

# User Guide

## **NRB-51 Outdoor Wireless Antenna (Dundee)**



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#### Save our environment

When this equipment has reached the end of its useful life, it must be taken to a recycling centre and processed separately from domestic waste.

The cardboard box, the plastic contained in the packaging, and the parts that make up this device can be recycled in accordance with regionally established regulations. Never dispose of this electronic equipment along with your household waste. You may be subject to penalties or sanctions under the law. Instead, ask for disposal instructions from your municipal government.

Please be responsible and protect our environment.

This guide covers the following products:

Outdoor Wireless Antenna (NRB-51)

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# Overview

## Introduction






This document provides you the information you need to set up, configure and use the NetComm Wireless NRB-51 Outdoor Wireless Antenna, also referred to as OWA (Dundee) in the document.

## Target audience

This document is intended for system integrators or experienced hardware installers who understand telecommunications terminology and concepts.

## Prerequisites

Before continuing with the installation of NRB-51, please confirm that you have the following:

-  A laptop with a working Ethernet network adapter and web browser.
-  Adjustable wrench, a nutdriver set, screwdrivers and appropriate screws for mounting the outdoor unit.
-  Ethernet cable long enough to reach from the Outdoor unit mount location to the indoor unit (POE-02) mount location, RJ45 heads and a crimping tool
-  Shorter Ethernet cable long enough to reach from the indoor unit (POE-02) to the Arris RG.
-  A device with WiFi client to access the installation alignment tool's web browser

## Notation

The following symbols are used in this user guide:



The following note requires attention.



The following note provides a warning.



The following note provides useful information.

# Product introduction

## Product overview

Rural and regional homes and businesses, remote commercial sites and metropolitan fringe districts located beyond the reach of fixed line infrastructure rely on mobile networks to access broadband Internet.



Designed to optimize signal strength in weak signal areas, the NetComm Wireless NRB-51 Outdoor Wireless Antenna (OWA) is positioned on the exterior of the premises to overcome distance limitations and geographical obstructions, and deliver high-speed LTE broadband connectivity to wired and wireless clients in the property via an indoor router.

## Product features

- Attractive compact ID that can withstand harsh weather elements
- Software upgrade path to support 4x4 MIMO
- Designed to meet applicable GR-1089 immunity & surge tests
- Proven and documented installation optimized for speed, safety and accuracy

## Package contents

The NetComm Wireless NRB-51 in-box contents include:

-  1 x NetComm Wireless NRB-51 (also referred to as OWA) device
-  1 x Assembled mount (2" DTV compatible) with 5 screws

If any of these items are missing or damaged, please contact NetComm Wireless Support immediately. The NetComm Wireless Support website can be found at: <http://support.netcommwireless.com>.

# Physical dimensions and interfaces

## Physical dimensions

Below is a list of the physical dimensions of the NRB-51

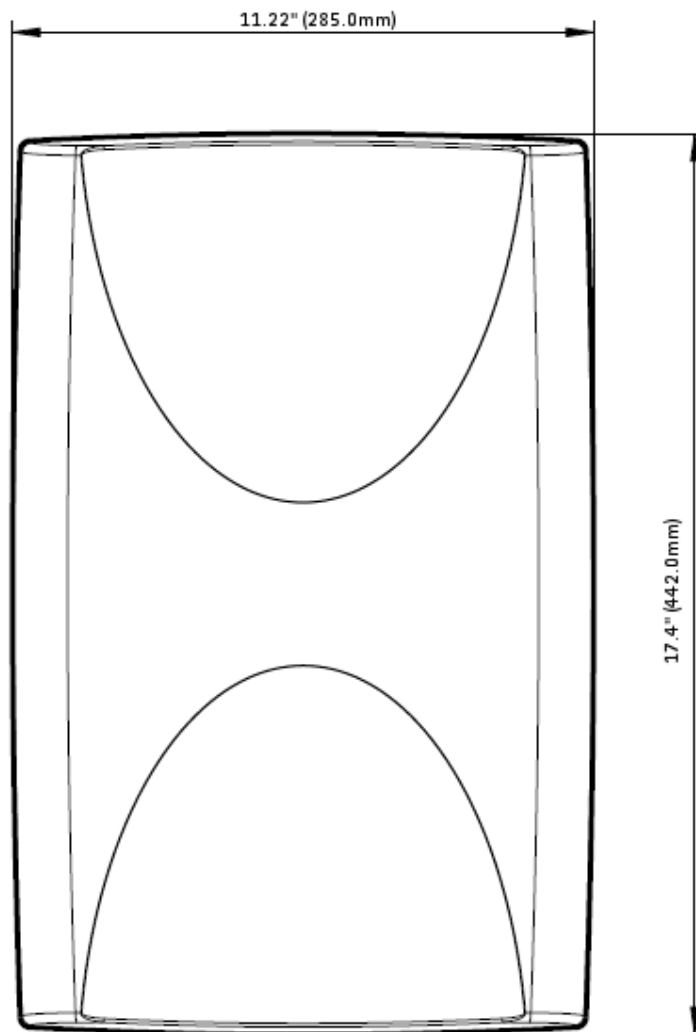


Figure 1 – NTC-140W Series router Dimensions

NRB-51 OWA DIMENSIONS	
Length	17.4" (442.0 mm)
Width	11.22" (285.0mm)
Height	6.3" (Assembled with mount)
Weight	5.9 lbs with cavity filter
	7.1 lbs (Assembled with mount)

