AU540 eNB B41 User Guide

Part Number: UGD-D01112

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Legal Notices

UK WEEE Registration number: WEEE/AB0207WZ. For more information, see WEEE Information for Airspan Customers and Recyclers.

Acknowledgements

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Document Information

Abstract

This document details a description of and initial configuration of Airspan's AU540 eNB B41 (LTE) module.

Revision History

Revision Details	Date	Summary of Changes
0.1	June 2016	• Initial draft document & comments
A+ A1	July 2016	• After comments • Publish

Warnings and Cautions

Human Exposure to Radio Frequencies

The AU540 eNB B41 antennas should be installed with a minimum distance of 20 CM from your body.

Radio Interference

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 internal vehicle radio communications.

Please ensure a maximum separation between the AU540 eNB B41's antenna and other antennas.

Modifications

Any changes and modifications to this device that are not expressly approved by Airspan Networks may void the user's authority to operate the equipment.

General

- Only qualified personnel should be allowed to install, replace, and service the equipment.
- The device cannot be sold retail, to the general public or by mail order. It must be sold to operators.
- Installation must be controlled.
- Installation must be performed by licensed professionals.
- Installation requires special training. The AU540 eNB B41 module and antenna should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void Airspan's product warranty and may expose the end user or the service provider to legal and financial liabilities. Airspan and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.
- The AU540 eNB B41 module does not provide protection from hazard energy in case of single fault condition.
- Power supply shall be limited up to 4A in normal and single fault condition.

⚠ Important Safety Instructions

- Read and Save these instructions
- This Installation Guide contains instructions and warnings that should be followed during installation, and operation.
- Failure to follow these instructions could cause bodily injury and/or product failure

Safety

1. Read this guide and follow all operating and safety instructions.
2. Supply cord is not shipped with the unit and is to be provided by user. Installation is to be performed by a qualified electrician according to local codes. Installation to be done in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2.
3. Static sensitive components inside - do not remove the lid or base: No user serviceable parts inside.

4. Position the power cord to avoid possible damage; do not overload circuits.
5. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.
6. To avoid electrical shock do not install this device during adverse conditions such as rain or inclement weather.
7. Use only a damp cloth for cleaning. Do not use liquid or aerosol cleaners. Disconnect the power before cleaning.
8. The units should not be located too near power lines or other electrical power circuits, where it can come into contact with such power lines or circuits.
9. The radio transceiver must be properly grounded to protect against power surges and accumulated static electricity. It is the user's responsibility to install this device in accordance with the local electrical codes.
10. Installation of the AU540 eNB Module must be contracted to a professional installer.
11. The circuit breaker should be easily accessible in case you have to disconnect the device.
12. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

Warning of Hazardous Voltages

On DC sections, short-circuiting the low voltage, low impedance circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches etc. to avoid shorting DC circuits.

Note: Airspan products do not contain hazardous substances (as defined in UK Control of Substances Hazardous to Health Regulations 1989 and the Dangerous Substances Regulations 1990). At the end of any Airspan products life cycle, the customer should consult with Airspan to ensure that the product is disposed of in conformance with the relevant regulatory requirements.

Adherence to European Directive 1999/5/EC

European Council Recommendation 1999/5/EC details basic restrictions and reference levels on human exposure to electromagnetic fields as advised by the ICNIRP. Adherence to these recommended restrictions and reference levels should provide a high level of protection as regards the established health effects that may result from exposure to electromagnetic fields.

Airspan equipment is compliant with CE and R&TTE regulations and be operated in all EU (European Union) locations listed below:

Country Code			
BE	EL	LT	PT
BG	ES	LU	RO
CZ	FR	HU	SI
DK	HR	MT	SK
DE	IT	NL	FI
EE	CY	AT	SE
IE	LV	PL	UK

Warning Symbols

The following symbols may be encountered during installation or troubleshooting. These warning symbols mean danger. Bodily injury may result if you are not aware of the safety hazards involved in working with electrical equipment and radio transmitters. Familiarize yourself with standard safety practices before continuing.

Caution, hot surface

Caution

Electro-Magnetic Radiation

High Voltage

Service Information

Refer all repairs to qualified service personnel. Do not modify any part of this device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

a. The terminal does not function after following the operating instructions outlined in this manual.

b. The product has been dropped or the housing is damaged.

Locate the serial number of the terminal and record this on your registration card for future reference. Also record the MAC address, located on the product sticker.

UL Information

- The circuit where the equipment is connected must be properly grounded according with NEC and other local safety code requirements.

- Reminder to all the BWA system installers: Attention to Section 820-40 of the NEC which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.

Lightning Protection

WARNING: The following notes are general recommendations for the system. The wireless equipment should be installed by a qualified professional installer and must follow local and national codes for electrical grounding and safety. Failure to meet safety requirements and/or use of non-standard practices and procedures could result in personal injury and damage to equipment. A direct lightning strike may cause serious damage even if these guidelines are followed.

