/11/08 11:11:0] [BTS boot] ==> Reset FEP 0
   [2006/11/08 11:11:0] [BTS boot] ==> Reset FEP 1
   [2006/11/08 11:11:0] [BTS boot] ==> FEP 0 reset, start code download
   [2006/11/08 11:11:0] [BTS boot] ==> FEP 1 reset, start code download
   [2006/11/08 11:11:0] [tSys] BTS FEP[0] boot up SUCCESS
   [2006/11/08 11:11:0] [tSys] BTS FEP[1] boot up SUCCESS
    FEP circuit module boot completed


   [2006/11/08 11:11:0] [BTS boot] ==> Whole BTS boot finished
   [2006/11/08 11:11:0] [tSys] BTS standby version: 0
   [2006/11/08 11:11:0] [tSys] Send BTS Reset Notify to EMS.
   [2006/11/08 11:11:0] [tSys] BTS boot from NvRam.
   L2 AIR LINK DATA:################################
   btsid     = 000000A0
   networkid = 00000001
   reset cnt = 0017
   seqid     = 00
   subcgmask = 1F
   timeslotn = 08
   dltsnum   = 04
   BCHSCG    = 02 FF FF FF FF FF FF FF FF FF
   BCHTS     = 01 FF FF FF FF FF FF FF FF FF
   RRCHSCG   = 02 FF FF FF FF FF FF FF FF FF
   RRCHTS    = 03 FF FF FF FF FF FF FF FF FF
   RACHSCG   = 02 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF F
F
   RACHTS    = 02 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF F
F
   maxscale  = 2000
   premscale = E4F
   BCHSCALE  = 0EAE 0C8E 0EAE[2006/11/08 11:11:0] [tSys] BTS boot up SU
CCESS.
    0EAE 0000 0000 0000 0000
   TCHSCALE  = 03D7 03D7 03D7 03D7 0000 0000 0000 0000
   W0I       = 1DB1 D8B5 E4BD 2CAB 2CAB E4BD D8B5 1DB1
   W0Q       = DF1B EBE8 2312 0000 0000 2312 EB65 0000 [2006/11/08 11:11:
0] [tCfg]
   receive msg = 0x2012
   [2006/11/08 11:11:0] [tCfg]Boot from NvRam! please wait...
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x2028
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x2025
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x2022
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x202b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x0011
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x0029
```

```
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x0015
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3038
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3002
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3005
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3008
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x300b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3015
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3018
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x301b
   [2006/11/08 11:11:0] [tCfg]Syn_Src[1] Antanna Mask in NvRam[00ff]
   [2006/11/08 11:11:0] [tCfg]GPS not ready, config Antenna Mask with
0x0000
   [2006/11/08 11:11:0] [tCfg]Antanna Mask:[0000]
   [2006/11/08 11:11:0] [tCfg]Send L1GenData0[0001]:
   [2006/11/08 11:11:0] [tCfg]Send L1GenData1[0000]:
   [2006/11/08 11:11:0] [tCfg]Send L1GenData2[0000]:
   [2006/11/08 11:11:0] [tCfg] receive msg = 0x3012
   [2006/11/08 11:11:0] [tCfg] send Data Init Finish Notify to tSys
   [2006/11/08 11:11:0] [tSys] receive Data Init Finish Notify from tC
fg
   [2006/11/08 11:11:0] ====================
   [2006/11/08 11:11:0] BTS IS WORKING STATUS
   [2006/11/08 11:11:0] ====================
    BTS starting succeed.


   [2006/11/08 11:11:0] [tCfg]Boot from NvRam success!
   [2006/11/08 11:12:0] [tGPS] send msg M_L3_L2_L1_GENERAL_SETTING_REQ
 RF Mask[0x00ff]success!
```

```
[2006/11/08 11:12:0] [tGPS] GPS locked!
[2006/11/08 11:12:0] [tCpeM] receive msg[0x200b] from task[3]
[2006/11/08 11:12:0] [tCpeM] receive msg[0x3706] from task[57]
[2006/11/08 11:13:0] [tCpeM] receive msg[0x3706] from task[57]
```

When the status of started BTS is shown as "connected" or "In operation warning" in net element information screen in EMS, the base station is successfully started.

3.4.2 Base Station reboot

When base station needs reboot due to incidents happening to BTS or other causes:

First, if the base station is in normal working mode(i.e. there is data output from BTS serial port(or level 3 of telnet)), you can enter command "reboot" in L3 command line or "rebootL2" for only rebooting L2.

Second, there is a "Reset" switch in front panel. Press this button for several seconds and the base station will enter reset rebooting; besides, you can disconnect main switch at the back of base station rear panel and then switch on again.

4   Calibration

When BTS is successfully started, some of its initializing data can be configured via EMS client so that BTS is calibrated for normal work.

During base station calibration, the inter-antenna phase difference can be measured and the all output power from RFS to antenna can be matched. The calibration should be conducted at least three times to ensure its effectiveness. At least 20 minutes are required for loading new software in RFC.

4.1   Complete calibration

As there may be changes in the system due to temperature and climate changes as well as normal equipment aging in normal operation, the base station must be completely calibrated before power-on after implementation. The calibration is based on the target data set in EMS. In McWiLL V5 system complete calibration is adopted.

In complete calibration, calculation is conducted of the power and gain in each antenna to get data for calibrating base station antenna. The calibration result covers calibration data of the eight antennas, current sending and receiving amplitude and phase diagrams of the current calibration results, comparison with history calibration data, etc.

In complete calibration a log file will be generated in the "calibration" folder in the "system" of EMS installation folder(standard file location), with standard file name in 154_20061206163046 format, in which 154 is the base station ID and the digits are the time of calibration (year, month, day, hour, minute, second, or YYYYMMDDhhmmss).

4.2   Calibration method

In EMS client computer, open IE and start EMS client GUI in IE address bar; input user name and password in EMS client login window; by default they are Admin/xinwei.

Click [Resource Management| Network Element Management] and select the bts just added and successfully started. Double click to open BTS panel.

Fig 4-1   Base station calibration configuration (1)

Fig 4-2   Base station calibration configuration (2)

Fig 4-3   Base station calibration configuration (3)

Some basic configurations are needed at present:

（1）   Click [System Management-GPS Settings] and select the time zone of the base station in [GMT difference], e.g. Beijing time. Click [OK] and the configuration is successful.