Table 1 - Device Dimensions

## Interfaces

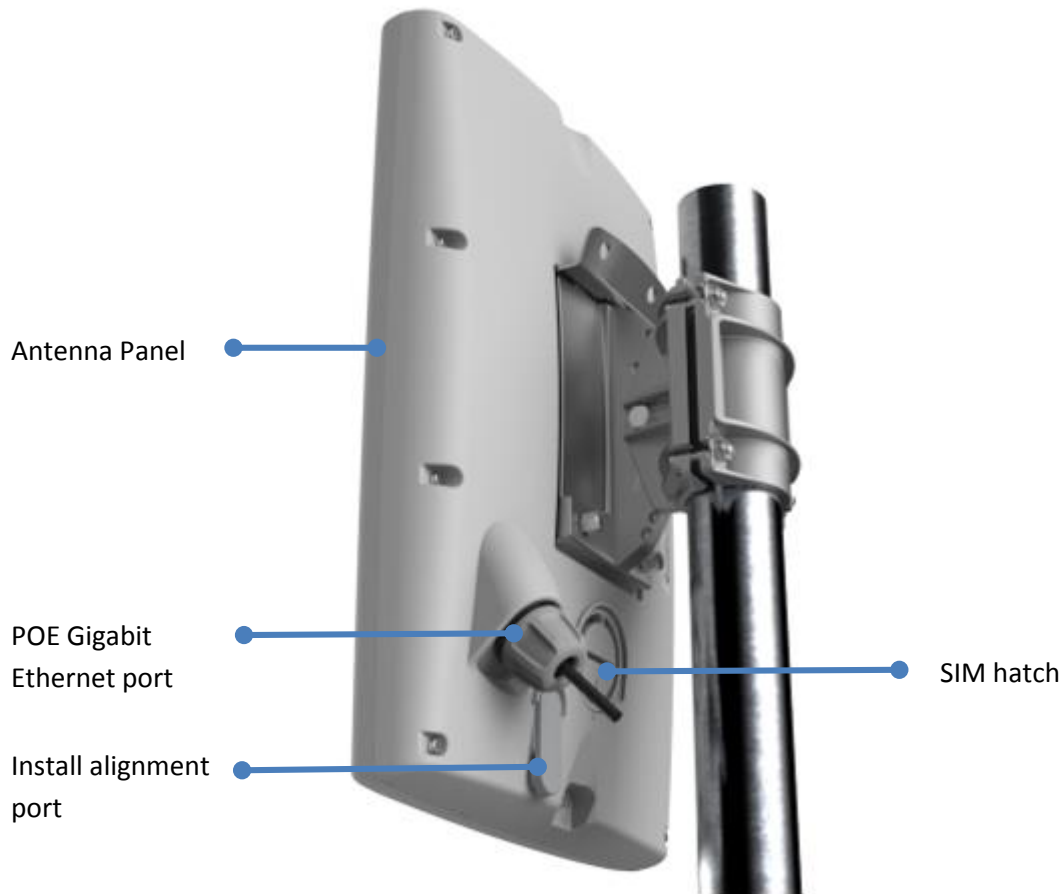


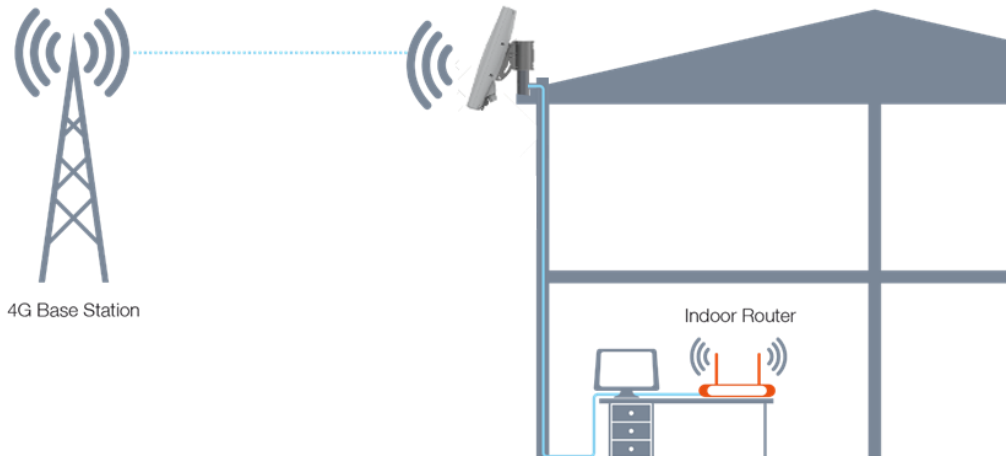
Figure 2 - Interfaces

NO.	ITEM	DESCRIPTION
1	Antenna panel	Includes 2 x pairs Cross polarised antennas and GPS antenna
2	Installation alignment port	SMA connector for GPS antenna (not included in package).
6	SIM hatch	Open the hatch to insert SIM here
11	POE Gigabit Ethernet port	Provides power and data connectivity to the OWA with Ethernet cable

Table 2 – Interfaces

# Installing the Outdoor Unit

The image below illustrates a typical installation of the WNTD Outdoor Unit.



