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JPW-7320 User Manual

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Revision History

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Important Safety Precautions



The JPW-7320 unit is powered by either VAC or VDC. Only personnel who have received relevant training from Juni are authorised to open any part or section of the JPW-7320. To prevent electrical shock when installing or maintaining the equipment, **ENSURE THE SUPPLY OF POWER IS REMOVED** by unplugging the power connectors before accessing any section of the equipment.



Place a protective cap/cover to prevent accidental exposure and eliminate dirt particles contaminating the connection ports.



Wet locations and conditions will increase the risk of electrical shock when installing or using electrical powered equipment. To prevent electrical shock, never install or use electrical equipment in wet locations or during lightning storms.



Static electricity means no risk of personal injury but it can severely damage and corrupt essential circuitry within the equipment, if not handled carefully. Always use ESD protective devices when handling the equipment.



Always observe the warning labels and markings present on the equipment. If unsure, contact Juni Korea on +82 70 8611 5300 for advice.

1 Introduction

The JPW-7320 provides an ideal cost-effective alternative to macro deployments for coverage and capacity needs, suitable for vertical market business including Smart Grid network and services at railways, campuses, mines, oil drilling sites, bay area, and harbors.

The very compact design and narrow form factor of the JPW-7320 enable it to be seamlessly attached to light poles as well as other similar structures. The unit can be used in conjunction with JS-100 Provisioning and JS-200 SON Servers.

With MIMO technology and an open R6 Profile Interface, the JPW-7320 allows easy installation and operation providing less than 35dBm of output power (< 1.5W x 2 MIMO).

The JPW-7320 also boasts extremely low power consumption allowing it to be implemented as a solar cell solution for those remote and hard-to-reach areas where self-sufficient power is desired.

This User Manual outlines the specifications and the operation for the Juni JPW-7320 WiMAX Outdoor Picocell, hereon referred to as JPW-7320.

2 System Description

2.1 Configuration

The JPW-7320 has been designed to operate in the Mobile WiMAX network using TDD (Time Division Duplexing) technology.

The basic configuration of the JPW-7320 connects to the Operator Core Network via the Internet - RJ45 Ethernet cable interface to connect to local xDSL/cable ISP.

The JPW-7320 site configuration includes a single dual-polarized antenna that transmits and receives signals to/from the Mobile Station. The Mobile Station may include handsets, mobile phones, wireless modems and other CPE (Customer Premises Equipment).

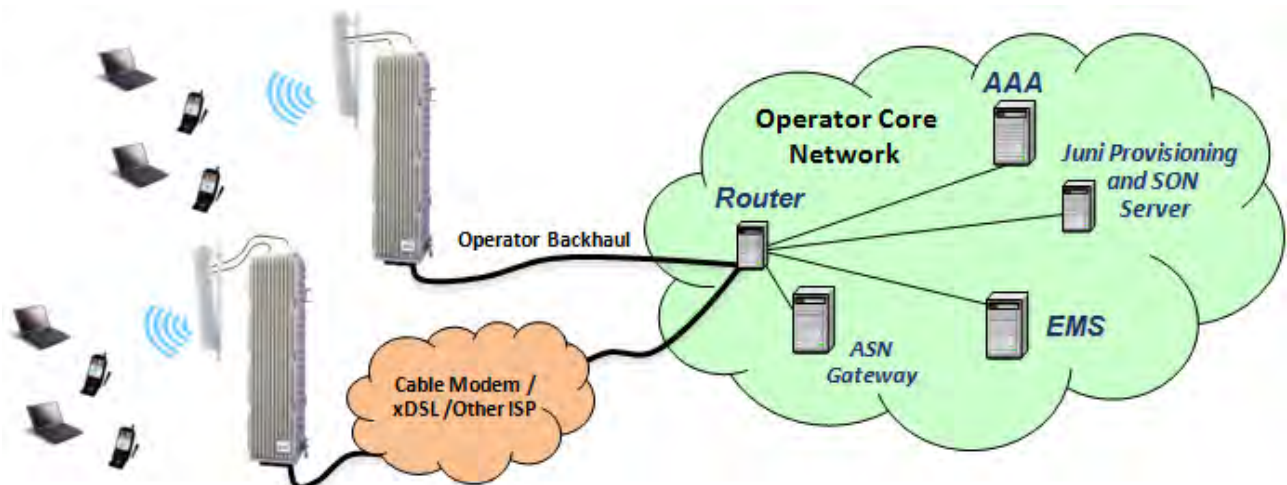


Figure 2-1 Basic JPW-7320 Configuration

2.1.1 WiMAX Channel Allocation

The JPW-7320 operates on the 2.3GHz frequency band.

2.2 General Appearance of the JPW-7320

2.2.1 General Appearance

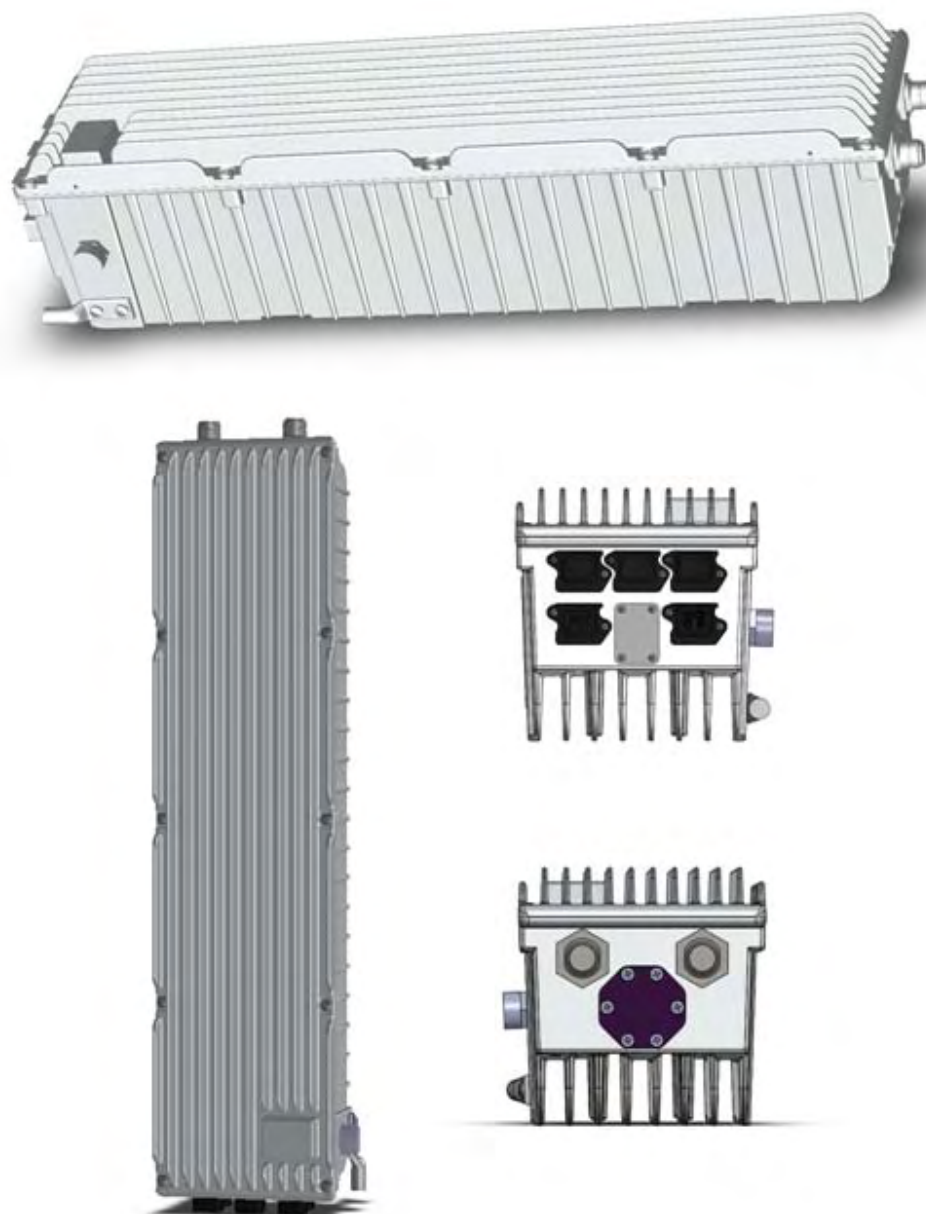


Figure 2-2 JPW-7320 Picocell



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2.3 General Appearance of the JPW-7320

The JPW-7320 has 6 (six) connection ports located on the bottom of the enclosure and 3 connection ports located on the top of the enclosure. These ports allow for RF, Ethernet, power and monitoring connections.



Figure 2-3 Connection Ports of the JPW-7320

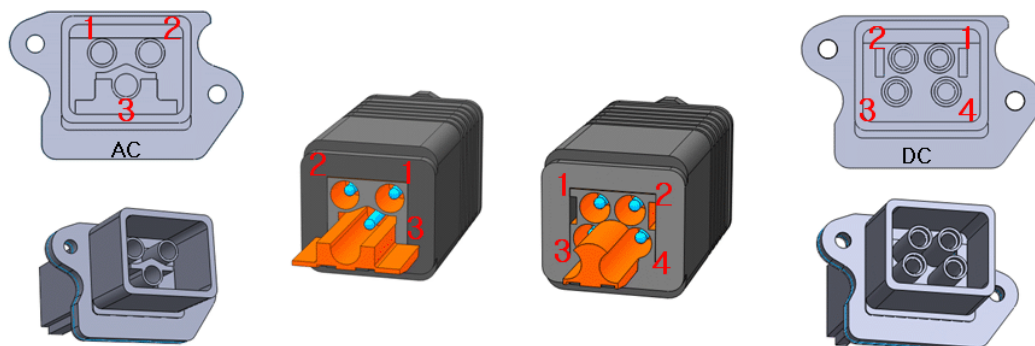
- ① Ethernet: Connects to the Internet via xDSL/Cable Modem
- ② AC In: Connects to the VAC source
- ③ DC In: Connects to the VDC source (It can be blocked when using only AC,Option)
- ④ Debug: Used to access the local maintenance with PC
- ⑤ Alarm: Connects to external alarm interface
- ⑥ ANT0 & ANT1: Connects to the Tx0 and Tx1 antennas

2.4 Power and Ethernet Connection

The JPW-7320 is powered by VAC (110V ~ 240V) or VDC (30V). These power inputs as well as the Ethernet connections are delivered to the unit via weatherproof cable and connector harnesses.



Figure 2-4 JPW-7320 AC/DC Power and Ethernet Harness



1 Pin: ACL
2 Pin: ACN
3 Pin: F.G
(Harting: TB 09 46 245 3410)

1 Pin: GND
2 Pin: GND
3 Pin: -48V
4 Pin: -48V
(Harting: 09 46 245 4400)

Figure 2-5 JPW-7320 AC/DC Power Harness and Connectors

3 Installation

3.1 Transportation to the Site

During transportation of the JPW-7320 to the site, the following points need to be considered.

- While transporting the unit, ensure the JPW-7320 is packaged in its original packaging supplied by Juni.
- It is important to prevent any unnecessary shock applied to the unit while loading/unloading to/from the vehicle.
- During transportation, it is advised to prevent or minimise any movement of the packed units.

3.2 Transportation to the Site

- To avoid the risk accidental fire or electric shock, do not expose the JPW-7320 to rain or any other wet condition during installation.

3.3 Transportation to the Site

- Avoid direct sunlight and place the unit in a well ventilated location.
- The environment temperature should be in the range of $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$.
- Ground connections must be made to all metal cabinets for safety.
- Avoid any vibration.
- The VSWR of the cable which connects the JPW-7320 to the antenna should be less than 1:1.5

3.4 Inspection before Installing the JPW-7320

- Check if there is any physical damage on the cabinet. If any damage is found, it is advised to perform close inspection on the operating features and RF signal test to verify performance.
- Check if there's any part of the cabinet exposed to water or other liquid substances.
- Before installing the JPW-7320, check the serial number of the units to be installed.
- Confirm the correct accessories have been supplied.