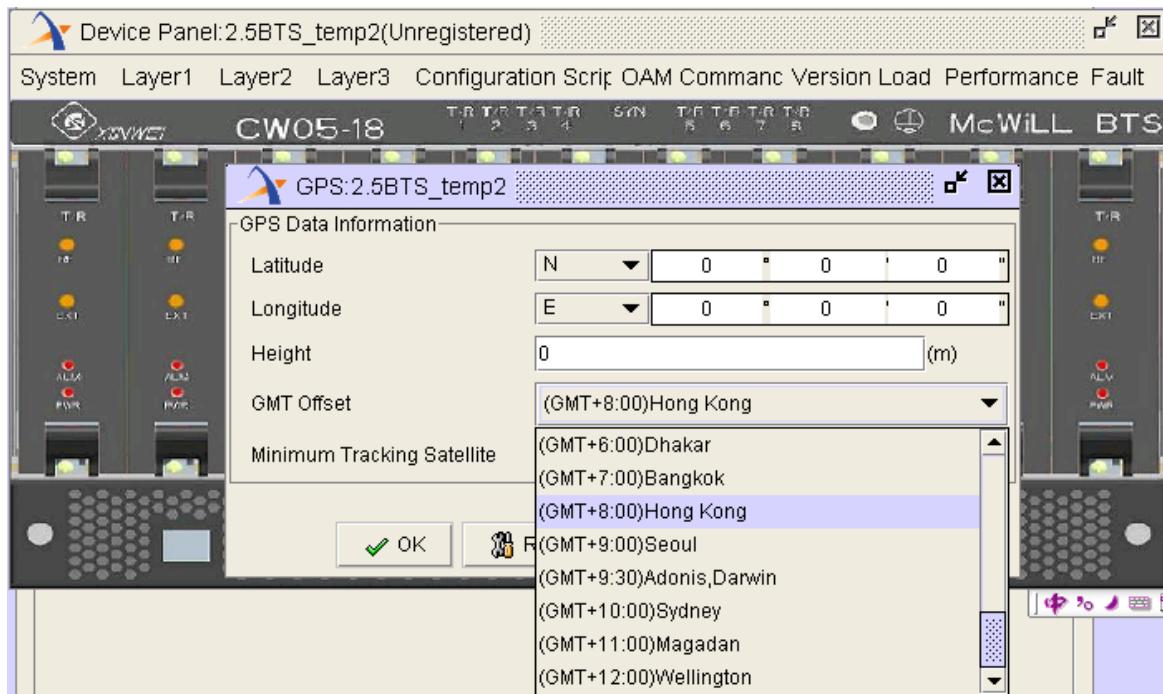
Fig 4-4   Base station calibration configuration (4)

Click [Ok] and the configuration is successful.
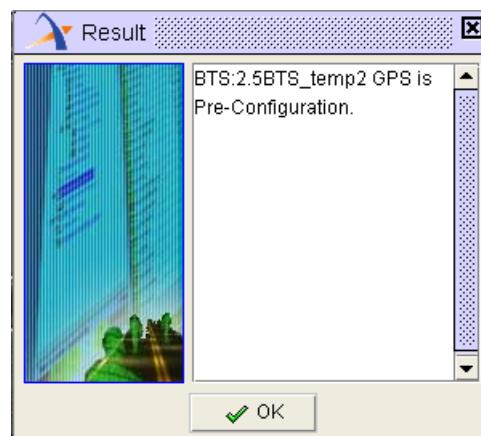
Fig 4-5   Base station calibration configuration (5)

（2）   Enter [System Configuration|Performance Log settings] and fill in [Server IP] with the server IP for performance log uploading and storage. Please make sure that this IP matches the IP address in front-end processor configuration. For other entries, just keep the default value.
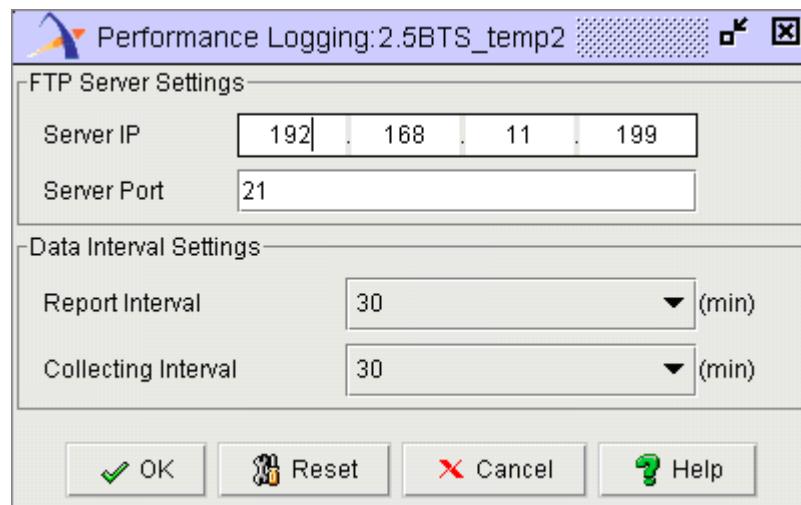
Fig 4-6　　Base station calibration configuration (6)

Click [Ok] and the configuration is successful.

（3）　　　[L1 Configuration—L1 Configuration]:
  ◆　Antenna mask: enable or disable, select one or multiple ones.
  ◆　Sync Source:　"Local" or "GPS". Please select "GPS" if GPS is connected.
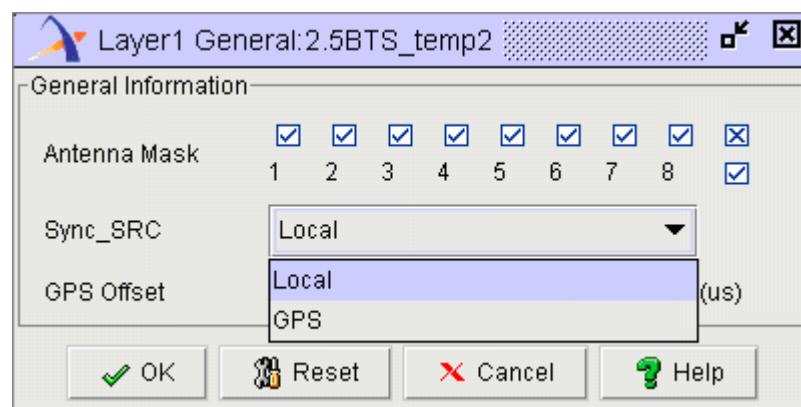
Fig 4-7　　Base station calibration configuration (7)

Click [Ok] and the configuration is successful.