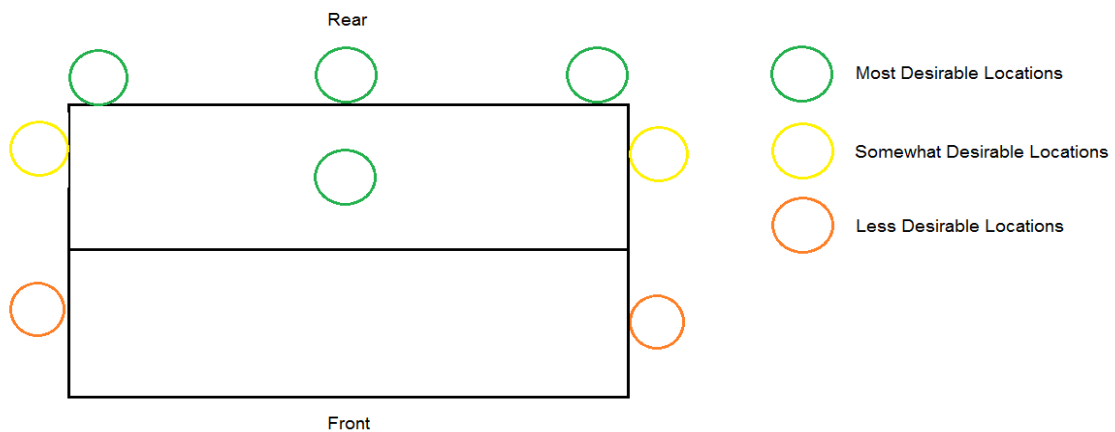
## Determining the best location for the Outdoor unit

Determining the best location for the Outdoor Wireless Antenna (OWA) involves:

1. Performing a survey of the site using the RF alignment tool and
2. Consulting the customer about positioning based on results of the RF test, aesthetics and any planned renovations to the property that may affect the mounting location.

When selecting a location to mount the OWA, ensure that:

- lock of the desired cell and optimal signal level is achieved.
- the mounting position is unobtrusive and aesthetically pleasing where possible.
- the mount/antenna is not closer than 1 meter from other antenna equipment.
- strata or heritage properties have obtained approval for the installation. This is the sole responsibility of the customer.
- the OWA is mounted only in locations which adhere to the following property diagram:



Where possible, avoid mounting the OWA so that it is aimed back over the roof of the property.



## Mounting options

Two options available for the mounting brackets as shown in the images below:

- 1) Slide on the pole
- 2) Top of the pole



# Connecting the Outdoor Unit

## Powering the Outdoor Unit

Power over Ethernet (PoE) is a method of connecting network devices through Ethernet cable where power and data are passed along a single cable. It is therefore a convenient method of powering the OWA.

Note that POE-02 is packaged and supplied separately.

To power the OWA:

1. Connect a straight-through Ethernet cable (not included in the package) to the Ethernet port of the OWA then connect the other end of the cable to the Ethernet port labelled "WALL" on the POE-02..
2. Use another Ethernet cable (not included in the package) to connect the indoor router to the "Router" port of the POE-02.
3. Connect the power cable to the POE-02 and then plug it in to an available wall socket. Examine the Power and ANTENNA LEDs of the POE and compare them with the LED table below. When both the POWER and ANTENNA LEDs are solid green, the OWA unit is correctly powered and connected.

## POE-02 LED indicators

The table below describes the status of the POWER and ANTENNA LEDs on the PoE injector.

LED	STATUS	DESCRIPTION
POWER	Solid green	PoE injector is connected to AC power.
ANTENNA	Solid green	PoE injector is connected to AC power and the POE port is connected to the OWA.

# Communicating with the Outdoor unit

## Diagnostics Tools

The following tools may be required to access and perform any admin or testing tasks.

- 🔌 adb: console access through the host USB connection (Android tool)
- 🔌 fastboot: firmware upgrade through the host USB connection (Android tool)
- 🔌 QXDM diag tool and drivers: Qualcomm diagnostic tools and drivers
- 🔌 Terminal emulator: emulator software such as PuTTY will be used to connect to the AT command port of the OWA's Wireless module.
- 🔌 SSH client: SSH client such as PuTTY will be used to access the OWA's admin shell through the admin VLAN (i.e. 4001).

The following table lists all the required files to complete diagnostics. Some of these may require third party NDA's, please contact your account representative for details.

### List of required files

FILENAME	DESCRIPTION
adb-setup-1.3.exe	Google USB driver installer
netcomm_nrb51_adb_driver.zip	NRB-51 ADB driver archive
minimal_adb_fastboot_v1.1.3_setup.exe	Android Debug Bridge and Fastboot installer
QXDM.WIN.3.14 Installer-01004.6.zip	Qualcomm QXDM.WIN.3.14 Installer-01004.6
QPST.WIN.2.7 Installer-00432.1.zip	Qualcomm Product Support Tool
QUD.WIN.1.1 Installer-10036.7	Qualcomm USB Driver

OWA supports two methods to perform communication with the device for diagnostic or debug operations.

- 🔌 Admin shell session – useful for performing application level diagnostic and debugging. This is the preferred method in most cases.
- 🔌 Qualcomm's QXDM tools including the AT command interface – mainly for RF module level diagnostic

There are two ways to access the admin session on OWA.