3.5 Installation Procedure

3.5.1 Unit Dimensions

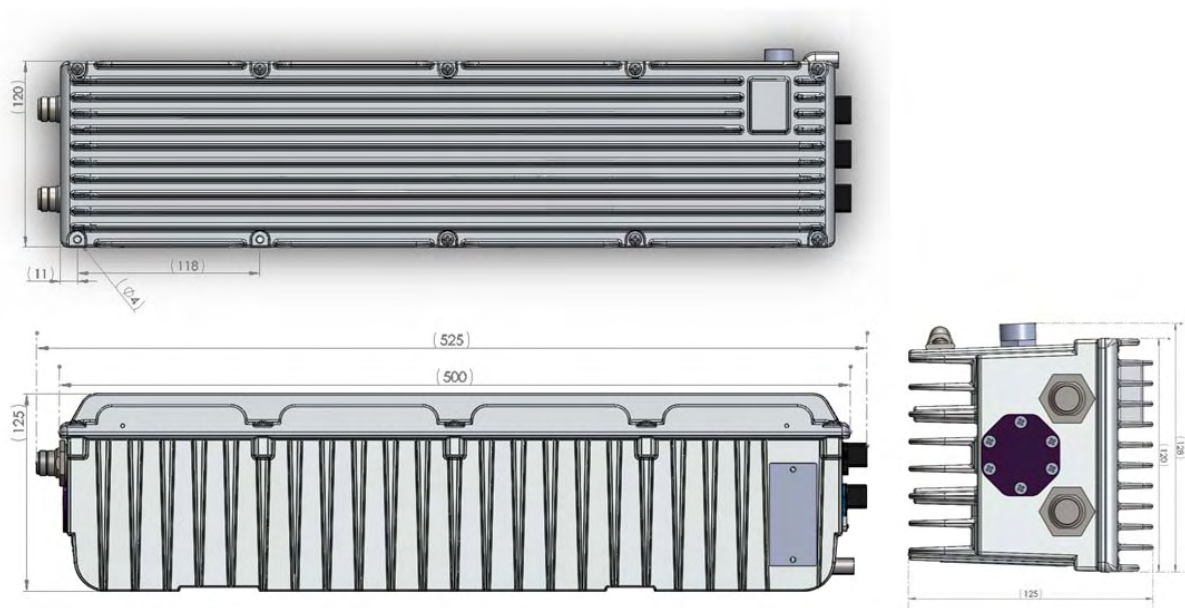


Figure 3-1 JPW-7320 Unit Dimensions

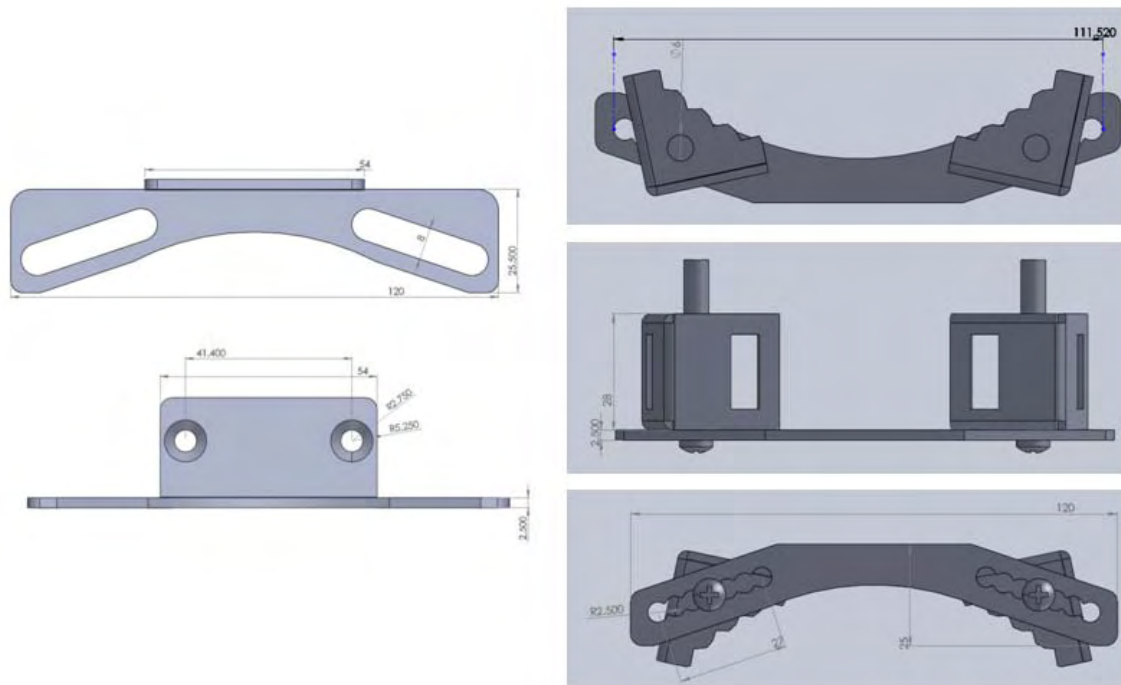


Figure 3-2 Pole Bracket Dimensions

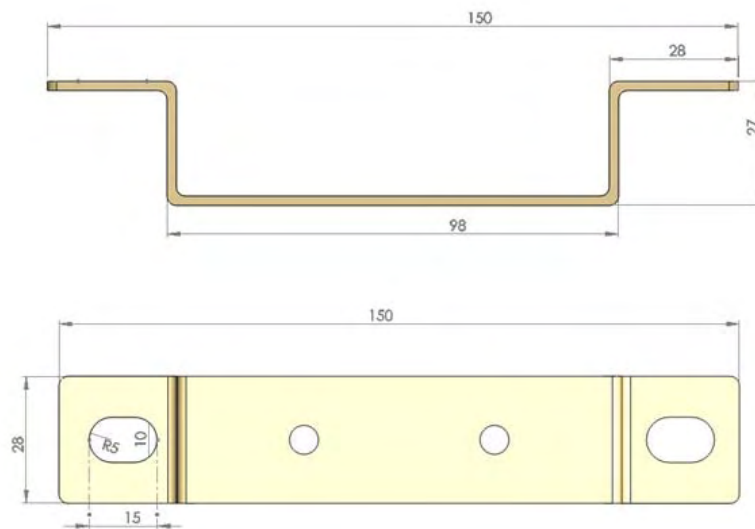


Figure 3-3 Wall Bracket Dimensions

3.5.2 Unit Dimensions

The following table lists the materials required for the installation of one JPW-7320. Ensure all materials are available and ready prior to commencing installation.

Description	Qty	comments
JPW-7320	1	Solar cover is option
Pole mount bracket (1set)	1	Wall mount bracket set is option. Banding strap is not included.
RJ-45 connector	1	Outdoor connector only
AC connector	1	Outdoor connector only
DC connector	1	Outdoor connector only. (It will not be provided when using only DC.)
Ground cable (1set)	1	5m earth cable with rug to JPW-7320

Table 3-1 Required Materials for Installation

Notes

- In case of power cable, 5m, 10m or 50m outdoor power cable with outdoor AC/DC connector is option.
- In case of Ethernet cable, 5m, 10m or 50m outdoor Ethernet cable with outdoor RJ-45 connector is option. Indoor RJ-45 connector with 10m indoor Ethernet cable is option either.
- 5m, 10m, or 50m earth cable with rug is available as option.
- The socket-outlet shall be installing near the equipment and shall be easily accessible.

3.5.3 Pole Mounting Installation

- 1) Fasten a banding strap to the desired position on the pole.



Figure 3-4 Fixing Banding strap to pole

- 2) Ensure the banding strap is fixed securely. Mount the unit onto the banding strap by using the pole mount bracket hooks. Secure the unit to the banding strap using the nut and bolts provided.

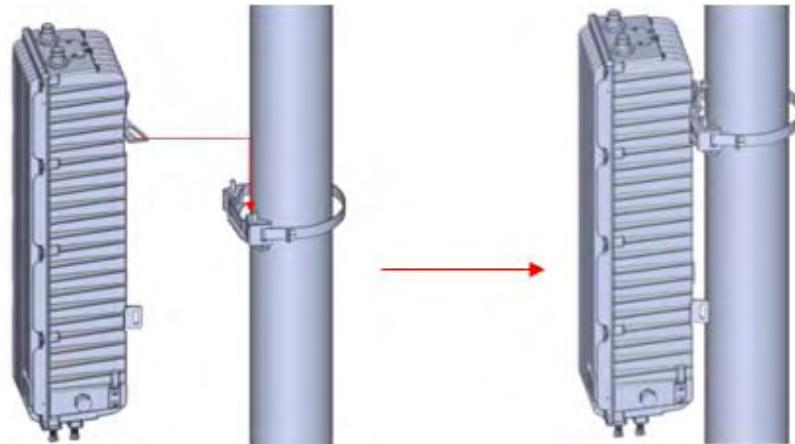


Figure 3-5 Attaching unit to Banding Strap

- 3) Fix the unit to the pole by using another banding strap on the bottom of the JPW-7320. Again use the nuts and bolts provided to secure the unit to the pole.

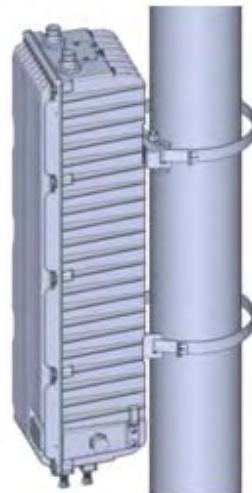


Figure 3-6 Fixing the unit to the Pole

- 4) Ensure all fixings are secure and ensure all connections are waterproof. Attach solar panel if required.



Figure 3-7 Pole Mounting Complete

3.5.4 Wall Mounting Installation

- 1) Fasten the four wall mount brackets to the slots of the JPW-7320 as shown in the figure below.

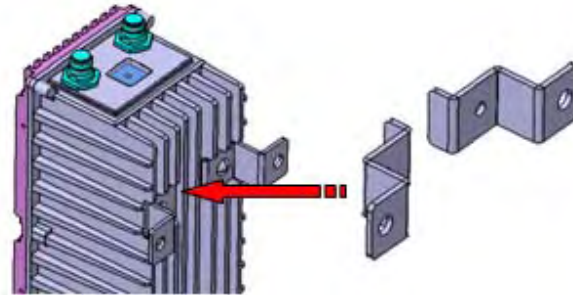


Figure 3-8 Attaching Wall Mount Brackets

- 2) Using anchor bolts or similar (depending on the installation wall material), fix the JPW-7320 to the wall.
- 3) Ensure all fixings are secure and ensure all connections are waterproof. Attach solar panel if required.

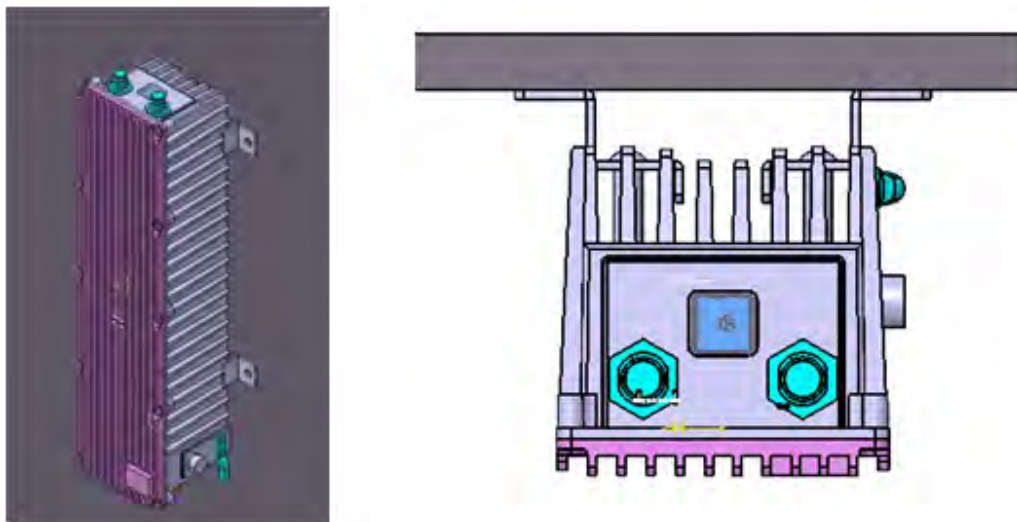


Figure 3-9 Wall Mounting Complete

3.5.5 Ground Wire Installation

Round terminals located on the side of a 0.75 mm² (18 AWG) or more wires Using permanently connected to earth