（4）　　　[L1 Configuration| L1 Calibration Data], drag the slider to select central frequency used by base station.

Antenna power, receiving senstivity, cable loss and power splitter loss: the values obtained by calculating or measurement.
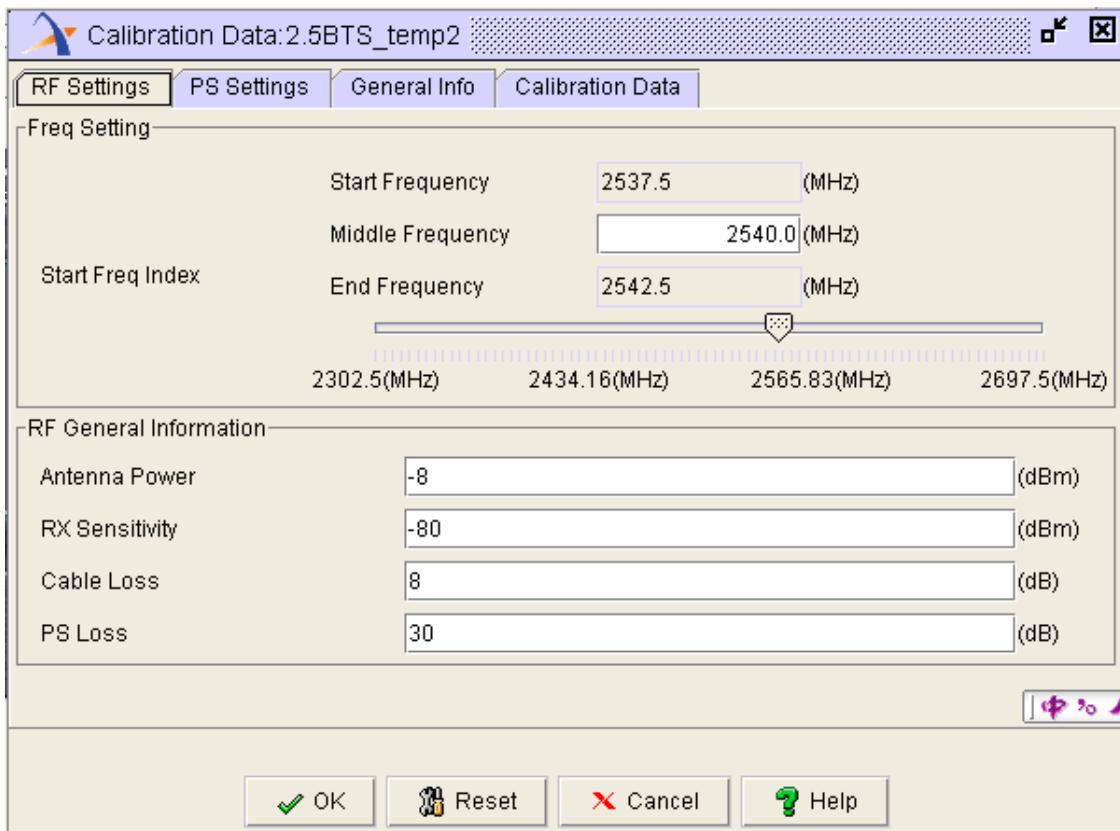
Fig 4-8   Base station calibration configuration (8)

Click [Ok] and the configuration is successful.
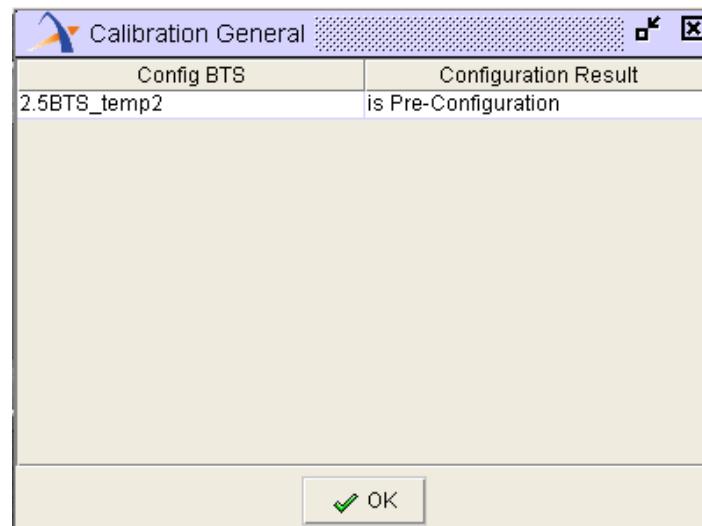
Fig 4-9   Base station calibration configuration (9)

（5）   [L2 configuration—Air link], in which

♦   "Fronting Serial ID" supports intra-frequency network;