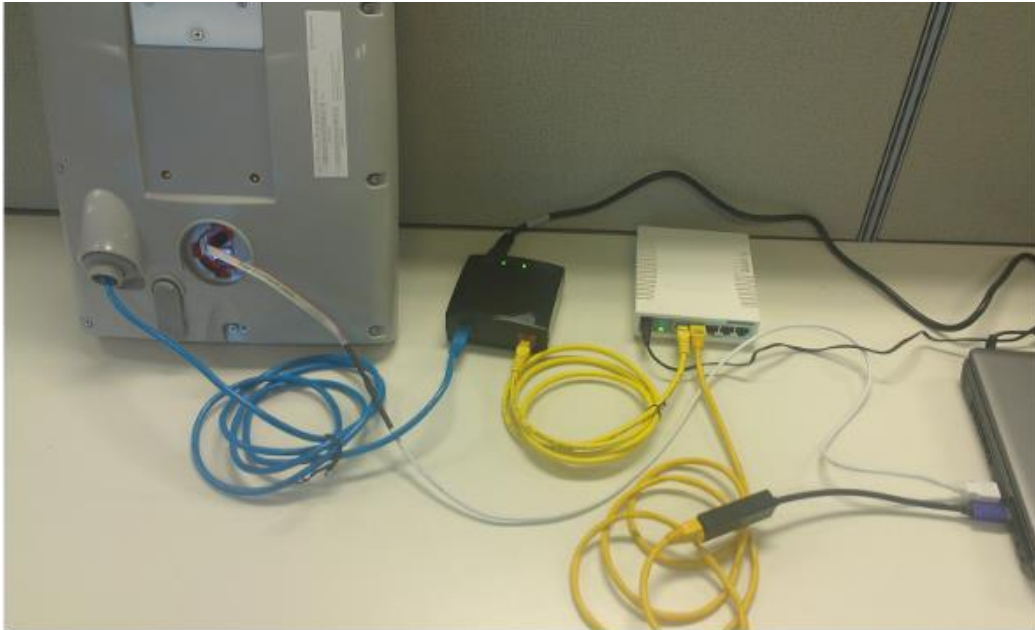
- 🔌 adb tool through the USB connection
- 🔌 ssh through the admin VLAN – ID 4001

To access the admin session through USB, the adb tool (an Android tool) needs to be installed on a PC connected to the NRB-51. After installing the adb tool (see Firmware installation), connecting the special USB cable and creating the admin VLAN ID 4001 on the PC connected to the NRB-51, you can access the session through the Ethernet interface. For more details about accessing the admin session, please refer to the section Admin shell session.

QXDM tool is used when the RF modem level diagnostic including the AT command interface is required. When the special USB cable is connected (see Installation instructions) and the Qualcomm drivers are installed, the QXDM tools can be used.

The QXDM tools and AT command interface sections contain the details about the QXDM tools. These sections do not have any in-depth details about the QXDM tools since QXDM is not a NetComm Wireless product. You may need to contact Qualcomm to get the QXDM installation packages and tools. Qualcomm's QXDM tools and drivers are required and you must have the proper Qualcomm license to install and run these tools. Please check with Qualcomm for more details about the license terms.

The images below show the correct connection of the components.



Note that the white USB to TAG connect ribbon cable is only required for debug and is not part of the actual deployment.

RG PORT NUMBER	VLAN ID	IP ADDRESS RANGE	FUNCTION
1	NIL	-	Trunk (to OWA)
2	4001	192.168.11.X	Provides connectivity to admin VLAN on the OWA.
3	4002	192.168.12.X	Provides connectivity to Data VLAN on the OWA.
4	4003	192.168.13.X	Provides connectivity to IMS VLAN on the OWA.

- Using RJ45 Ethernet cable, connect the OWA unit to the **blue** Ethernet port of the PoE injector. This connection is represented by the Blue Ethernet cable in the picture above.
- Using RJ45 Ethernet cable, connect one end to **Ethernet port 1** of the RG and the other end to the **red** Ethernet port of the PoE injector. This connection is represented by the Yellow Ethernet cable in the picture above.
- Connect the PoE injector's power cable to a wall socket and turn on the power. Turn on the PoE-02's power switch.
- Open a command prompt (press Windows key and type **cmd** then press Enter) and type **ipconfig**. Press the Enter key.
- Confirm that the Ethernet interface has been assigned an IP address in the 192.168.11.X range.

```

Command Prompt
C:\Users\johnn>ipconfig
Windows IP Configuration

Ethernet adapter Ethernet 5:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::c405:b963:e382:62f6%42
    IPv4 Address. . . . . : 192.168.11.136
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :
  
```

Before proceeding with tests on the data VLAN, ensure that you have connected an appropriate cellular antenna to the MAIN antenna socket of the OWA.