3.5.6 Cable Connecting Installation

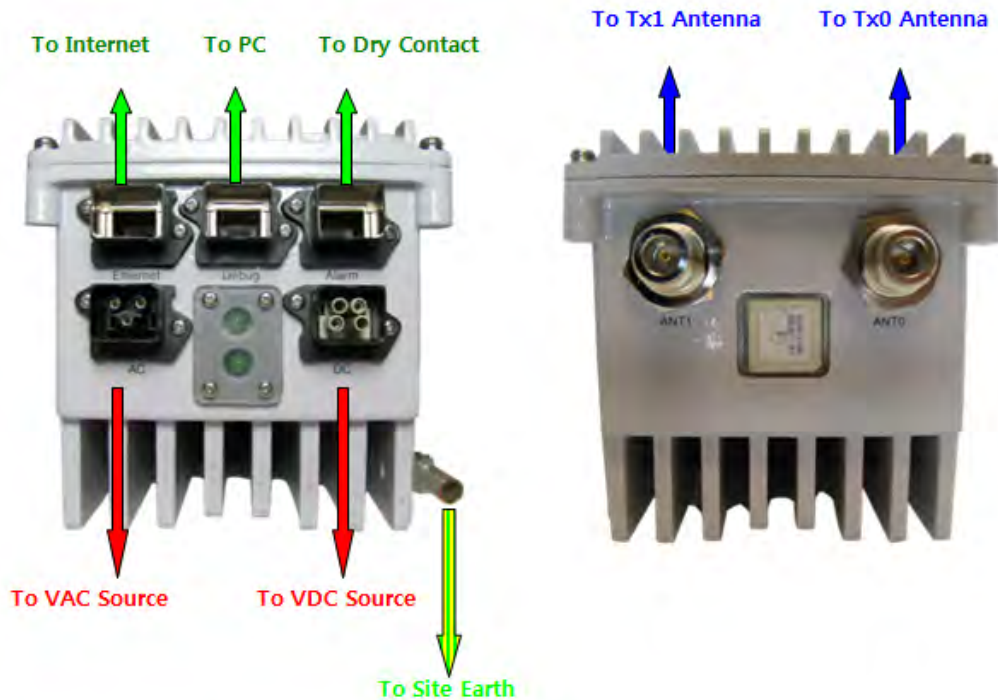


Figure 3-10 JPW-7320 Cable Connections



CAUTION

Before making any cable connections or supplying any power to the unit, ensure there is sufficient earth connection to the equipment by connecting an earth cable to the supplied Earth Terminal on the unit.



CAUTION DOUBLE POLE/NEUTRAL FUSING

- 1) Confirm that the unit is firmly mounted and connected to the site ground using the Earth Terminal located on the bottom side of the JPW-7320. Basically JPW-7320 is common ground system, so when power ground is well provided, outside Earth Terminal can not be used.
- 2) Connect the Ethernet cable from backhaul to the "Ethernet" port of the JPW-7320.
This equipment is indoor use and all the communication wirings are limited to inside of the building
- 3) If the unit is powered by AC, then connect the AC power using the cable harness to the "AC" port of the unit.
- 4) This power of this system shall be supplied through wiring installed in a normal building. If powered directly from the mains distribution system, it shall be used additional protection, such as overvoltage protection device.

- 5) If the unit is powered by DC, then connect the DC power using the cable harness to the “DC” port of the unit.
- 6) Connect the Alarm cable to the “Alarm” port of the unit. The Alarm cable connects to the dry contact interface on site.
- 7) Connect the “ANT0” port to the Tx0 antenna using RF feeder cable. The cable loss should be minimised (ie. <3dB).
- 8) Connect the “ANT1” port to the Tx1 antenna using RF feeder cable. The cable loss should be minimised (ie. <3dB).
- 9) If local control is required, connect the LMT cable (USB or RJ45) from the PC to the “Debug” port of the unit.

3.6 Cautions during Installation

- 1) Ensure the earth connections are made.
 - A. Attach all earthing cables to the Earth Terminals using the appropriated Crimp Tool.
 - B. Confirm the ground connection complies with the specifications.
- 2) Supply power to the equipment only after the correct cable connections are made.
 - A. All cable connections should be made correctly before supplying power to the equipment.

3.7 Storage of the JPW-7320

- 1) When storing the unit, it is recommended to pack the unit in its original packaging supplied by Juni.
- 2) The JPW-7320 should not be stored in a high temperature or humid environment. Avoid direct sunlight.

3.8 Maintenance

- 1) The JPW-7320 does not require regular maintenance under normal operation, however, it is recommended to check the condition of the unit occasionally for any abnormal alarms.
- 2) If the unit requires cleaning, to avoid static electricity and use a dry cloth.

3.9 Safety Instructions

- 1) If replacement is required, the power should be turned ‘OFF’ before taking any action.
- 2) To avoid the risk of accidental fire or electric shock, do not expose this product to rain or any other wet condition during installation or maintenance.
- 3) Only a qualified technician should service this equipment. Opening or removing covers may expose you to dangerous voltage and/or other risks. Incorrect assembly may cause electric shock when the appliance is subsequently used.
- 4) **Observe ALL warning and caution labels on the equipment and in this document.**

4 Operation

4.1 Introduction

The JPW-7320 can be controlled by a PC connected to the same network as the JPW-7320 using the Web Management tool.

The Web Management tool allows the user to monitor the status of the system and control all aspects of the system with a user-friendly Graphical User Interface (GUI).

4.2 JPW-7320 Web Management

4.2.1 Cable Connection

A notebook PC is required for web management to communicate with the JPW-7320.

To test if a PC is capable of accessing the Web Management tool, perform a ping command to the JPW-7320. If the ping command is successfully returned by the JPW-7320, then the PC is able to use Web Management via its web browser.

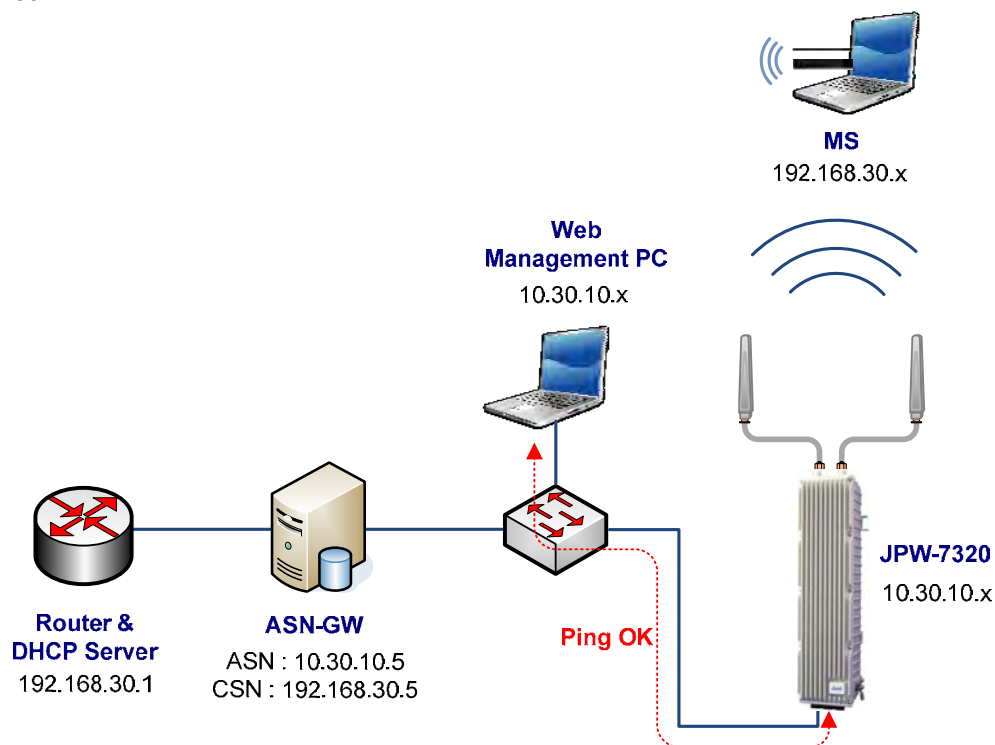


Figure 4-1 JPW-7320 Connection

4.2.2 Logging In to Web Management

- 1) To use the Web Management tool, open a web browser and enter the IP address of the JPW-7320 unit.
- 2) When the authentication page is displayed, enter the following credentials.
ID: admin
PWD: junifemto

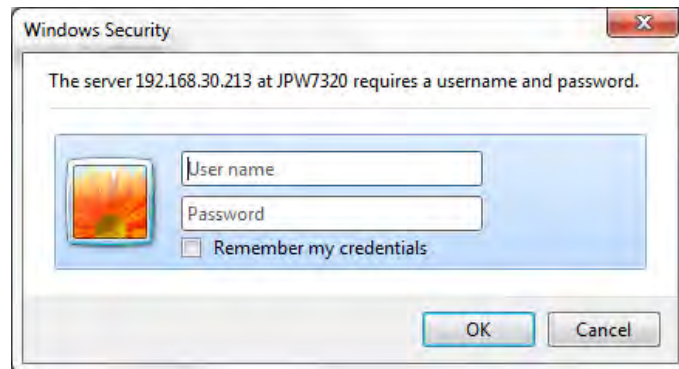


Figure 4-2 Authentication page

- 3) Successful login will display the initial page as shown below.



Figure 4-3 Initial Page

4.2.3 Saving Configuration Settings

- 1) To save the current configuration, go to [Configuration] → [Administration] → [Settings] on the left menu tree.

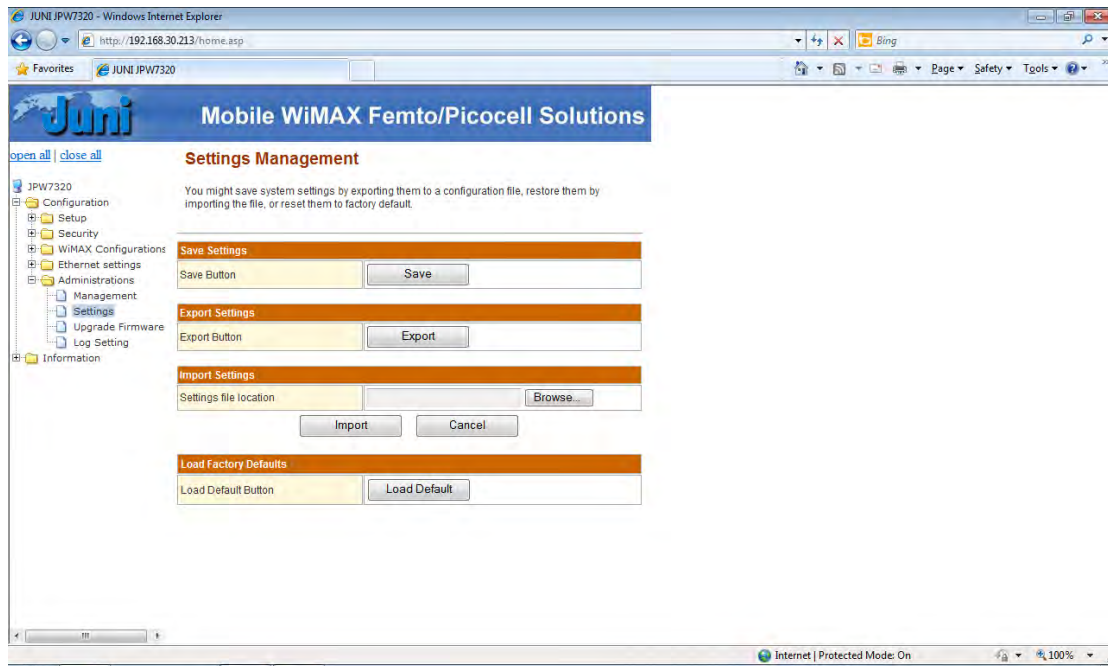


Figure 4-4 Settings Management Page

- 2) Click [Save]. Press the [OK] button on the confirmation window to save the current settings.



Figure 4-5 Confirmation Screen

4.2.4 JPW-7320 Reboot

Click the left menu: Configuration > Administration > Management.
Click Reboot Button.