♦   Different number should be used for Cell bts;
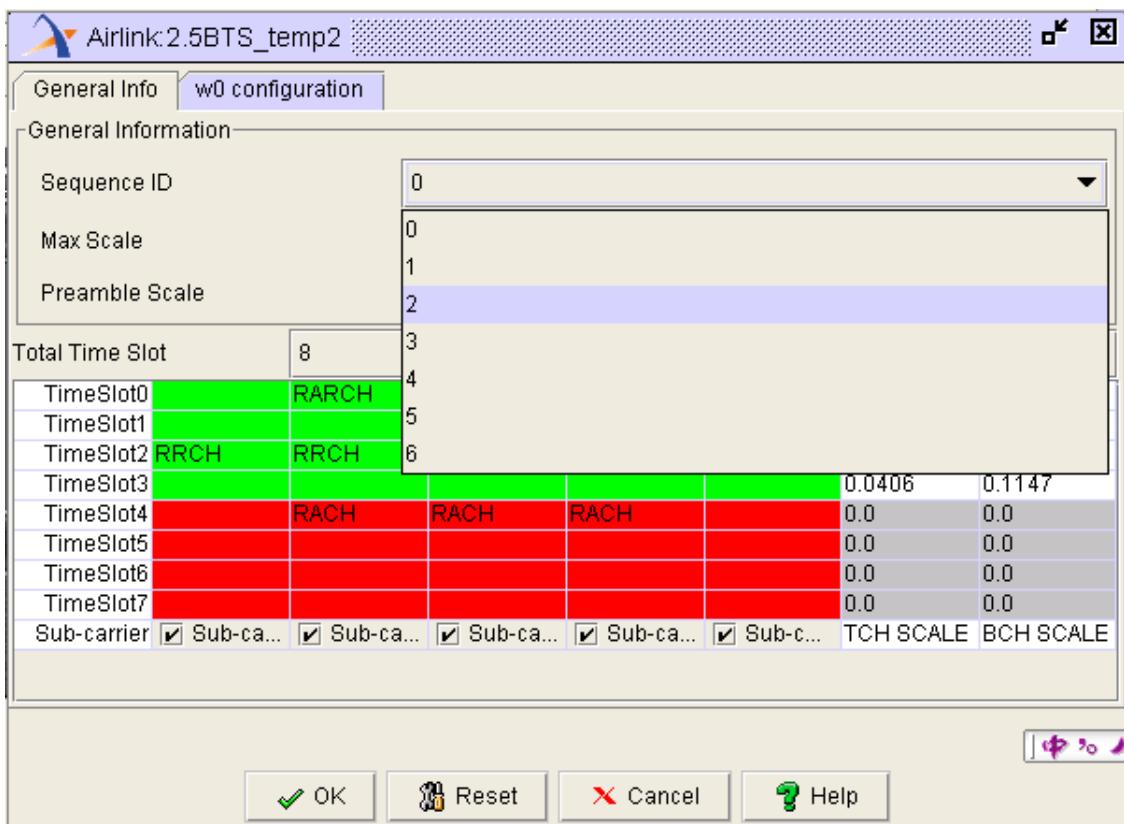
Fig 4-10　Base station calibration configuration (10)
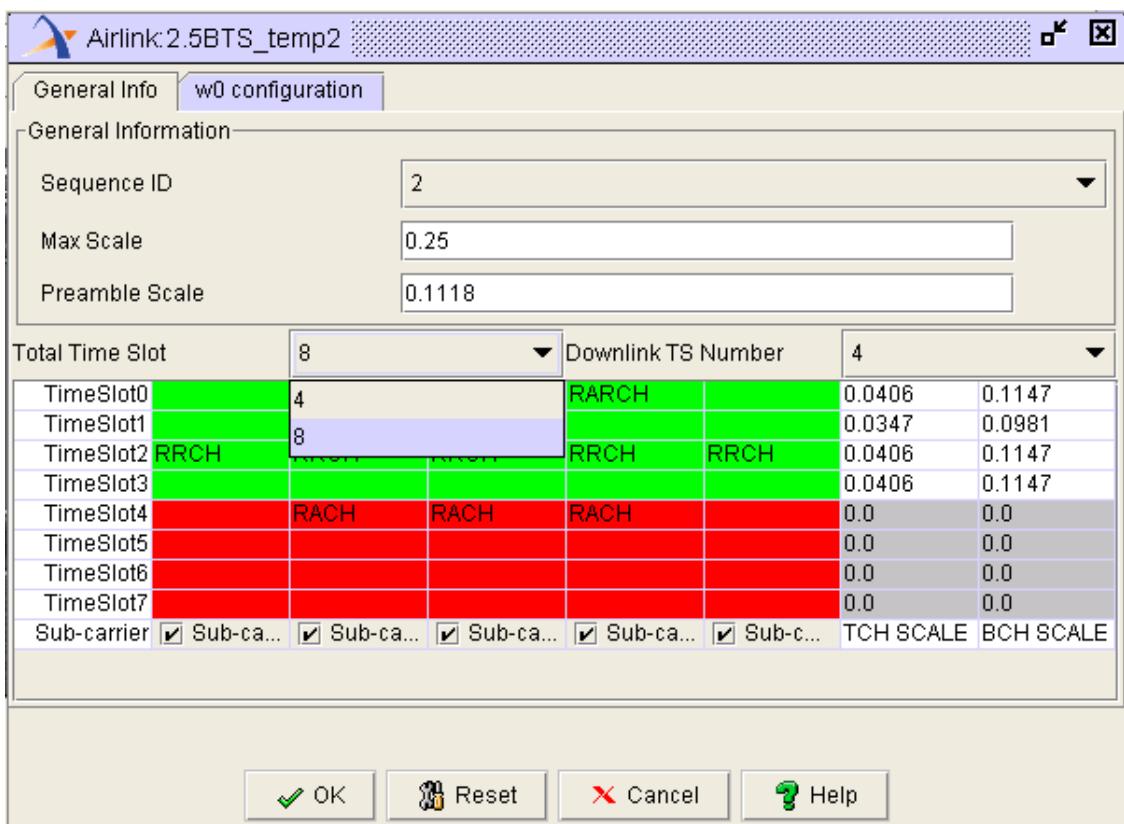
Fig 4-11　Base station calibration configuration (11)

◆　Select total time slot, default: 8

- ♦   Select total downlink time slot, default: 4
- ♦   Channel resource allocation
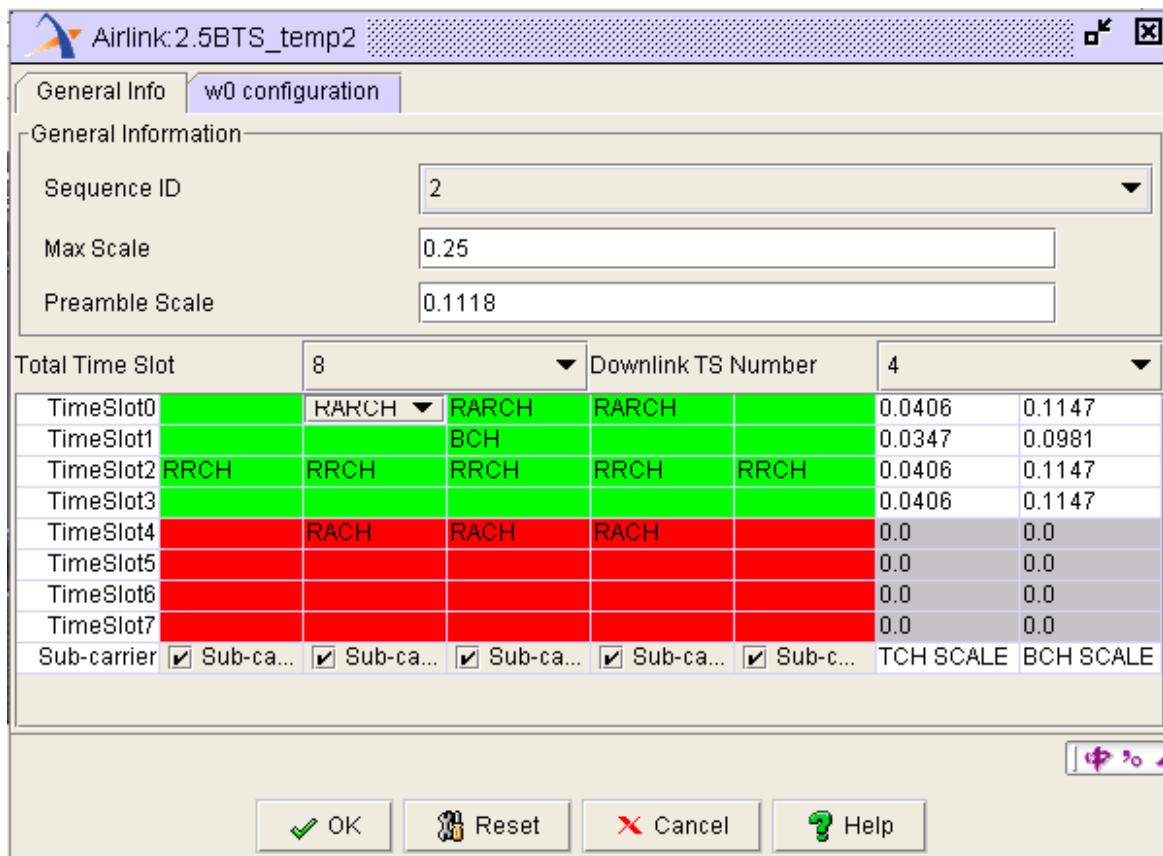
Fig 4-12   Base station calibration configuration (12)

Click [Ok] and the configuration is successful.

（6）   [L2 Configuration| Radio Resource Management Policy Configuration]: Configure modulation mode, power control and minimum bandwidth. Usually the default values are used.