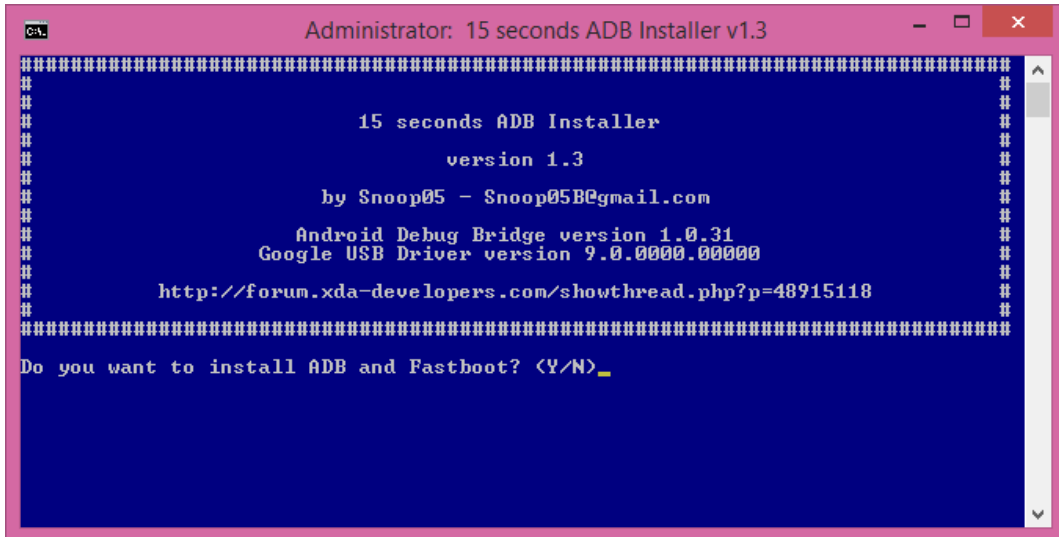
## Firmware Upgrade on Windows 8/8.1/10 PCs

### Installing the ADB driver

Extract the `netcomm_nrb51_adb_driver.zip` archive to a folder on the PC. On 32-bit Windows systems, run `DPIinst_x86.exe` and on 64-bit Windows systems, run `DPIinst_x64.exe`. Follow the installation wizard steps.

### Installing the USB driver

1. Double click on the `adb-setup-1.3.exe` file that you downloaded to install the USB driver. The main screen displays an install confirmation.



2. Type Y and press Enter.
  - When prompted to install ADB system-wide, press Y and then Enter.
  - When prompted to install device drivers, press Y and then Enter.
3. On the Device Driver Installation Wizard window that appears, click the **Next** button.
  - On the Windows Security pop-up window, click the **Install** button, then click the **Finish** button.
  - The ADB installer window closes.
4. Double click on the `minimal_adb_fastboot_v1.1.3_setup.exe` file.
  - Click the **Next** button through the prompts then click the **Install** button.
  - When the installation has completed, click the **Finish** button. Close the Command Prompt window that appears.
5. To verify correct installation of the tool, open a command prompt (press Windows key and type `cmd` then press Enter).
  - Change directory to "C:\Program Files (x86)\Minimal ADB and Fastboot" by typing `cd "C:\Program Files (x86)\Minimal ADB and Fastboot"` then pressing Enter.
  - Type `adb devices` in the command prompt, then press Enter.
  - Verify that the device is listed in "List of devices attached".
6. On the Windows PC, create a local directory then copy `nrb-51_v_<version number>.zip` into the directory.
7. Extract the archive into "C:\Program Files (x86)\Minimal ADB and Fastboot".
8. Run the following command from Minimal ADB Tool folder to upgrade the recovery image:
 

```
C:\Program Files (x86)\Minimal ADB and Fastboot>update_bootloader.bat
```

```

C:\Program Files (x86)\Minimal ADB and Fastboot>update_bootloader.bat
If you don't see "sending 'sbl'" within 30 seconds try power-cycling the DUT
Starting version:
1.0.3.1
< waiting for device >
target reported max download size of 134217728 bytes
sending 'sbl' (244 KB)...
OKAY [ 0.036s]
writing 'sbl'...
OKAY [ 0.068s]
finished. total time: 0.111s
target reported max download size of 134217728 bytes
sending 'tz' (413 KB)...
OKAY [ 0.037s]
writing 'tz'...
OKAY [ 0.084s]
finished. total time: 0.128s
target reported max download size of 134217728 bytes
sending 'rpm' (157 KB)...
OKAY [ 0.027s]
writing 'rpm'...
OKAY [ 0.052s]
finished. total time: 0.082s
target reported max download size of 134217728 bytes
sending 'aboot' (265 KB)...
OKAY [ 0.037s]
writing 'aboot'...
OKAY [ 0.069s]
finished. total time: 0.107s
target reported max download size of 134217728 bytes
sending 'recovery' (5344 KB)...
OKAY [ 0.145s]
writing 'recovery'...
OKAY [ 0.795s]
finished. total time: 0.944s
target reported max download size of 134217728 bytes
sending 'recoveryfs' (9984 KB)...
OKAY [ 0.252s]
writing 'recoveryfs'...
OKAY [ 1.398s]
finished. total time: 1.659s
rebooting...

finished. total time: 0.008s

```

9. Enter the following command from Minimal ADB Tool folder to upgrade the main system image

C:\Program Files (x86)\Minimal ADB and Fastboot>update\_main.bat

```

C:\Program Files (x86)\Minimal ADB and Fastboot>update_main.bat
If you don't see "sending 'boot'" within 30 seconds try power-cycling the DUT
< waiting for device >
target reported max download size of 134217728 bytes
sending 'boot' (5344 KB)...
OKAY [ 0.142s]
writing 'boot'...
OKAY [ 0.772s]
finished. total time: 0.919s
target reported max download size of 134217728 bytes
sending 'system' (66048 KB)...
OKAY [ 1.496s]
writing 'system'...
OKAY [ 11.691s]
finished. total time: 13.192s
resuming boot...
OKAY [ 0.004s]
finished. total time: 0.005s
Ending version:
1.0.4.2

C:\Program Files (x86)\Minimal ADB and Fastboot>

```

The firmware upgrade is complete.