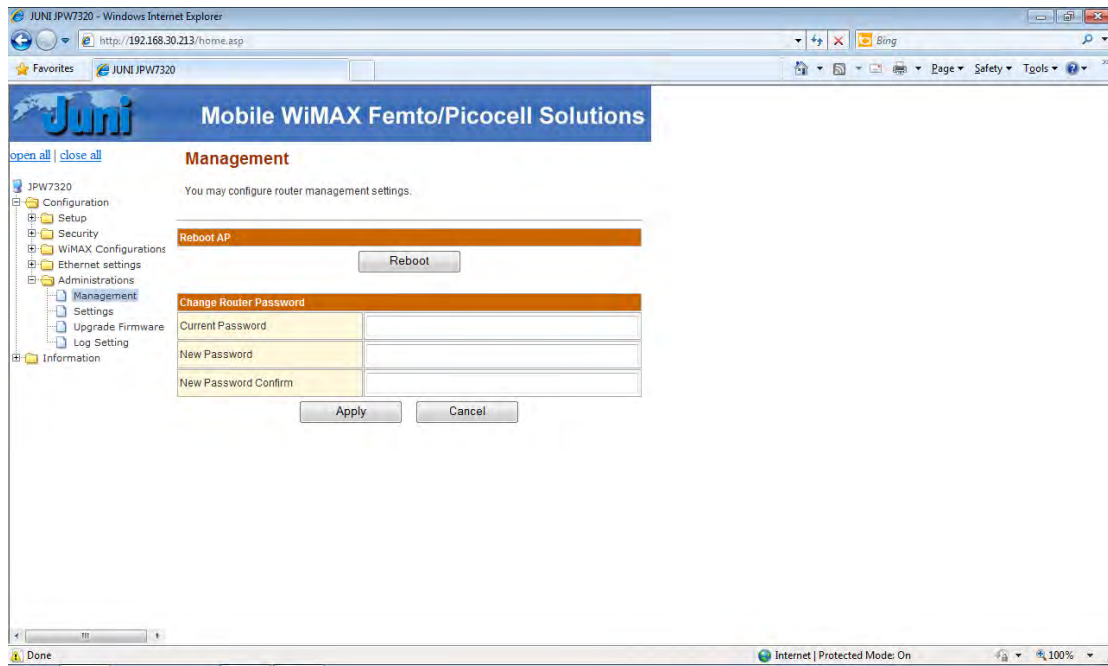


Figure 4-6 JPW-7320 Reboot

When the Reboot button is clicked and a pop-up window appears as follows, click 'OK' button.

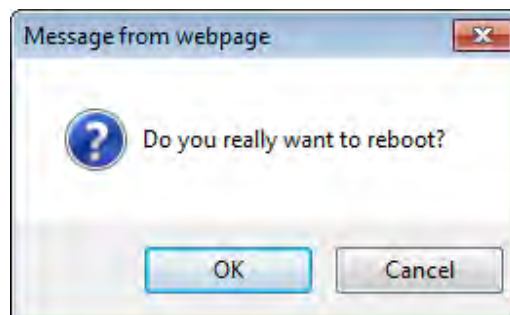


Figure 4-7 JPW-7320 Reboot Pop-up Window

When 'OK' is clicked, JPW-7320 will be rebooted and web page will show as follows.
When rebooted, the Management page will show up. Otherwise, type in the IP address of JPW-7320 to load Web Management Page.

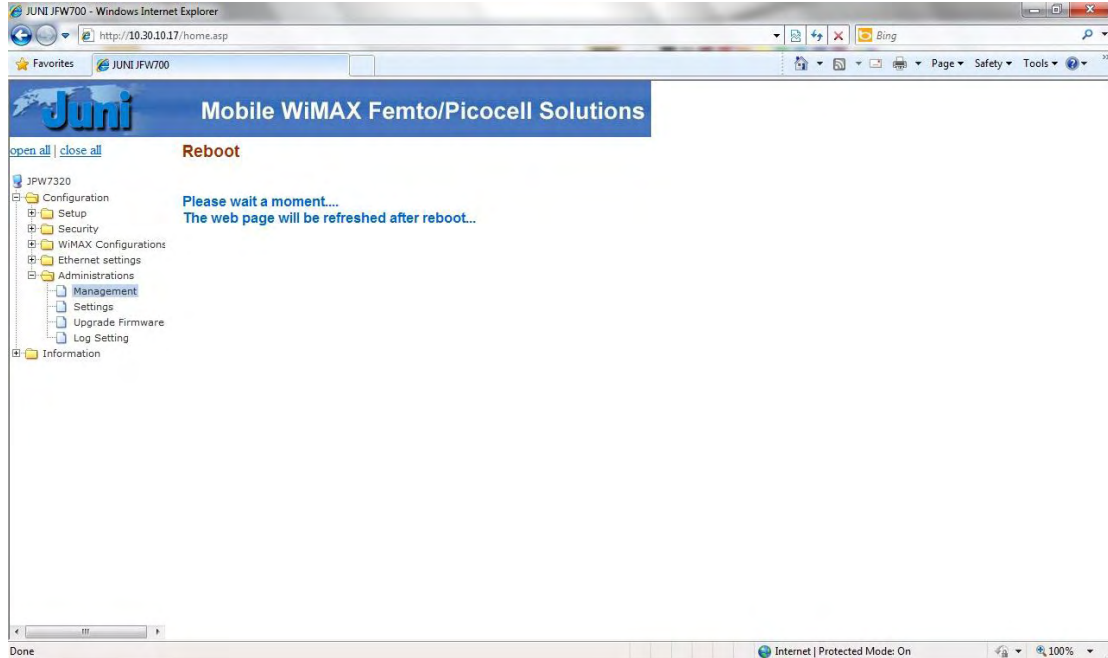


Figure 4-8 JPW-7320 Reboot Notification

4.2.5 JPW-7320 IP address Change

Click the left menu : Configuration > Setup > Internet.

Type in a new IP address and click the Apply button located at the bottom of the page.

Connection Type can be changed to DHCP : Select connection type → DHCP and click Apply button.

DHCP mode does not allow changing the IP Address manually.

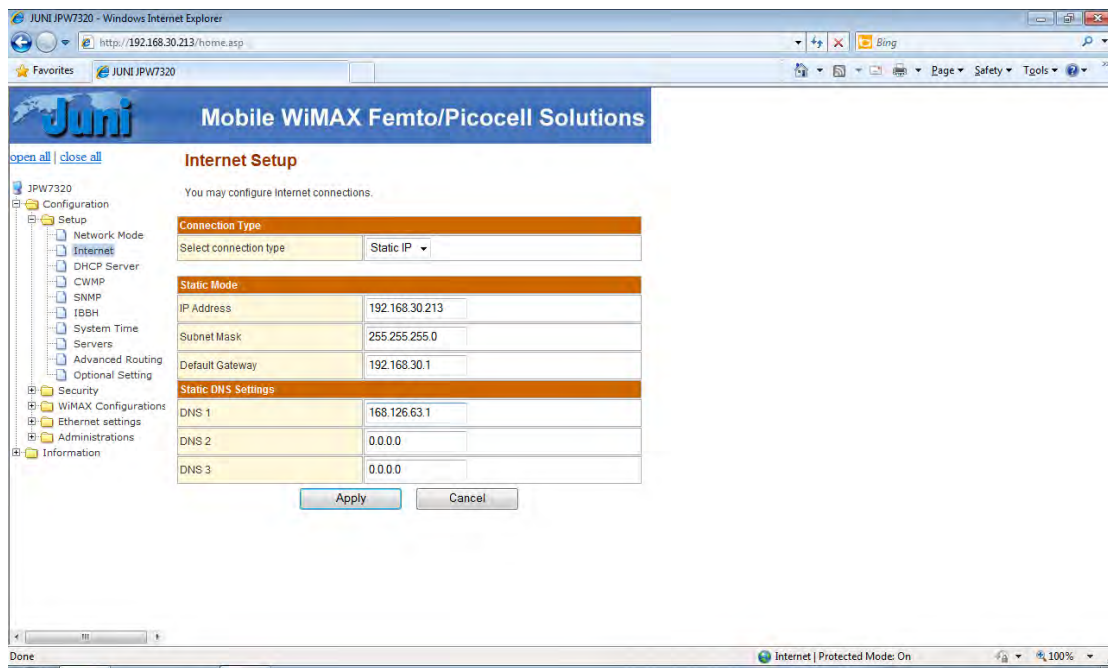


Figure 4-9 JPW-7320 IP Address Change

When Apply button is clicked, following page will show up. Then, Login Window will pop up, opening the web page with the new IP address. If the changed IP address is in different network, the web page will not open. If Configuration is not saved, it will go back to the previous IP address after reboot. (Configuration Save : refer to [4.2.3](#))

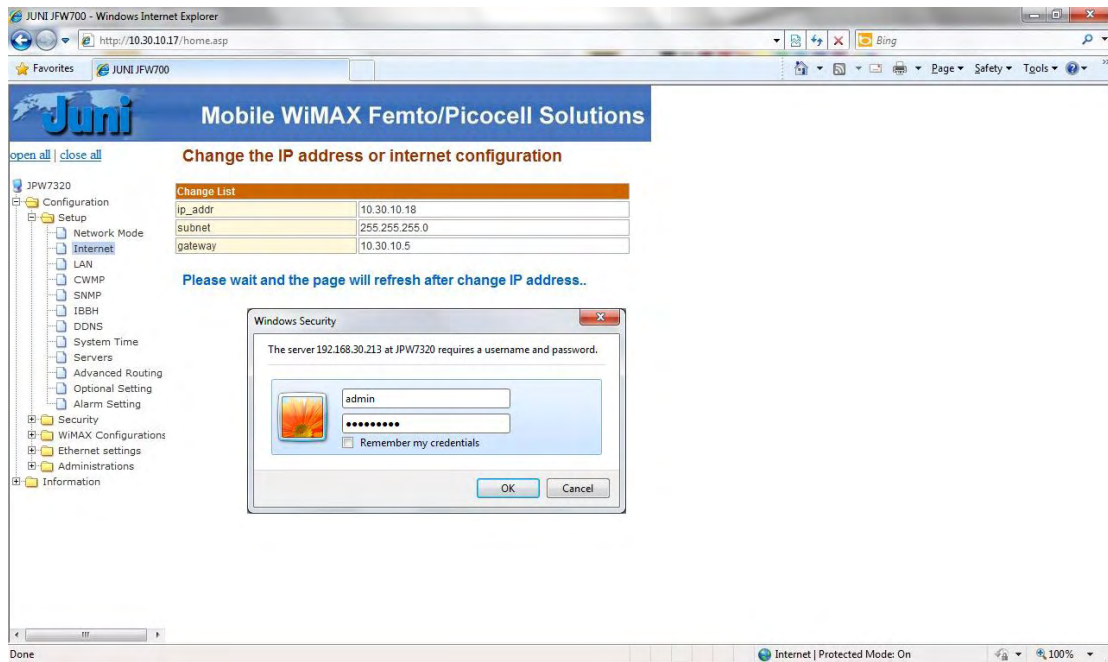


Figure 4-10 JFW-7320 IP Address Change Notification

4.2.6 JPW-7320 ASN-GW server IP Address Change

Click the left menu : Configuration > Setup > Servers.

Type in the ASN Gateway IP address and click the Apply button located at the bottom of the page.