All outdoor wireless equipment is susceptible to lightning damage from a direct hit or induced current from a near strike. Lightning protection and grounding practices in local and national electrical codes serve to minimize equipment damage, service outages, and serious injury. The antennas are to be DC grounded, so surge protection is not required. Reasons for lightning damage are summarized as:

- Poorly grounded tower/antenna sites that can conduct high lightning strike energy into equipment.

- Lack of properly installed lightning protection equipment that can cause equipment failures from lightning induced currents.

A lighting protection system provides a means by which the energy may enter earth without passing through and damaging parts of a structure. A lightning protection system does not prevent lightning from striking; it provides a means for controlling it and preventing damage by providing a low resistance path for the discharge of energy to travel safely to ground. Improperly grounded connections are also a source of noise that can cause sensitive equipment to malfunction.

A good tower grounding system disperses most of the surge energy from a tower strike away from the building and equipment.

To limit the equipment damage due to a lightning strike, the following practices are recommended for the wireless system:

- Provide direct grounding from the antenna mounting bracket, the radio and antenna and the lightning/surge protectors to the same ground point at the base of the tower or a ground bus on the building. Use the grounding screws on the antenna bracket and the radio and antenna for terminating the ground wires.

- The circuit ground must be connected to the same grounding system as the eNodeB.

DECLARATION OF CONFORMITY

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC

English:

This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Deutsch:

Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprecheneden Vorgaben der Richtlinie 1999/5/EU.

Dansk:

Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 1999/5/EF.

Español:

Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directive 1999/5/EC.

Greek:

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Airspan ΔΗΛΩΝΕΙ ΟΤΙ Ο ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.

Français:

Cet appareil est conforme aux exigencies essentialles et aux autres dispositions pertinantes de la Directive 1999/5/EC.

Íslenska:

Þessi búnaður samrýmist lögboðnum kröfum og öðrum ákvæðum tilskipunar 1999/5/ESB.

Italiano:

Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.

Nederlands:

Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.

Norsk:

Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 1999/5/EC.

Português:

Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.

Suomalainen:

Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.

Svenska:

Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

Román:

Acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 1999/5/CE.

The Declaration of Conformity related to this product can be obtained from PLM@Airspan.com.

FCC Notice

Federal Communication Commission Notice

The United States Federal Communication Commission (FCC) and the Canadian Department of Communications have established certain rules governing the use of electronic equipment. Part 15, Class B.

This device complies with Part 15 of 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 equipment 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 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 technician for help.

Note: The AU540 eNB B41 module is intended for use internally in the Airspan products.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users,

2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two (2) conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The OEM integrator must not provide information to the end user regarding how to install or remove this RF module.

Labeling Requirement

When the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.

This exterior label must include wording similar to the following:

- ‘‘Contains Transmitter Module FCC ID: PIDAU540ENB25’’
- ‘‘Contains FCC ID: PIDAU540ENB25’’

Maximum Output TX Total Power

Table 1: AU540 eNB FCC Maximum Output TX Total Power

Frequency Band (MHz)	TX (dBm)	EIRP (dBm)	Antenna Gain (dBi)	Variant
2506-2680	23.9	32.9	9	AU540

Caution: Do not set maximum output TX power to higher than local regulations.

Power Consumption

AU540 eNB B41 has a Max nominal power consumption of 24W. AU540 eNB B41 power consumption is described in the following table:

Table 2: Power Consumption

Duplex	Tx Total Power at RF Port (dBm)	Nominal Power Consumption (W)
TDD	23.9	24

Antenna Usage

AU540 eNB B41 module has four (4) RF ports that are connected to two (2) dual-port antennas arrays. Each antenna array is mounted on opposite sides internally within the Airspan product housing. This is so that one antenna array faces forwards and one antenna array faces outwards for optimized coverage.

Antenna Types

There are internally mounted antennas connected to the AU540 eNB B41 module which are designed specifically for this use and are specified below.

Table 3: Antenna Types - Technical

Antenna Array Type	LTE Band	Frequency Range (MHz)	Gain (dBi)	Part number
Dual Slant ±45° - Antenna A	41	2496 – 2690	9	AW3509-2
Dual Slant ±45° - Antenna B	41	2496 – 2690	9	AW3509-1

Note: The antennas are assembled and connected internally in the factory during installation into the Airspan product unit.

About This Document

Purpose

This User Guide is intended as an instruction manual for professional system integrators to provide step-by-step factory integration instructions for setting up and initial configuration of the AU540 eNB B41 module.

Intended Audience

This guide is intended for persons who are responsible for installing and performing initial configuration of the AU540 eNB B41 module.

These persons should have a working knowledge of the equipment.

Document Conventions

This document uses the following typographic conventions.