10. Confirm that the upgrade was successful by entering the following command:

**adb shell rdb get sw.version**

The software version displayed is 1.0.4.2.

```
C:\Program Files (x86)\Minimal ADB and Fastboot>adb shell rdb get sw.version
1.0.4.2

C:\Program Files (x86)\Minimal ADB and Fastboot>
```

## Verifying the PDC config

To verify the version of the PDC config file, enter the following command:

```
adb shell rdb get system.module.config_version
```

```
C:\Program Files (x86)\Minimal ADB and Fastboot>adb shell rdb get system.module.config_version
100729680

C:\Program Files (x86)\Minimal ADB and Fastboot>
```

## Admin Shell Session Using SSH

The admin shell can be accessed using the admin VLAN (i.e. VLAN 4001). Through this admin interface, ssh session can be setup and like the adb session, any admin activities can be performed,

For more details about the command list or details, please contact NetComm Wireless.

### Using SSH over Ethernet

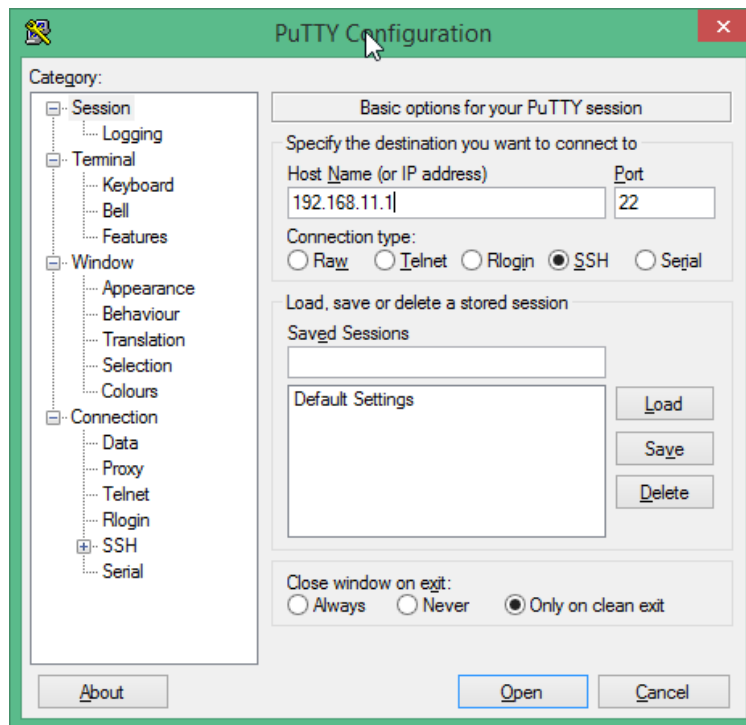
An SSH client is required for Ethernet access.



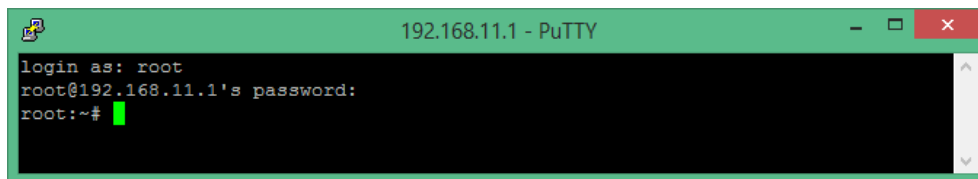
Note: To use this method, a PC must be directly connected to the OWA's Ethernet interface, that is, it must not be connected via another router/gateway.

Follow these steps to gain admin shell access:

1. Connect a PC to the NRB-51 using the Ethernet cable (see [Installation instructions](#)) and create a VLAN 4001 on the PC.
2. Get an IP address for the PC's 4001 VLAN interface using DHCP.
3. Open a terminal emulator such as PuTTY and SSH to 192.168.11.1.



4. Log in to the NRB-51 using username **root** and password **admin**.











## Connection Manager

Connection Manager is a process running on the Application Processor (AP), which communicates with the Baseband Processor (BP) to control the WAN related operations.

It uses the QMI protocol over the SMD interface to communicate with the BP.

The following QMI services in the BP are used by the Connection Manager.

-  WDS
-  NAS
-  VOICE
-  DMS
-  LOC
-  IMS
-  UIM

It reads and writes the connection profiles which reside in the BP and contain the APN details.

For more details about the QMI services, please refer to the associated Qualcomm documentation.

Although the Connection Manager is required to perform the normal WAN operation, it needs to be disabled sometimes, for example, during Lab testing. Otherwise, it can interfere with a testing tool or process.

### Disabling the Connection Manager

Before running the following command, please make sure that the Admin shell session is opened using adb (*ref.* Admin shell session using adb) or ssh (*ref.* Admin shell session using ssh).

1. To temporarily disable Connection Manager, please run the following command on the Admin shell session:

```
 rdb set service.wmmd.enable 0
```

2. To enable it,

```
 rdb set service.wmmd.enable 1
```

### Controlling a connection profile

Sometimes a user may want to selectively disable or enable a connection profile (i.e. an APN connection) instead of disabling the Connection Manager completely which would disable the connection profile management in the application level.

The following procedure can be used to manage each connection profile.

Before running this command, please make sure that the Admin shell session is opened using adb (*ref.* Admin shell session using adb) or ssh (*ref.* Admin shell session using ssh).