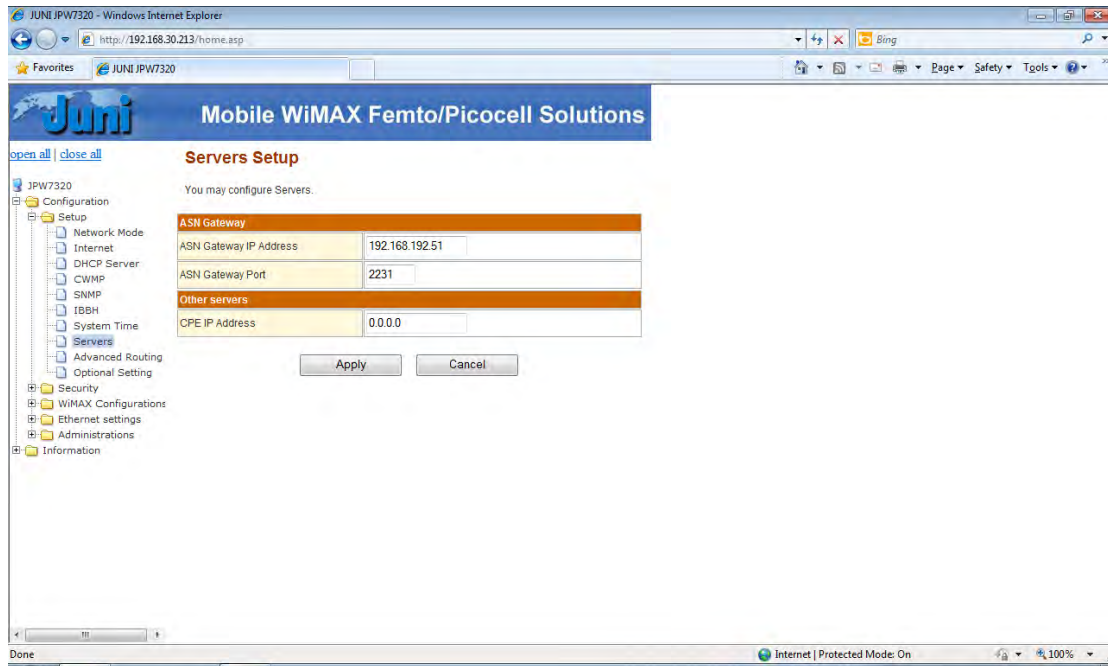


Figure 4-11 JPW-7320 ASN-GW IP Address Change

When Apply button is clicked, following pop-up windows will show up. ASN-GW IP address change is applied when JPW-7320 is rebooted. Configuration should be saved before JPW-7320 is rebooted. (Configuration Save: refer to [4.2.3](#))

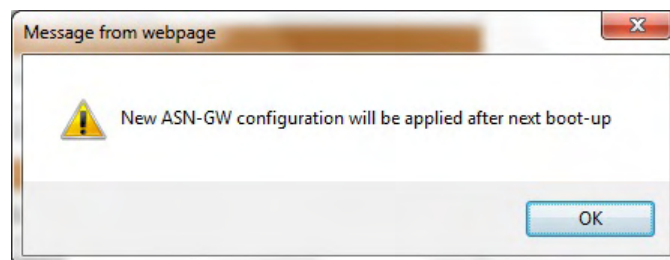


Figure 4-12 JPW-7320 ASN-GW IP Address Change Pop-up Window

4.2.7 JPW-7320 WiMAX Basic Configuration Change

Click the left menu : Configuration > WiMAX Configurations > Start-up

Select Segmentation Type, type in Preamble Index, Cell ID, BS ID and UL Permutation Base.

And click Apply button.

Segmentation Type is changeable. The value of Preamble Index is also changeable but it depends on Segmentation Type.

Segmentation Type and available value of Preamble index

- i. No Segmentation (preamble: 0-113)
- ii. Seg #0 DL/UL 1/3 (0-31, 96, 99, 102, 105, 108, 111)
- iii. Seg #1 DL/UL 1/3 (32-63, 97, 100, 103, 106, 109, 112)
- iv. Seg #2 DL/UL 1/3 (64-95, 98, 101, 104, 107, 110, 113)
- v. Seg #0 DL-only 1/3 (0-31, 96, 99, 102, 105, 108, 111)
- vi. Seg #1 DL-only 1/3 (32-63, 97, 100, 103, 106, 109, 112)
- vii. Seg #2 DL-only 1/3 (64-95, 98, 101, 104, 107, 110, 113)

Cell ID : 0 ~ 31 (Preamble Index % 32)

BS ID : 00:00:00:00:00:00 ~ FF:FF:FF:FF:FF:FF

UL Permutation Base : 0 ~ 127

If JPW-7320 is rebooted without configuration save, previous configuration will be loaded after booting.
 (Configuration Save: Refer to [4.2.3](#))

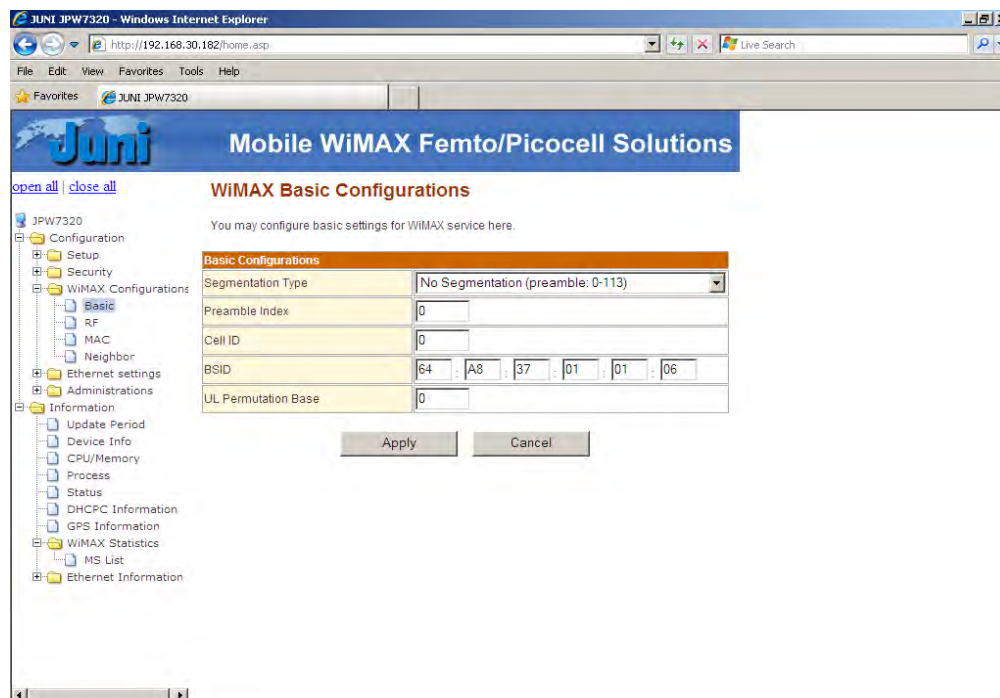


Figure 4-13 JPW-7320 WiMAX Basic Configuration Change

4.2.8 JPW-7320 RF Configuration Change (Frequency, Attenuation Change)

Click the left menu : Configuration > WiMAX Configurations > RF.

Type in Frequency, MAX path power, Tx/Rx Attenuation, select Antenna Mode and then click Apply button.

- i. Frequency range : 2505000 ~ 2695000 KHz (in case of 2.5GHz system)
- ii. Max path power range : 1 ~ 32 dBm
- iii. Tx/Rx Attenuation value : 0 ~ 40 dBm
- iv. Tx/Rx Antenna Mode : Single Antenna / Diversity Antenna
- v. Tx power at antenna post is limited from 23dBm to 32dBm because characteristics can not be guaranteed out of this range.

Block button prevent RF transmission and it applies on the fly.

If JPW-7320 is rebooted without configuration save, previous configuration will be loaded after booting.
(Configuration Save: Refer to [4.2.3](#))

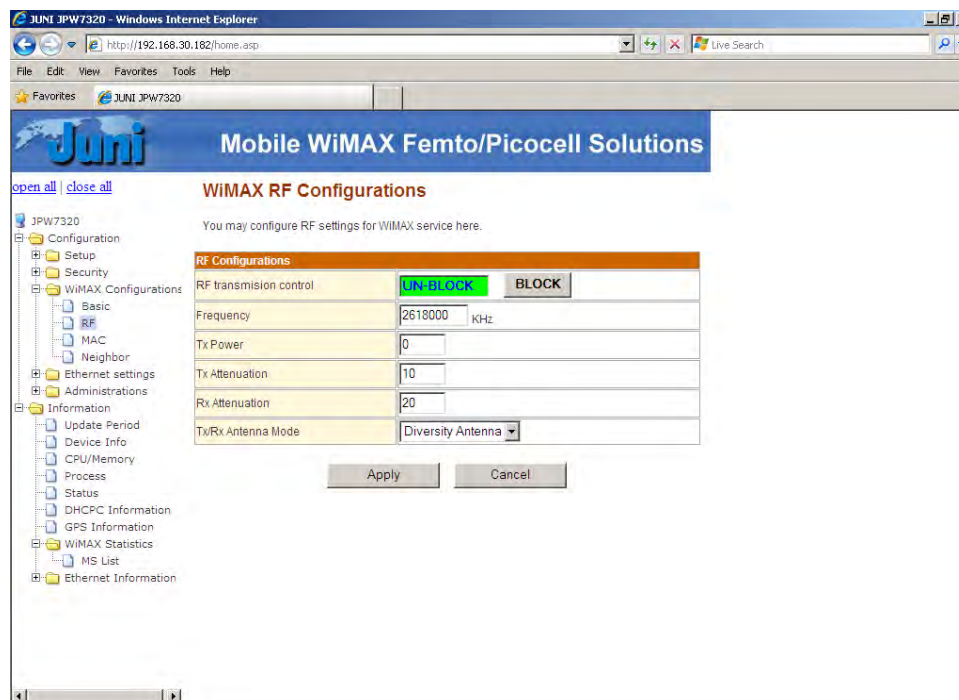


Figure 4-14 JPW-7320 RF Configuration Change (Frequency, Attenuation, etc.)

4.2.9 JPW-7320 MAC Configuration Setting

Click the left menu : Configuration > WiMAX Configurations > MAC

It can be changeable the ARQ, Auth. Policy, PHS, Mobility Feature, DL/UL HARQ, UL CSM mode, MIM, DL/UL MAP Repetition and Paging Interval.

Items and values for Common Configuration

- i. ARQ Support : Disable / Enable
- ii. Auth Policy Control : Disable / EAP Support
- iii. Packet PHS Support : Disable / Enable
- iv. Mobility Feature: Mobility (HO), Sleep Mode, Idle Mode
- v. DL HARQ Support : Disable / Enable
- vi. UL HARQ Support : Disable / Enable
- vii. UL CSM Mode : Disable / UL-CSM with highest priority / UL-CSM with lowest priority
- viii. MIMO Matrix-A Mode : Disable / Highest Priority / 2nd Priority / 3rd Priority / Lowest Priority
- ix. MIMO Matrix-B Mode : Disable / Highest Priority / 2nd Priority / 3rd Priority / Lowest Priority
- x. DL/UL MAP Repetition : No Repetition / 2 Repetition / 4 Repetition / 6 Repetition
- xi. Paging Interval : 100 ~ 10000 frame

4 Paging Group IDs can be configured.

Click Add button, type in the Paging Group ID and click Apply button. Paging Group ID will be added.

Edit the value of Paging Group ID and click Apply button. Paging Group ID will be changed.

Click the check box of Paging Group ID and click Delete button. Paging Group ID will be deleted.

Trigger items (Type Act, Value, Duration) for handover can be configured.

Value range of all items is 0 ~ 255.

Type Act is a trigger condition and the value of Type Act is the combination of Type, Function and Action of Table 4-1.

Value is the trigger value used in comparing measured metric for determining a trigger condition.

Duration is the trigger averaging duration is the time measured in number of frames over which the metric measurements are averaged

Refer examples of Table 4-2 to determine the value of Trigger items (Type Act, Value & Duration).