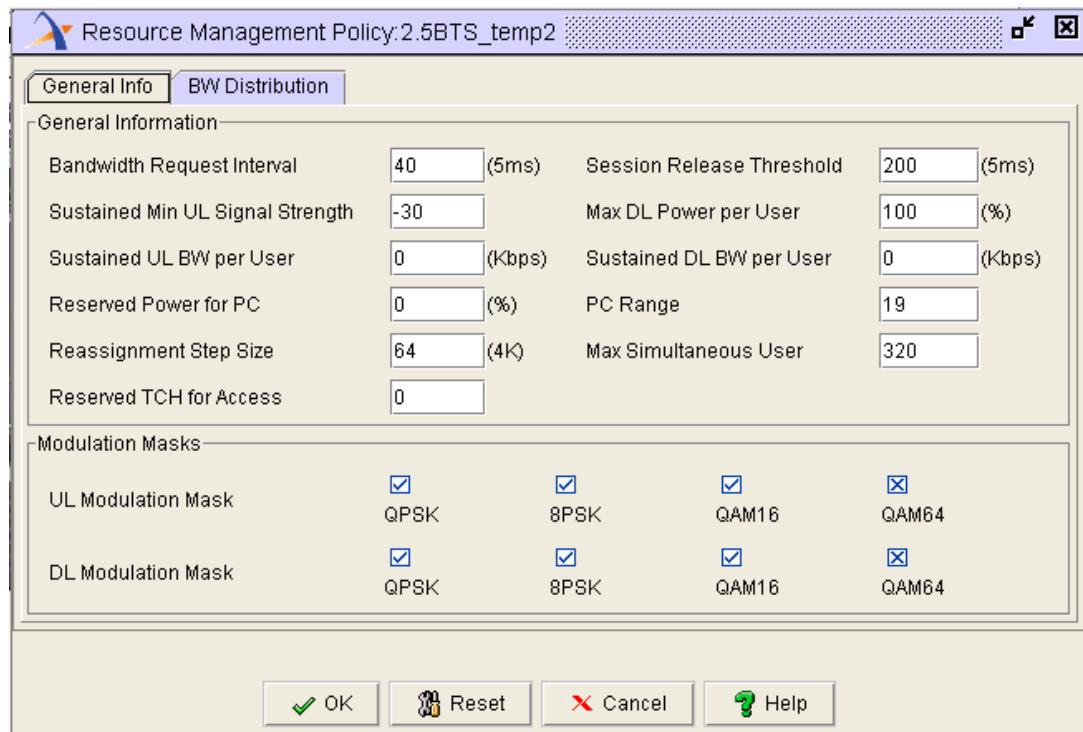
Fig 4-13　Base station calibration configuration (13)

（7）　　　Click the base station to be calibrated and select it.

Fig 4-14　Base station calibration configuration (14)

（8）　　　Click [L1 Configuration—Calibration Request]
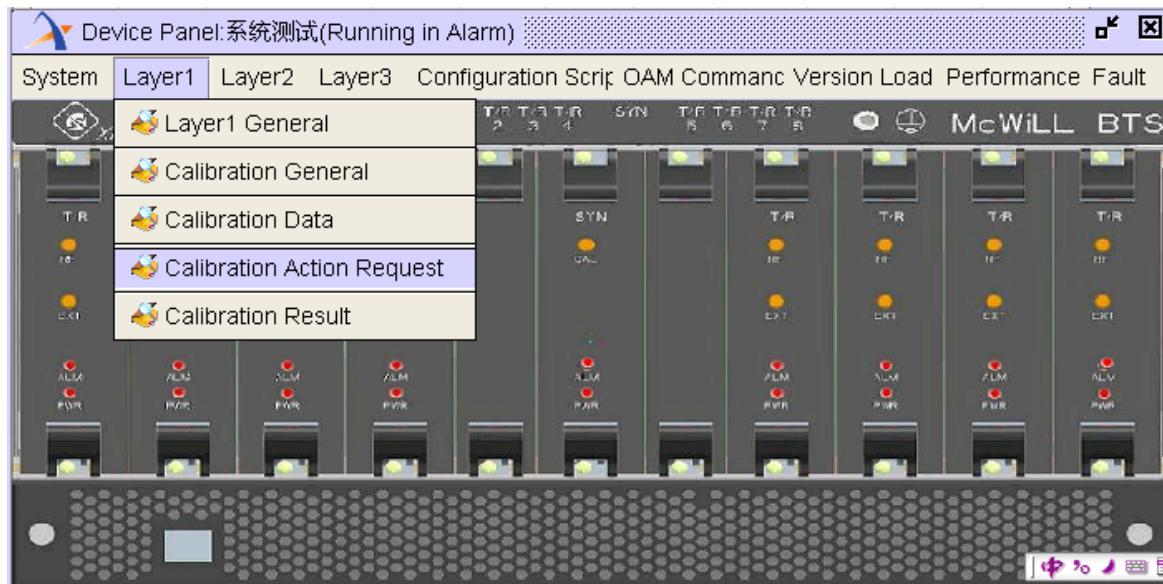
Fig 4-15　　Base station calibration configuration (15)

A dialogue box for calibration request pops up. Select calibration type between "Complete calibration" and "Express calibration", then click "OK" and the calibration is successful.