To list a connection profile, please run the following command: 'x' can be a value ranged from '1' to '6' (i.e. there are six profiles available):

```
 rdb dump link.profile.<x>
```

To disable a connection profile, please run the following command: 'x' can be a value ranged from '1' to '6':

```
 rdb set link.profile.<x>.enable 0
```

To enable a connection profile, please run the following command: 'x' can be a value ranged from '1' to '6':

```
 rdb set link.profile.<x>.enable 1
```

To change the APN of a connection profile, for example, to 'wldata', please run the following command: 'x' can be a value ranged from '1' to '6':

```
 rdb set link.profile.<x>.apn wldata
```

```
 rdb set link.profile.<x>.writeflag 1
```

For example, 'rdb dump link.profile.1' shows output below:

```

192.168.11.1 - PuTTY
root:~#
root:~# rdb dump link.profile.1
link.profile.1.apn      p      nxtgenphone
link.profile.1.auth_type  p      none
link.profile.1.autoapn  p      1
link.profile.1.defaultroute  p      1
link.profile.1.defaultroutroutemetric  p      20
link.profile.1.dev      p      wwan.0
link.profile.1.dialstr  p      atd*99#
link.profile.1.enable  p      1
link.profile.1.module_profile_idx  -      1
link.profile.1.name     p      Profile1
link.profile.1.pass     p
link.profile.1.pdp_function  p      Data
link.profile.1.pdp_type  p      ipv4v6
link.profile.1.readonly  p      0
link.profile.1.reconnect_delay  p      30
link.profile.1.reconnect_retries  p      0
link.profile.1.routes  p
link.profile.1.snat     p      1
link.profile.1.trigger  -
link.profile.1.usage_current  s      wwan down
link.profile.1.usage_current_startTimeInsysUpTime  s      0
link.profile.1.usage_history  -
link.profile.1.usage_total  -      1447384209,1447393438,0,0,0,0,0,0,0
link.profile.1.user     p
link.profile.1.userpeerdns  p      1
link.profile.1.verbose_logging  p      1
link.profile.1.writeflag  -
root:~#

```

### Conducting tests on admin VLAN:

1. Make sure Ethernet cable is connected from RG Port #2 to the test PC. This provides connectivity to admin VLAN on the OWA.
2. Ping the admin VLAN  
 >ping 192.168.11.1

Ping should be successful as shown in the figure below.

```

C:\Titan\Minimal ADB and Fastboot>ping 192.168.11.1
Pinging 192.168.11.1 with 32 bytes of data:
Reply from 192.168.11.1: bytes=32 time<1ms TTL=64
Reply from 192.168.11.1: bytes=32 time<1ms TTL=64
Reply from 192.168.11.1: bytes=32 time<1ms TTL=64
Reply from 192.168.11.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.11.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

## Verification of SIM status:

This section is applicable only if SIM is already installed.

1. Make sure that a SIM is inserted before the OWA is powered ON.
2. Ensure that the test PC can access admin VLAN of OWA.
3. Using PuTTY/Tera Term tool, open an SSH client session on the Test PC with following credentials:

Host: 192.168.11.1

User name: root

Password: <confidential>

When successfully logged in, the terminal window displays “root: ~#”

4. Read the SIM status using the following command as shown in the screenshot:

```
#rdb get wwan.0.sim.status.status
```

When the SIM is detected successfully, “SIM OK” is displayed as shown below:

```
root:~#  
root:~# rdb get wwan.0.sim.status.status  
SIM OK  
root:~#
```

## Useful Commands

### VLAN details

```
adb shell rdb dump vlan.admin
adb shell rdb dump vlan.data
adb shell rdb dump vlan.ems
adb shell rdb dump vlan.voice
```

### WWAN status

```
adb shell rdb dump wwan.0.system_network_status
```

### SIM status

```
adb shell rdb dump sim
```

### IMEI

```
adb shell rdb dump imei
```

### IMS status

```
adb shell rdb dump wwan.0.ims
```

### Data Profile

```
adb shell rdb dump link.profile.1
adb shell rdb dump link.profile.1.apn
```

### Voice (IMS) profile

```
adb shell rdb dump link.profile.2
```

### SOS profile

```
adb shell rdb dump link.profile.3
```

### EMS profile

```
adb shell rdb dump link.profile.4
```

### To change an APN name,

```
adb shell rdb set link.profile.1.apn [new apn]
adb shell rdb set link.profile.1.writeflag 1
```

### To change an APN's IP type,

```
adb shell rdb set link.profile.1.pdp_type [ipv4|ipv6|ipv4v6]
adb shell rdb set link.profile.1.writeflag 1
```

### To enable and disable, an APN state