If JPW-7320 is rebooted without configuration save, previous configuration will be loaded after booting.
(Configuration Save : Refer to 4.2.3)

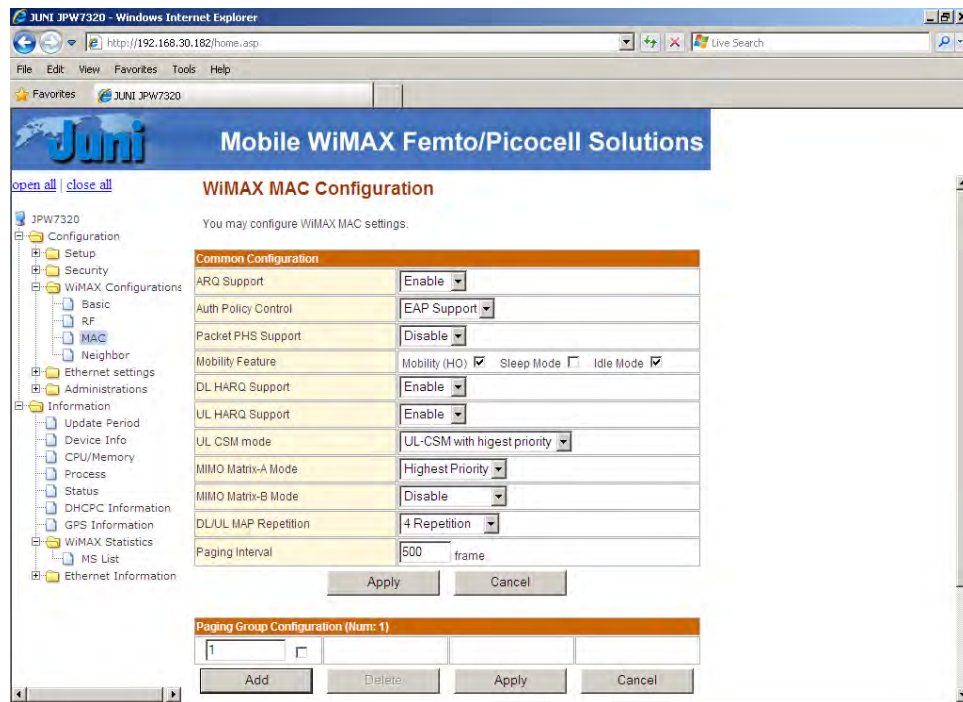


Figure 4-15 Setting MAC Configuration 1

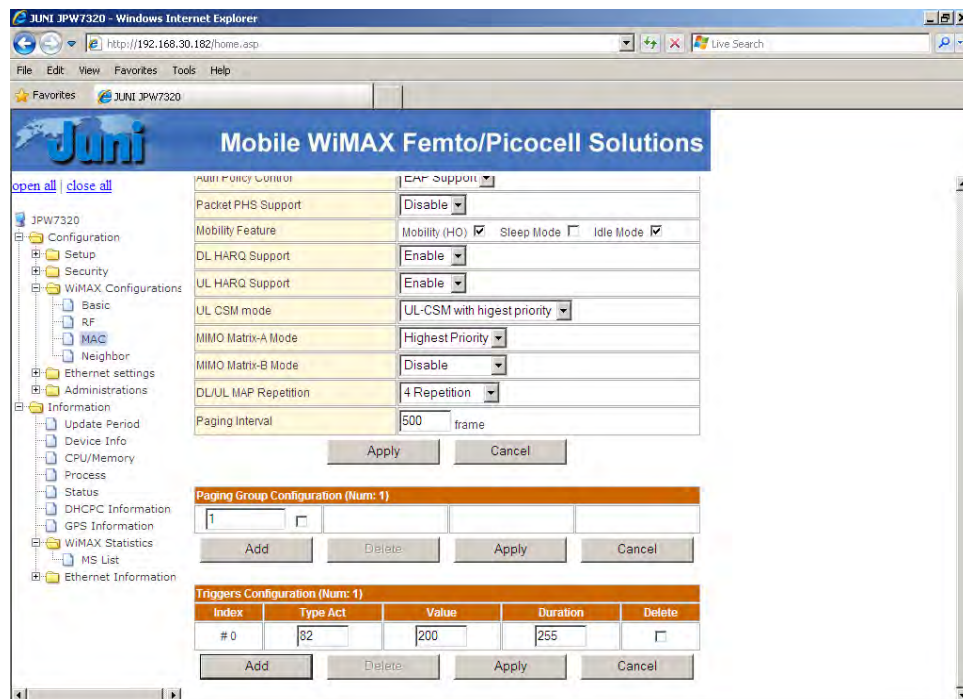


Figure 4-16 Setting MAC Configuration 2

1

Name	Length (bit)	Value
Type	2 (MSB)	- 00: CINR - 01: RSSI
Function	3	- 001: Metric of neighbor BS is greater than absolute value - 010: Metric of neighbor BS is less than absolute value - 011: Metric of neighbor BS is greater than serving BS metric by relative value - 100: Metric of neighbor BS is less than serving BS metric by relative value - 101: Metric of serving BS greater than absolute value - 110: Metric of serving BS less than absolute value - When type 0x1 is used together with function 0x3 or 0x4, the threshold value shall range from -32 dB (0x80) to +31.75 dB (0x7F). - When type 0x1 is used together with function 0x1, 0x2, 0x5 or 0x6, the threshold value shall be interpreted as an unsigned byte with units of 0.25 dB, such that 0x00 is interpreted as -103.75 dBm and 0xFF is interpreted as -40 dBm
Action	3 (LSB)	- 001: Respond on trigger with MOB_SCN-REP after the end of each scanning interval - 010: Respond on trigger with MOB_MSHO-REQ - 011: MS shall start neighbor BS scanning process by sending MOB_SCN-REQ, by initiating Autonomous neighbor cell scanning or both. - NOTE—0x3 is not applicable when neighbor BS metrics are defined (i.e., only Function values 0x5 or 0x6 are applicable).

2

Table 4-1 Trigger (Type/function/action) description

3

4

Trigger Condition	Trigger Value		Description
Send MOB_MSHO-REQ if CINR of Neighbor is greater than 20 dB.	Type Act	10	Type: 00 + Function : 001 + Action: 010 = 00001010 = 10
	Value	40	20 * 2(0.5 dB step)
	Duration	200	
Send MOB_MSHO-REQ if RSSI of Neighbor is greater than -50 dBm.	Type Act	74	Type: 01 + Function : 001 + Action: 010 = 01001010 = 74
	Value	215	-103.75 + x = -50, x = 53.75, y = x * 4 = 215 (0.25 db step)
	Duration	255	
Send MOB_SCN-REQ if CINR of Serving is less than 10 dB.	Type Act	51	Type: 00 + Function : 110 + Action: 011 = 00110011 = 51
	Value	20	10 * 2(0.5 dB step)
	Duration	255	

5

Table 4-2 Example of Trigger values

6

4.2.10 JPW-7320 Neighbor Configuration Setting

Click the left menu : Configuration > WiMAX Configurations > Neighbor

Type in the value of MOD_NBR_ADV Tx Interval, then the interval of neighbor advertisement message will be changed.

It should be less than 30 seconds.

Then neighbor list will show up.

Click Add button then it is able to type in the information of new neighbor.

Click Detail button then detail information of selected neighbor index will show up.

Configuration Information for Neighbor

- BSID
- Segmentation Type
- Preamble Index
- UCD Config Change Count
- DCD Config Change Count
- Mobility Feature
- PHY Profile ID
- UL Permutation Base

Detail Information for PHY Profile ID

- Co-located FA indicator
- FA configuration indicator
- Unsynchronized / Time synchronization / Time and Frequency synchronization
- BS-EIRP indicator
- DCD/UCD Reference Indicator
- FA Index Indicator
- Trigger Reference Indicator

Paging Group and Trigger information of Neighbor BS should be configured.

If JPW-7320 is rebooted without configuration save, previous configuration will be loaded after booting.
(Configuration Save : Refer to [4.2.3](#))

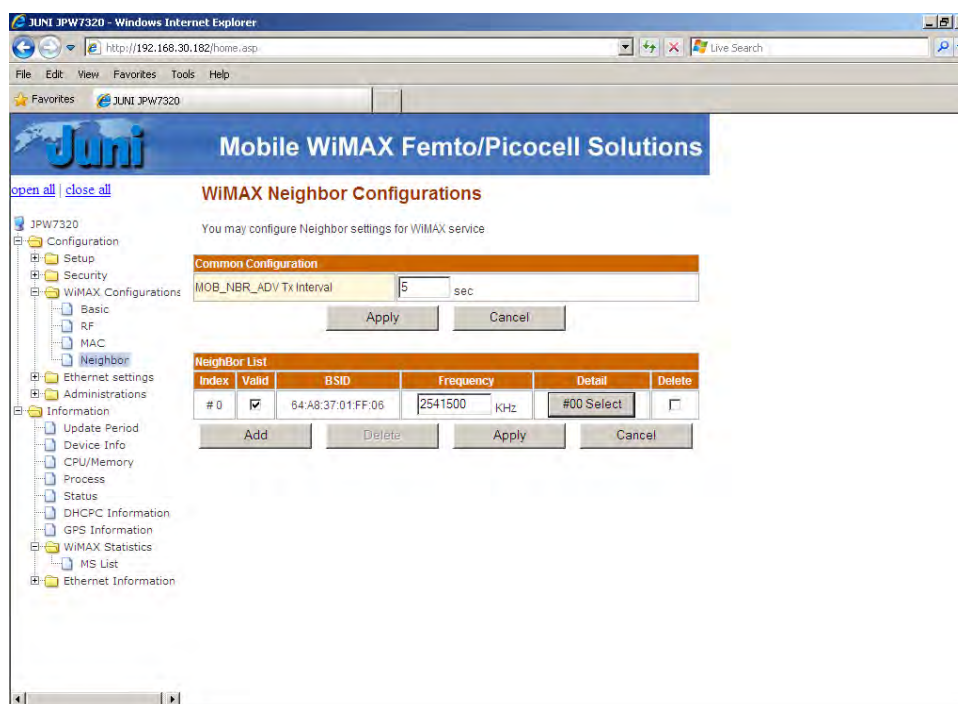


Figure 4-17 Setting Neighbor Configuration 1

JUNI 3PW7320 - Windows Internet Explorer
 http://192.168.30.213/home.asp

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WIMAX Neighbor Configurations

You may configure Neighbor settings for WIMAX service

Common Configuration

MOB_NBR_ADV Tx Interval: 5 sec

Apply Cancel

Neighbor List

Index	Valid	BSID	Frequency	Detail	Delete
# 0	<input checked="" type="checkbox"/>	64:A8:37:01:FF:06	2541500 KHz	#00 Select	<input type="checkbox"/>
# 1	<input type="checkbox"/>	64:A8:37:01:01:06	30908 KHz	#01 Select	<input type="checkbox"/>

Add Delete Apply Cancel

Neighbor Detail Configuration of #> 1 64:A8:37:01:01:06

BSID: 64 A8 37 01 01 06

Segmentation Type: Select Sdgm ID

Preamble Index: 0

UCD Config Change Count: 0

DCD Config Change Count: 0

Mobility Feature: Mobility (HO) ☐ Sleep Mode ☐ Idle Mode ☐

PHY Profile ID (Hex): 0 (Hex) Show Details Hide

UL Permutation Base: 0

Hide **Detail PHY Profile ID**

☐ collocated FA Indicator

☐ FA configuration indicator

Unsynchronized

☐ BS-EIRP Indicator

☐ DCD/UCD Reference Indicator

☐ FA Index Indicator

☐ Trigger Reference Indicator

Apply Cancel

DL Channel Paging Group (Num: 1)

1 ☐

Add Delete Apply Cancel

DL Channel Triggers Configuration (Num: 1)

Index	Type Act	Value	Duration	Delete
# 0	02	200	255	<input type="checkbox"/>

Add Delete Apply Cancel

Figure 4-18 Setting Neighbor Configuration 2

1
2
3

4.2.11 JPW-7320 SW Image Upgrade

Click the left menu : Configuration > Administrations > Upgrade Firmware.

Click 'Browse' button, to find and open a S/W image file, and then click Apply to proceed S/W Upgrade.

When upgrade is finished, JPW-7320 reboots automatically. When upgrade is ongoing, manual reboot is not allowed.

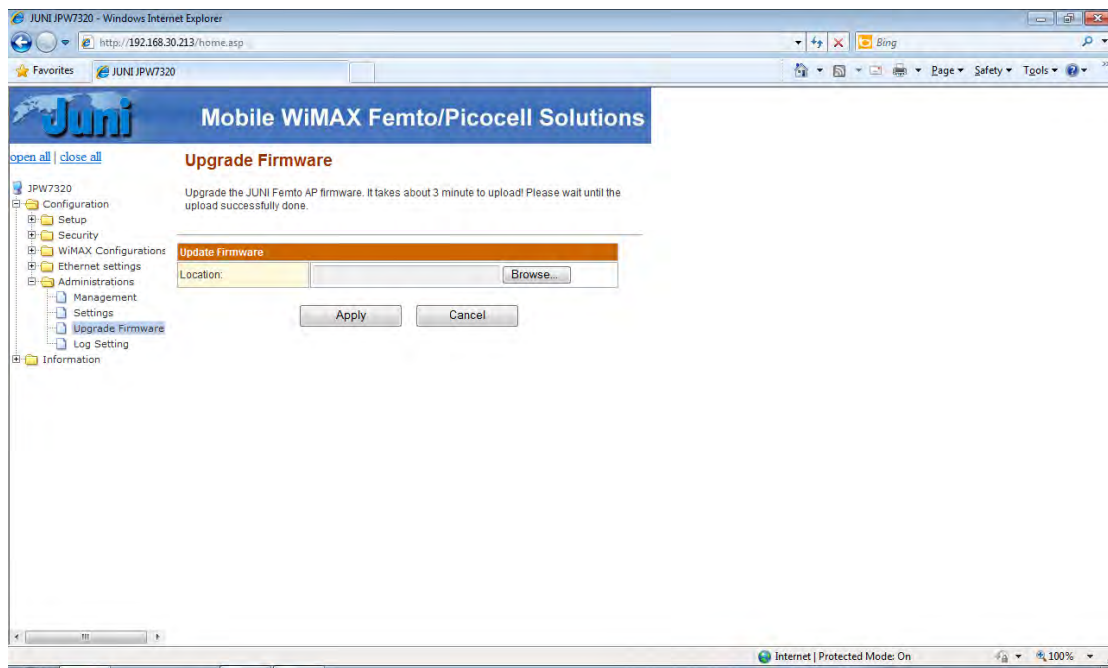


Figure 4-19 JPW-7320 SW Image Upgrade Page

4.2.12 JPW-7320 MS Status Check

Click the left menu : Information to check basic information of JPW-7320, such as Device Information.