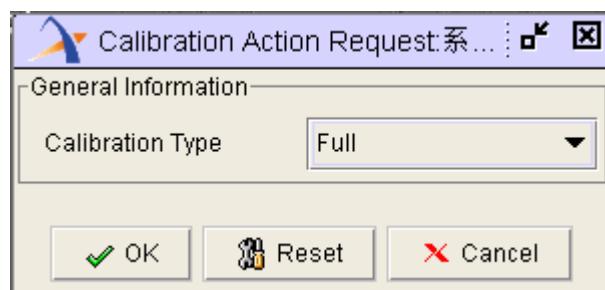
Fig 4-16　　Base station calibration configuration (16)

After calibration, click calibration result to view whether the result is saved and whether the calibration result is correct. If the result is not saved, "No calibration result" will be displayed and if the calibration is not successful, the words will be displayed in red.　Meanwhile, please check calibration time to make sure that the calibration result is from current calibration.
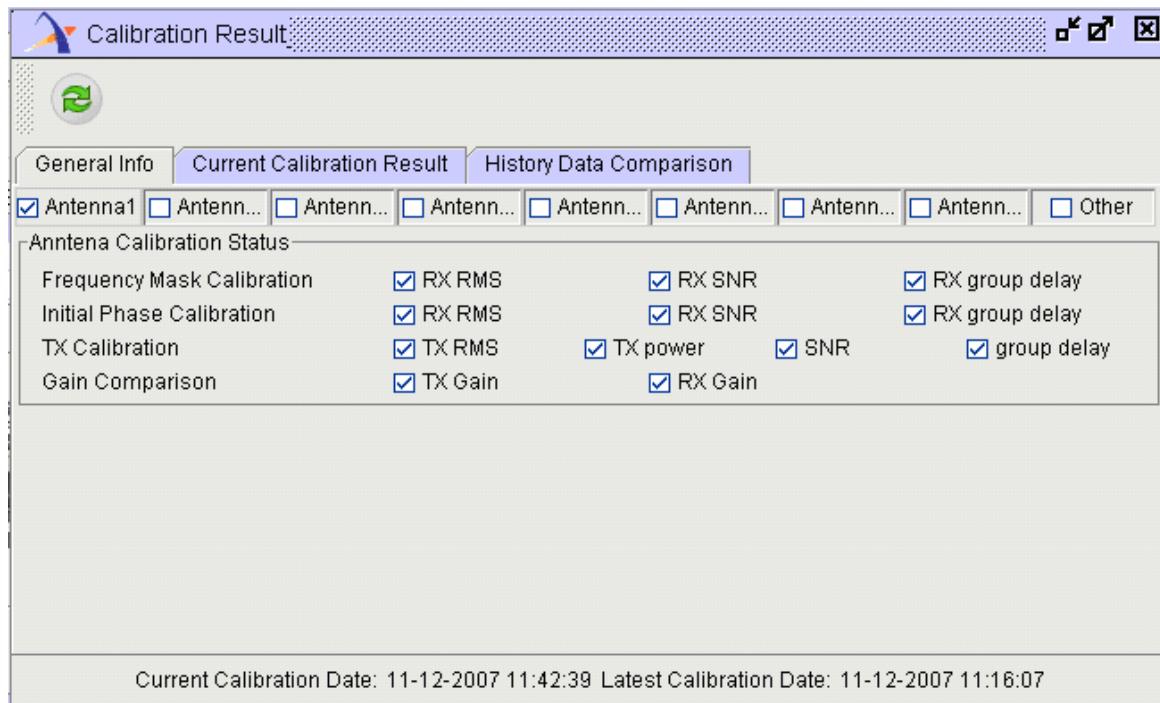
Fig 4-17   Base station calibration configuration (17)

The calibration process should be executed more than twice. Make sure that the values are relatively stable(+/-3) and there is no "zero" in the result. After the second calibration is conducted, click [Calibration Data] to show the data for second calibration in the window.