```
adb shell rdb set link.profile.1.enable 1
adb shell rdb set link.profile.1.enable 0
```

### Check the interface status

#ifconfig

Log dump

#logcat

Log file location

/var/log/messages

Query signal strength

adb shell rdb dump signal

## Technical Specifications

- 📶 Network Technology
  - LTE – CAT6, with software upgrade path for 4x4 DL MIMO B2,30
  - VoLTE HD Voice
- 📶 Chipset:
  - Qualcomm MDM9340-1
- 📶 4 x Antennas (2 x cross-polarized pairs)
- 📶 Antenna gain:
  - B2 = 13 dBi
  - B30 = 13 dBi
- 📶 E911 including GPS
- 📶 FOTA: Yes
- 📶 Ports (under cover):
  - 1 x PoE Gigabit Ethernet RJ45
  - Installation alignment port
- 📶 Environmentally protected to IP65
- 📶 Temp range: -40 to +65°C (-40 to 150 F)
- 📶 Dimensions: 17.4" x 11.2" x 6.3" (on mount)
- 📶 Weight: 5.8 lbs (5.9 lbs with KMW filter)
  - Including mount: 7.1 lbs

# Appendix A: Tables

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# Safety and product care

## RF Exposure

Your device contains a transmitter and a receiver. When it is on, it receives and transmits RF energy. When you communicate with your device, the system handling your connection controls the power level at which your device transmits.

This device meets the government's requirements for exposure to radio waves.

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

This equipment complies with radio frequency (RF) exposure limits adopted by the Federal Communications Commission for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

### Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Tout gain d'antenne externe doit répondre l'exposition aux radiofréquences et les limites de puissance de sortie maximum rayonnée de la section de la règle applicable. Le gain maximal de l'antenne de cet appareil est: dBi (MHz) et dBi (MHz).

## FCC Statement





### FCC compliance

Federal Communications Commission Notice (United States): Before a wireless device model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure.

### FCC regulations

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.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-  Reorient or relocate the receiving antenna.
-  Increase the separation between the equipment and receiver.
-  Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-  Consult the dealer or an experienced radio/TV technician for help.

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

## Electrical safety

### Accessories

Only use approved accessories.

Do not connect with incompatible products or accessories.



## Connection to a car

Seek professional advice when connecting a device interface to the vehicle electrical system.

## Distraction

### Operating machinery

Full attention must be given to operating the machinery in order to reduce the risk of an accident.

## Product handling

You alone are responsible for how you use your device and any consequences of its use.

You must always switch off your device wherever the use of a mobile phone is prohibited. Do not use the device without the clip-on covers attached, and do not remove or change the covers while using the device. Use of your device is subject to safety measures designed to protect users and their environment.

Always treat your device and its accessories with care and keep it in a clean and dust-free place.

Do not expose your device or its accessories to open flames or lit tobacco products.

Do not expose your device or its accessories to liquid, moisture or high humidity.

Do not drop, throw or try to bend your device or its accessories.

Do not use harsh chemicals, cleaning solvents, or aerosols to clean the device or its accessories.

Do not paint your device or its accessories.

Do not attempt to disassemble your device or its accessories, only authorised personnel must do so.

Do not use or install this product in extremely hot or cold areas. Ensure that the device is installed in an area where the temperature is within the supported operating temperature range (-20°C to 70°C)

Do not use your device in an enclosed environment or where heat dissipation is poor. Prolonged use in such space may cause excessive heat and raise ambient temperature, which will lead to automatic shutdown of your device or the disconnection of the mobile network connection for your safety. To use your device normally again after such shutdown, cool it in a well-ventilated place before turning it on.

Please check local regulations for disposal of electronic products.

Do not operate the device where ventilation is restricted

Installation and configuration should be performed by trained personnel only.

Do not use or install this product near water to avoid fire or shock hazard. Avoid exposing the equipment to rain or damp areas.

Arrange power and Ethernet cables in a manner such that they are not likely to be stepped on or have items placed on them.

Ensure that the voltage and rated current of the power source match the requirements of the device. Do not connect the device to an inappropriate power source.

## Small children

Do not leave your device and its accessories within the reach of small children or allow them to play with it.

They could hurt themselves or others, or could accidentally damage the device.

Your device contains small parts with sharp edges that may cause an injury or which could become detached and create a choking hazard.

## Emergency situations

This device, like any wireless device, operates using radio signals, which cannot guarantee connection in all conditions. Therefore, you must never rely solely on any wireless device for emergency communications.

## Device heating

Your device may become warm during normal use.

## Faulty and damaged products

Do not attempt to disassemble the device or its accessories.

Only qualified personnel must service or repair the device or its accessories.

If your device or its accessories have been submerged in water punctured or subjected to a severe fall, do not use until they have been checked at an authorised service centre.

## Interference

Care must be taken when using the device in close proximity to personal medical devices, such as pacemakers and hearing aids.

### Pacemakers

Pacemaker manufacturers recommend that a minimum separation of 15cm be maintained between a device and a pacemaker to avoid potential interference with the pacemaker.

### Hearing aids

People with hearing aids or other cochlear implants may experience interfering noises when using wireless devices or when one is nearby.

The level of interference will depend on the type of hearing device and the distance from the interference source, increasing the separation between them may reduce the interference. You may also consult your hearing aid manufacturer to discuss alternatives.

### Medical devices

Please consult your doctor and the device manufacturer to determine if operation of your device may interfere with the operation of your medical device.

### Hospitals

Switch off your wireless device when requested to do so in hospitals, clinics or health care facilities. These requests are designed to prevent possible interference with sensitive medical equipment.

### Interference in cars

Please note that because of possible interference to electronic equipment, some vehicle manufacturers forbid the use of devices in their vehicles unless an external antenna is included in the installation.

## Explosive environments

### Petrol stations and explosive atmospheres

In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your device or other radio equipment.

Areas with potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

### Blasting caps and areas

Turn off your device or wireless device when in a blasting area or in areas posted turn off “two-way radios” or “electronic devices” to avoid interfering with blasting operations.

# Product Warranty

For warranty information please visit

<http://support.netcommwireless.com/support/warranty>