Click the left menu : Information > WiMAX Statistics > MS List to check MS statistic information of JPW-7320.

MS List with status will be displayed.

MS Status

- i. Initial Ranging Requested
- ii. Initial Ranging Completed
- iii. SBC Requested
- iv. SBC Completed
- v. REG Requested
- vi. REG Completed
- vii. Auth Requested
- viii. UnReg Requested
- ix. UnReg Completed
- x. Waiting Entry
- xi. Scan Duration
- xii. Scan Interleaving
- xiii. HO Preparation
- xiv. HO Action
- xv. HO Ranging
- xvi. HO Retain
- xvii. Idle Mode
- xviii. Paging Period
- xix. Location Update
- xx. DeRegistration

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JPW7320

- Configuration
- Information
 - Update Period
 - Device Info
 - CPU/Memory
 - Process
 - Status
 - DHCP Information
 - GPS Information
 - WiMAX Statistics
 - MS List**
 - Ethernet Information

WiMAX MS List

Display current WiMAX MS List.

No	MSID	B-CID	P-CID	Status
0	00:21:07:00:65:20	1	129	SBC Completed
1	00:21:07:00:42:91	2	130	REG Completed

To be refreshed after 1 seconds

Figure 4-20 JPW-7320 WiMAX MS List

Click button of MS-ID value, then detail information of MS will be displayed.

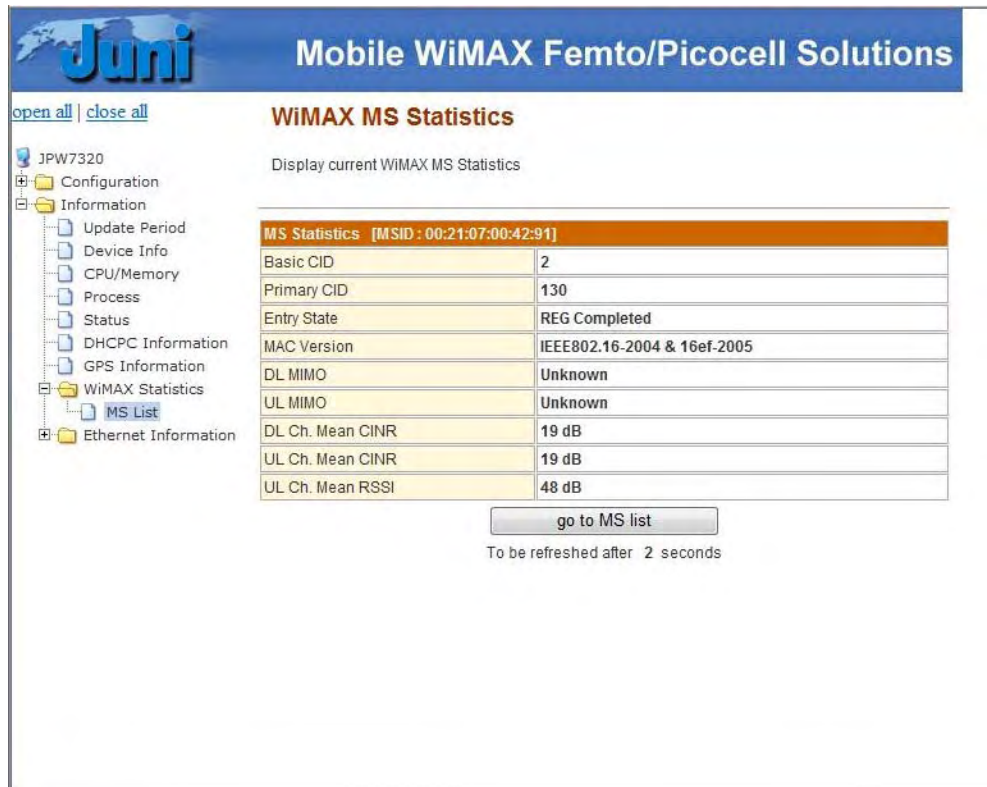


Figure 4-21 JPW-7320 WiMAX MS Statistics

4.2.13 JPW-7320 Device Information Check

Click the left menu : Information > Device Info to check current device information of JPW-7320, such as, MAC Address, Serial Number, SW Version, HW Version and Up Time.

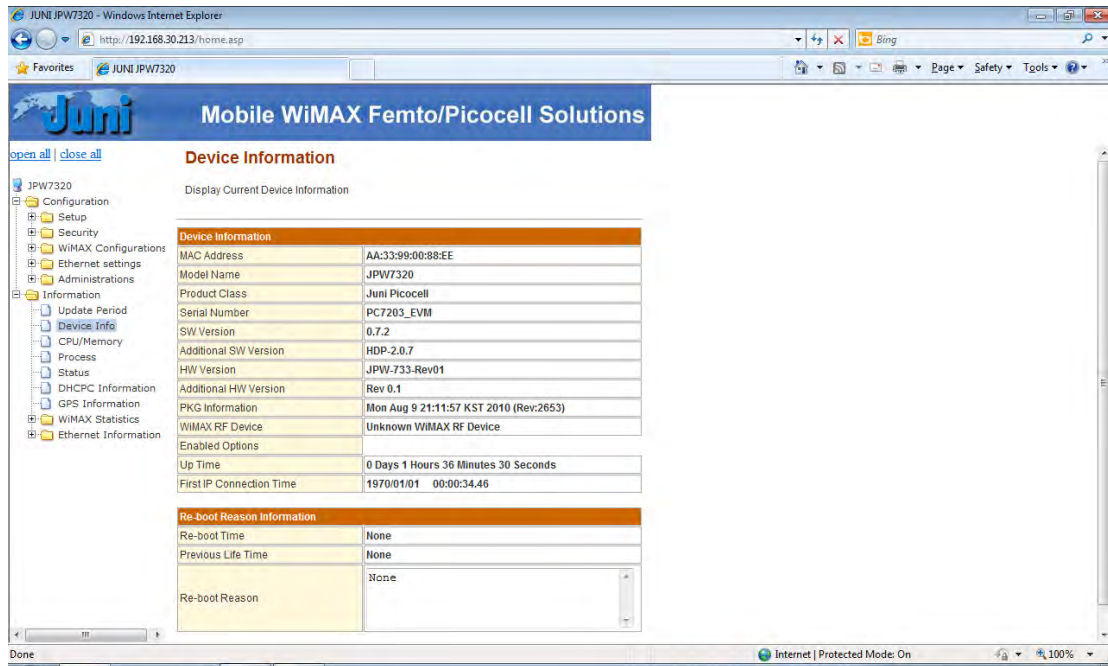


Figure 4-22 JPW-7320 Device Information Check

4.2.14 JPW-7320 S/W and H/W Status Check

Click the left menu : Information > Status to check current SW and HW status of JPW-7320.

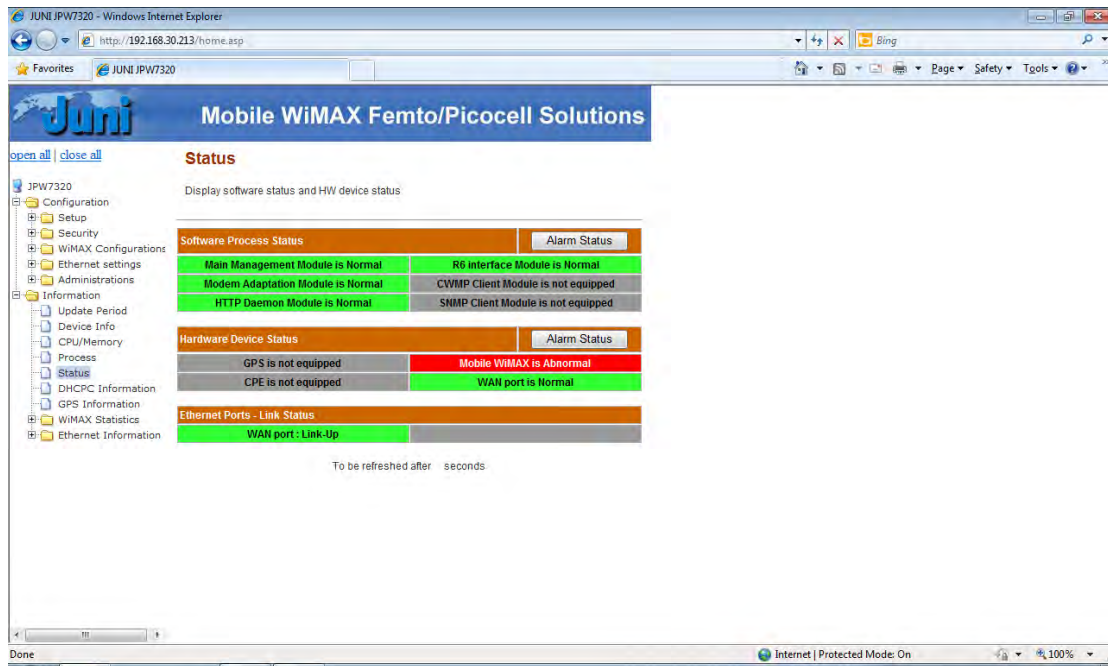


Figure 4-23 JPW-7320 Status Check

5 Functions and Features

5.1 Introduction

The JPW-7320 supports various functions and features to enhance its performance including (but not limited to) the following:

- Web Management
- Low Power Consumption
- MIMO Operation
- Automatic provisioning, configuration and alarm management
- Automatic optimisation and interference management

5.2 Web Management

The Web Management tool allows the user to connect a PC to the system allowing full control of the unit. The user is required to be on the same network as the JPW-7320, and all required is a web browser with the correct authentication details.

Once logged in, the Web Management tool enables simple yet comprehensive control of all JPW-7320 functions and parameters in a user-friendly GUI.

For detailed information on the Web Management operation, see section **4.2 Web Management Operation**.

5.3 Low Power Consumption

Using the latest technology and power saving innovation, the JPW-7320 uses less than 80W of power under full load.

With this extremely low power consumption, coupled with easy installation, the JPW-7320 is ideal for solar cell installations.

5.4 MIMO Operation

Using multiple antennas with MIMO (multiple-input and multiple-output) operation improves performance by increasing its spectral efficiency and link diversity, leading to increased data throughput and link range.

The JPW-7320 operates on 2 x MIMO using two antennas to transmit WiMAX signals. Each output is capable of 1.5W (32dBm) of power – more if antenna gain is considered.

5.5 Automatic Provisioning through JS-100

Through a connection to JS-100(ACS server), automatic provisioning is provided. Automatic provisioning is by CWMP technology based on TR-069 and provides Remote Firmware Update, Alarm Management & Logging Statistics, and Automatic Configuration of PHY/MAC parameters. For more details, see the JS-100 Manual.

5.6 Automatic Optimisation

Through a connection with JS-200(SON Server), automatic optimization is provided. Automatic Optimization provides Radio Parameter Optimization for Interference Mitigation, Ranging, HO, QoS and Load Balancing Parameters and adaptation when other basestation added and etc.. For more details, see the JS-200 manual.