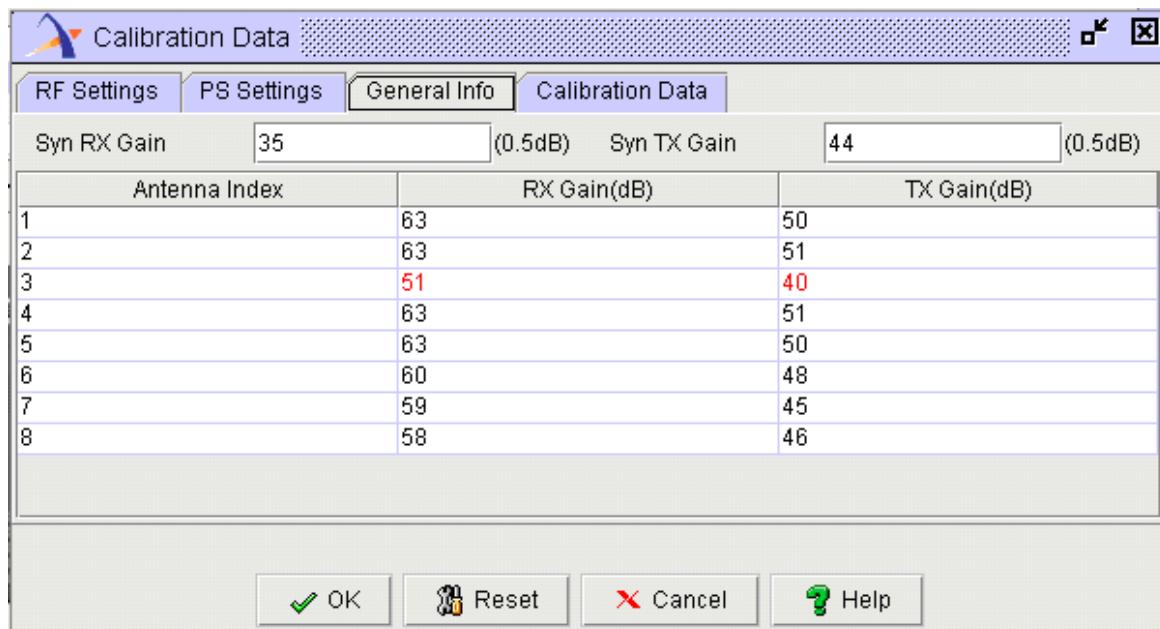
Fig 4-18   Base station calibration configuration (18)

4.3   The calibration date can't be updated

If the calibration date can't be updated in base station calibration, the following two solutions can be adopted:

Make sure that ftp (Serve-U) is working properly: for example, the user name and password for

calibration are correctly matched; the folder of calibration file is correct or not, etc.
Make sure that FTP IP information is correctly set in performance logs.
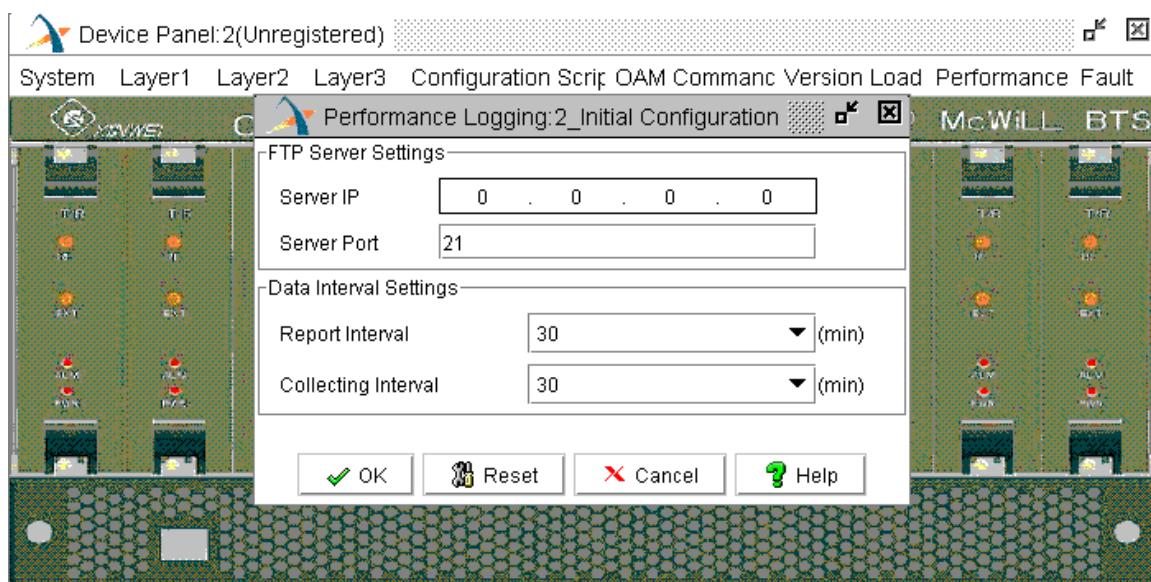
Fig 4-19   Calibration FTP settings

Delete old calibration files of this base station in the "calibration" folder in system folder and conduct calibration again.

5 Status

Any communication equipments must work within a certain range of temperatures because over-high and over-low temperatures will affect its performance. For McWiLL V5 base station system the working temperature is between 0 and 50 centigrade degree.

At the digital panel of the base station there is temperature sensor for real time monitoring of digital chipset board and transmitting detected temperature to EMS network management system.

General steps for viewing base station status:

Run EMS client program and input user name and password (Admin/xinwei by default).

Enter McWiLL EMS screen and double click the base station to view, then select [OAM Command—BTS System Status] and the corresponding information will pop up.
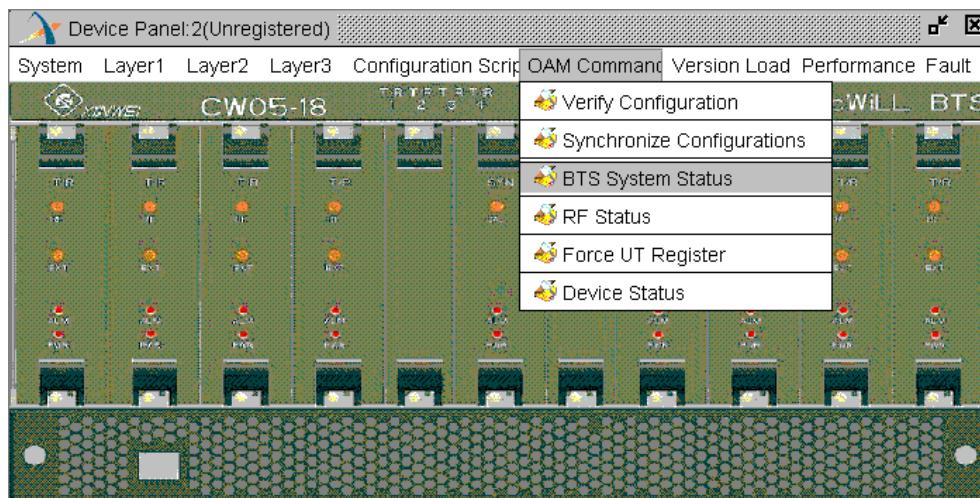
Fig 5-1   View system status
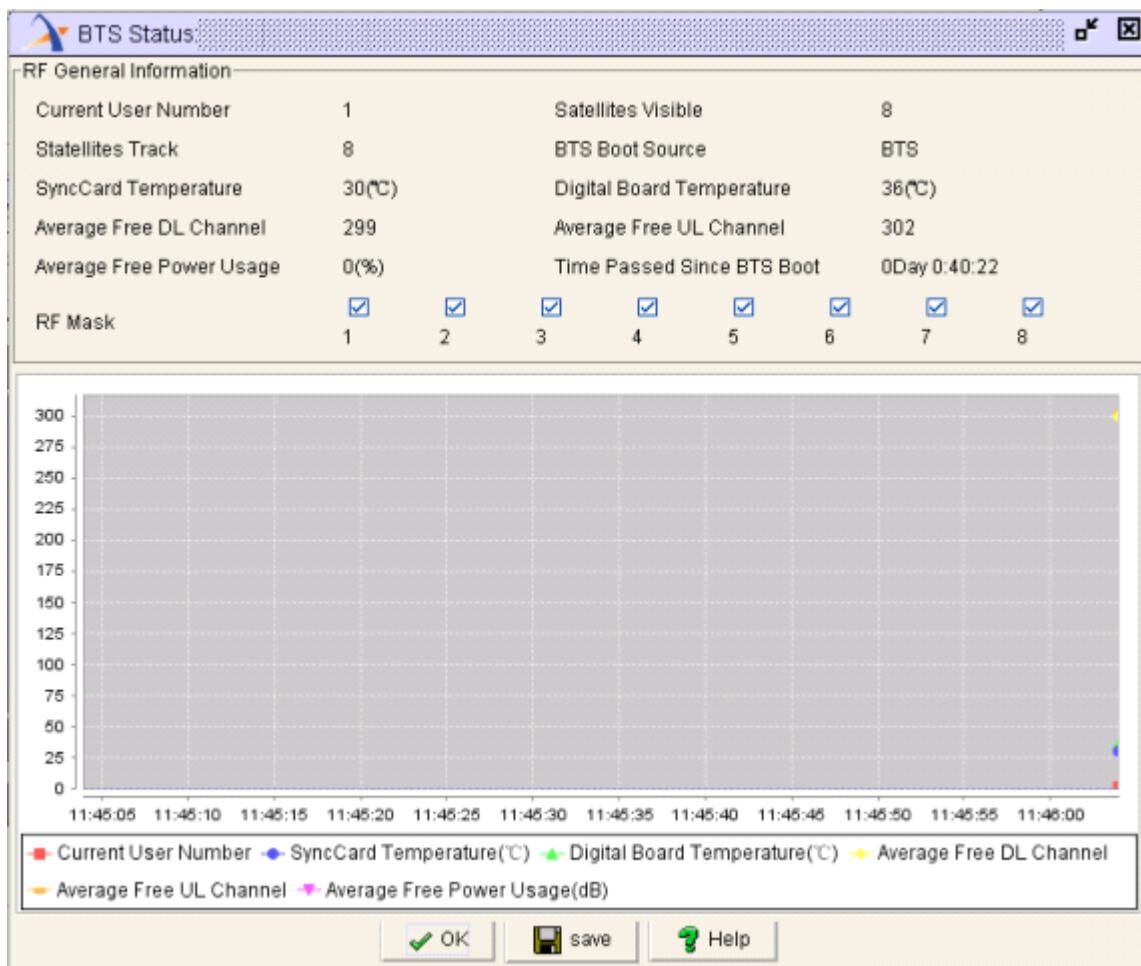
Fig 5-2   BTS status display

- ♦ Current user number: the amount of CPE currently registered.
- ♦ Satellites visible and satellites track: usually if the number of tracing satellites is greater than 3, synchronization can be conducted.
- ♦ BTS boot source: start data source of current base station.
- ♦ SyncCard temperature: the temperature of frequency synthesizer board in the base station.
- ♦ Average Free UL Channel and DL channel: amount of currently available channels.
- ♦ Time Passed Since BTS Boot: the time length for the continuous working of current base station.
- ♦ FR mask: the one with tick mark means the RF board is enabled and the one with check mark means the RF board is disabled.

   All the information above is shown graphically for easier view.

6 Alert

Similar to any maintenance system, V5 EMS conducts message records of failure or alert of the base station, which can be viewed from failure console or alert console.

Method 1:

Enter EMS and select [Fault—Console—Fault Console] to enter the screen as below. Click the network element to view and click [View] button in the left top and the detailed information of alert will be displayed.


Fig 6-1   Failure console

The operation of alert console is similar with failure console. If the information is too much, click a tab to sort, for example, sorting by network element.

Fig 6-2   Alert console

Enter corresponding network element management and view by selecting the right end [Failure Management—Events/Alerts] in its information panel.
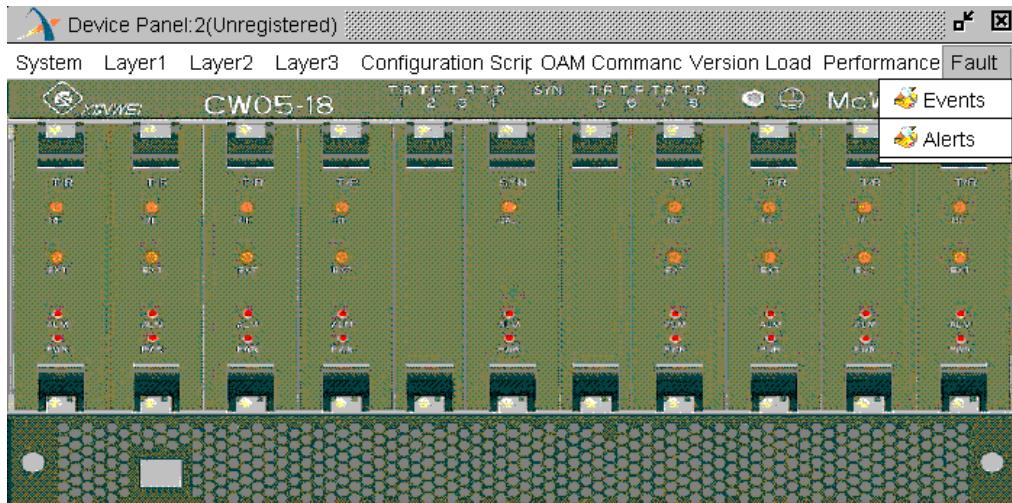
Fig 6-3　View events and alerts

Please refer to EMS operation manual for detailed information and measures for failures and alerts.

If it's confirmed that there is hardware failure, please consult relevant R&D or maintenance personnel to update hardware versions, etc.