Appendix 1. Specifications

A1.1 System Specification

Characteristics		Specification	Remarks
Frequency Range	DL	2300 ~ 2390MHz	TDD
	UL	Same with above	
Output Power	DL	32dBm x 2 (MIMO)	64-QAM Full Sub-channel PUSC
Channel Bandwidth		10MHz	
Noise Figure		5dB	
Tx/Rx Transition Time		35 usec	
EVM		Minimum -30dB	
Size		120 x 124 x 500 mm	W x D x H
Weight		9kg	
Power Supply		100-240V	
Power Consumption		< 50W	
Operating Temperature		-20 ° C ~ +50 ° C	
Storage Temperature		-40 ° C ~ +85 ° C	
IP rating		IP65	
Arrester characteristics		Frequency range (DC~3000MHz), Impedance (50ohm), VSWR [max 1.2 (measured DC~3000MHz)], Insertion loss [max 0.2dB (measured DC~3000MHz)], Surge voltage (1.2 * 50us 6kV/3kA)	
Power surge protection		2KV at L-L and L-G	

Table A-1-1 RF, Mechanical & Electrical Specifications

A1.2 Required Ground Specification

- Basically JPW-7320 is common ground system between power ground and communication ground, so when power ground is well provided, the below communication ground installation can not be used.
- Ground wire : Diameter should be bigger than 1.6mm or the cross-sectional area should be bigger than 2mm² (bigger than 14AWG). In case of aluminum wire, the diameter should be bigger than 2.6mm and the wire should be outdoor type wire.
- Ground : Ground scheme should comply the IEEE/ANSI STD 81-1983. Even though the grounding resistor is required to be less than 10 ohm, Juni recommends to use resistor less than 5 ohm. It should use ground different from lightning protection ground.
- Grounding type : JPW-7320 uses common grounding scheme and exterior ground does not have to be grounded if the power ground works fine. However, if the capacity of power grounding is considered to be not big enough, Juni recommends to use the exterior ground using the ground socket located at the bottom of JPW-7320.

A1.3 General Specifications

- IEEE 802.16e-2005/Cor2 PHY and MAC
- R6 Profile C
- 1.5 Watt x 2 (32 dBm MIMO) RF output power
- 10MHz channel bandwidth
- QPSK, 16QAM, 64QAM modulation
- 1/8 cyclic prefix, 5 msec frame
- 100 active users
- Juni Provisioning (JS-100) and SON Servers (JS-200) support
- In-band backhaul unit.support

A1.4 Data Access

- IP protocol LAN over Ethernet, 10/100 Base-T
- IPv4, IPV6, VLAN IEEE 802.1Q
- Optional xDSL or DOCSIS 2.0 or 3.0 cable modem support

A1.5 Standards Compliance

- IEEE 802.16e-2005/Cor2
- IPSec

A1.6 Interface Pin and Connector Specification

Interface	Part	Connector Type	Vendor PN	Pin no	Signal Description
Alarm Dry contact & Test Reference	Digital Board	2.0mm pitch, Box Header, 2x4pin	SOLITECH CH7420V100	1	Common
				2	AC Fail
				3	DC Output Warning
				4	Battery Disconnect
	Enclosure	HartingPushPull Compact panel feed through RJ45 Plastic	HARTING 09 45 245 1102	5	Cable sense
				6	TDD Sync
				7	GND
				8	10Mhz Reference
Maintenance	Same as Alarm				Ethernet
BackHAUL					Ethernet
AC Power	Enclosure	HartingPushPull Power 2/0 panel feed through for 250V Power supply Plastic with crimp term	Harting 09 46 245 3410	1	AC Live
				2	ACNeutral
				3	Frame GND
DC Power (option)	Enclosure	HartingPushPull Power 4/0 panel feed through for low voltage 48V application Plastic with climp term	Harting 09 46 245 4400	1,2	GND
				3,4	30V

Table A-1-2 Interface Pin and Connector Specification

A1.7 RF Tx Specification

Parameter	Condition	Target Spec	Remark
RF Frequency Range	All modulation and coding scheme supported about the mobile WiMAX standard	2300 ~ 2390MHz	
Output Power	64-QAM Full Sub-channelPUSC	1.5W(=32.2dBm)	Measured at the antenna connector
TX EVM	64-QAM Full Sub-channelPUSC	Minimum -30dB	About all operating frequency range
TX Spectrum Mask	Fc 5 MHz	-8dB	About all operating frequency range, 64-QAM Full Sub-channel PUSC, 1W output power
	Fc 7.1 MHz	-32dB	
	Fc 10.6 MHz	-38dB	
	Fc 20MHz	-50dB	
TX Spurious(30MHz ≤ F < 1000MHz)	30MHz ≤ F < 1000MHz @ RBW 100KHz	Minimum -36dBm	Same as the ITU-R standard
TX Spurious(1GHz ≤ F < 21.2 GHz)	1 MHz ≤ F < 21.2 MHz @ RBW 1 MHz	Minimum -30dBm	

Table A-1-3 RF Tx Specification

A1.8 RF Rx Specification

Parameter	Condition	Target Spec	Remark
RF Frequency Range	All modulation and coding scheme supported about the mobile WiMAX standard	2300 ~ 2390MHz	
Noise Figure			TBD
RX Sensitivity(2 Branch: 2 Receiver) @ r	-	-	In accordancewiththe802.16estandard
RX Maximum Input Level @ AWGN	16QAM– 3/4, PER: 0.4%	Minimum -45dBm	1 PDU/Frame, PDU Size : 576 Bytes

Table A-1-4 RF Rx Specification

Appendix 2. Interface Layout

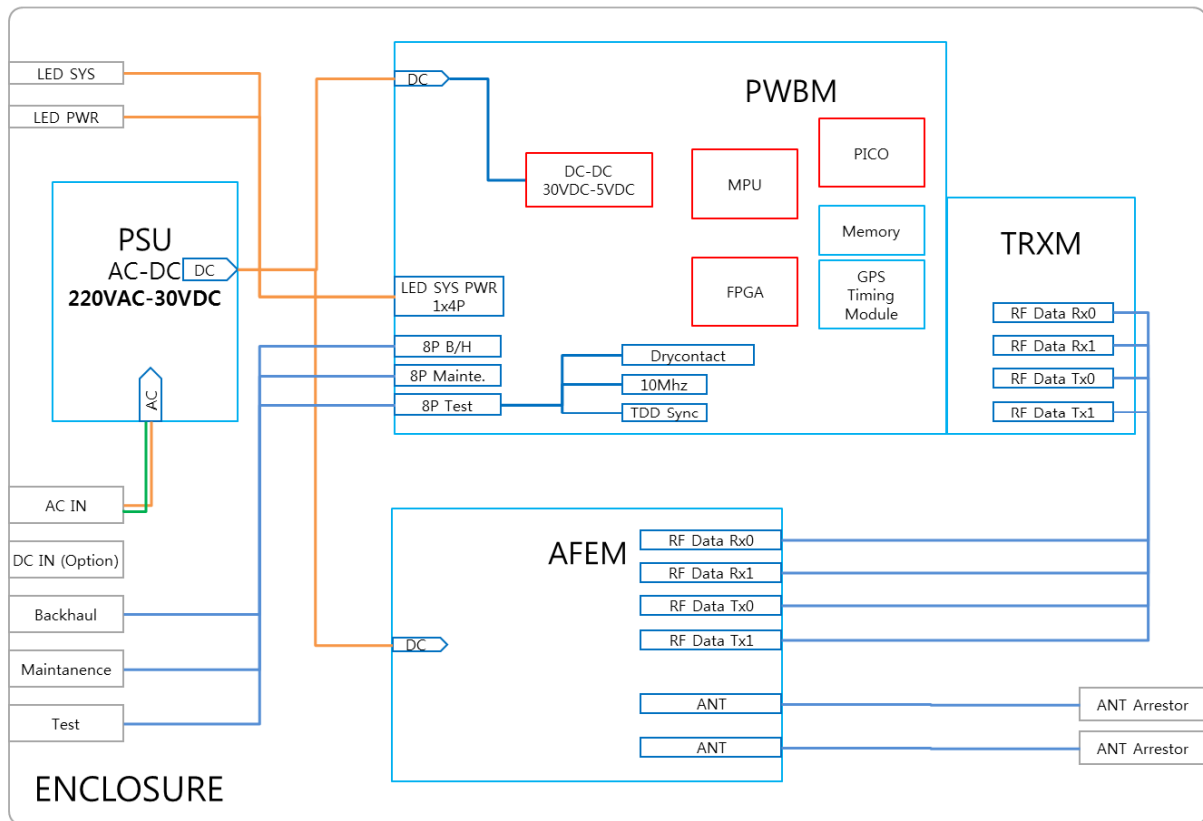



Figure A-2-1 JPW-7320 Interface Layout

Appendix 3. Reference of Linkbudget

		Downlink		Uplink	
		MAP	Data	Ranging	Data
Data Rate (physical layer)	kbps		512		128
Permutation		PUSC	PUSC		PUSC
MCS		QPSK 1/2	QPSK 1/2		QPSK 1/2
Repetition	2/4/6	6			
MIMO Mode (SIMO mode)		2 Rx. Diversity	2 Rx. Diversity	2 Rx. Diversity	2 Rx. Diversity
TDD Channel Bandwidth	MHz	10	10	10	10
Assumption					
# of Tx Antenna		1	2	1	1
# of Rx Antenna		2	2	2	2
# of Subcarriers (N_{FFT}) / # of Used Subcarriers (N_{USEP})		1024 / 840	1024 / 840	1024 / 840	1024 / 840
Subcarrier Spacing	KHz	10.9375	10.9375	10.9375	10.9375
# of Data Subcarriers per Subchannel		48	48		48
# of Pilot Subcarriers per Subchannel		8	8		24
Total # of Subchannels		30	30		36
# of Subchannels to Meet Throughput		30	5	16	3
Subchannel BW	KHz	308.3	308.3	262.5	262.5
Total BW Allocated for Link Budget Analysis	KHz	9187.5	1531.3	1575.0	787.5
TX					
Pilot Power Boosting	dB	2.5	2.5	0	0
Loss due to Pilot Powers	dB	0.5	0.5	0	0
Maximum Tx Power (1W)	dBm	30	30	30	30
Cable Loss	dB	1.5	1.5	0	0
Antenna Gain (8dB) + MIMO Gain (3dB)	dB	3	11	3	0
TX EIRP	dBm	36.0	39.0	22.0	22.0
TX EIRP per Occupied Bandwidth	dBm	36.0	31.3	22.0	22.0
RX					
Thermal Noise Density	dBm/Hz	-174	-174	-174	-174
Noise Bandwidth	KHz	9187.5	1531.3	1575.0	787.5
Noise Bandwidth	dB-Hz	69.6	61.9	62.0	59.0
RX Noise Power	dBm	-104.4	-112.1	-112.0	-115.0
RX Antenna Gain	dB	0	0	11	11
Cable Loss	dB	0	0	1.5	1.5
Interference Margin	dB	3	3	3	3
RX Noise Figure	dB	7	7	5	5
Required SINR (AWGN)	dB	-2.5	3.8	-0.5	3.2
Required SINR (Ped-B)	dB	1.5	8.8	5	8.6
Other margin	dB	0	0	0	0
RX sensitivity (AWGN)	dBm	-98.9	-98.5	-114.0	-113.3
RX sensitivity (Ped-B)	dBm	-92.9	-93.3	-108.5	-107.9
System Gain					
Max # of HARQ Retransmission		0	3	0	3
HARQ Gain	dB	0.0	4.8	0.0	4.8
System Gain (AWGN)	dB	132.9	134.6	136.0	140.1
System Gain (Ped-B)	dB	128.9	129.4	130.5	134.7
Extra Loss and Margin					
Penetration Loss	dB	0	0	0	0
Fast Fading Margin	dB	5	5	5	5
Shadow Fading Margin	dB	5	5	5	5
Total Margin	dB	11.0	11.0	11.0	11.0
MAPL (Maximum Allowable Path Loss) (AWGN)	dB	121.9	123.6	125.0	129.1
MAPL (Maximum Allowable Path Loss) (Ped-B)	dB	117.9	118.4	119.5	123.7

Table A-3-1 Linkbudget Reference

MPE Information

	<p>Warning: Exposure to Radio Frequency Radiation The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 50cm during normal operation. The gain of the antenna is 8 dBi. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.</p>
---	--