Table 4: Typographic Conventions

Convention	Element
Blue underlined text	Cross-reference links.
Bold text	Keyboard buttons and GUI elements.
Command	Command names or phrases.
Computer output	Text displayed by the computer.
Hyperlinks	Website and e-mail addresses.
Danger	Signifies a hazardous situation—if not avoided—will cause death or serious injury. Describes how to avoid it.
Warning	Signifies a hazardous situation—if not avoided—can cause death or serious personal injury. Describes how to avoid it.
Caution	Signifies a hazardous situation—if not avoided—can void the product warranty, and cause property damage. Describes how to avoid it.
Important	Provides necessary information to explain a task.
Note	Provides additional information.
Tip	Provides helpful hints.

Customer Care Help Desk

Airspan's *Customer Care Help Desk* offers prompt and efficient customer support services.

Note: To avail Airspan's *Customer Care Help Desk* support, you must be a registered user and must have a valid support contract. To register, click here and fill the **Registration** form.

To create and update issue logs, send e-mails to Customer Care Help Desk. Once you submit your issue, the system generates a new issue and sends an issue number for your reference. The system uses this issue number to categorize and store e-mails under the appropriate issue.

To help *Customer Care Help Desk* identify your issue, include the issue number and your *Customer Care Helpdesk* account details in all further communications.

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Airspan Encourages Comments

Airspan welcomes any feedback and suggestions that help to improve the quality of the documentation. Send your feedback to documentfeedback@airspan.com.

1 Overview

The Airspan AU540 eNB B41 module is a product specific module designed to be embedded in Airspan products. The Wireless protocols that come with this product ensure data security and isolation from interference generated by other radio frequencies.

The AU540 eNB B41 module supports MIMO antenna technology and high power output.

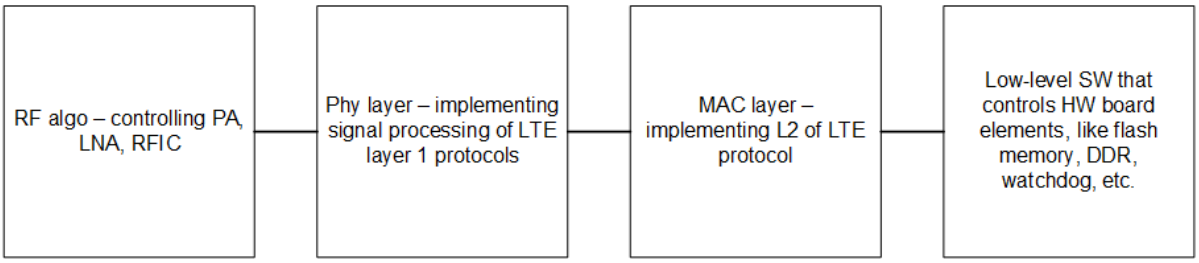
1.1 Management

- Software is upgraded locally and remotely.
- Designed for local and remote management via TBD

1.2 AU540 eNB B41 Block Diagram

The figure below displays a high level (simplified) block diagram of the software architecture:

Figure 1: Simplified Block Diagram



1.3 AU540 eNB Module Frequency Ranges

The table below lists the frequency range of AU540 eNB modules currently available. This table will grow as more models become available.

Table 5: Frequency Ranges

Frequency Band	Channel Bandwidth
41	TBD

2 Physical Description

This section provides a description of the components of the AU540 eNB B41:

- Dimensions
- Connector

2.1 AU540 eNB B41

The AU540 eNB B41.

Figure 2: AU540 eNB B41 – both sides

Figure 3: AU540 eNB B41 module inside housousing (w/o cover)

2.1.1 Physical Dimensions

The table below lists the physical dimensions of the AU540 eNB B41.

Table 6: AU540 eNB B41 Physical Dimentions

Parameter	Value
W x L	149.9 mm (5.0 in) x 159.7 mm (6.29 in)
Weight	157 g (5.54 oz)

2.1.2 Connector

The connector is described below:

Figure 4: 14 pin Connector

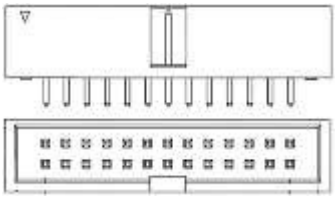


Table 7: Connector 14 pin, Pinouts

Pin	Signal
1	+12V
2	+12V
3	+12V
4	GND
5	GND
6	GND
7	-
8	-
9	-
10	-
11	GND
12	GND
13	GND
14	PPS, SYNC

3 Configuration

3.1 Node Management

This section pertains to Provider configuration which is performed during initial installation and setup of the unit.

Note: Access to the AU540 eNB module is by Telnet or SSH or secure WEB only

Note: Only the Service Provider can control the module SW and host SW. Other parties have no means to modify the SW

The following screen captures display recommended configuration setting (only Service Provider has access) using Airspan's NMS (network management service) Netspan.

Figure 5: Node Management – Node Properties

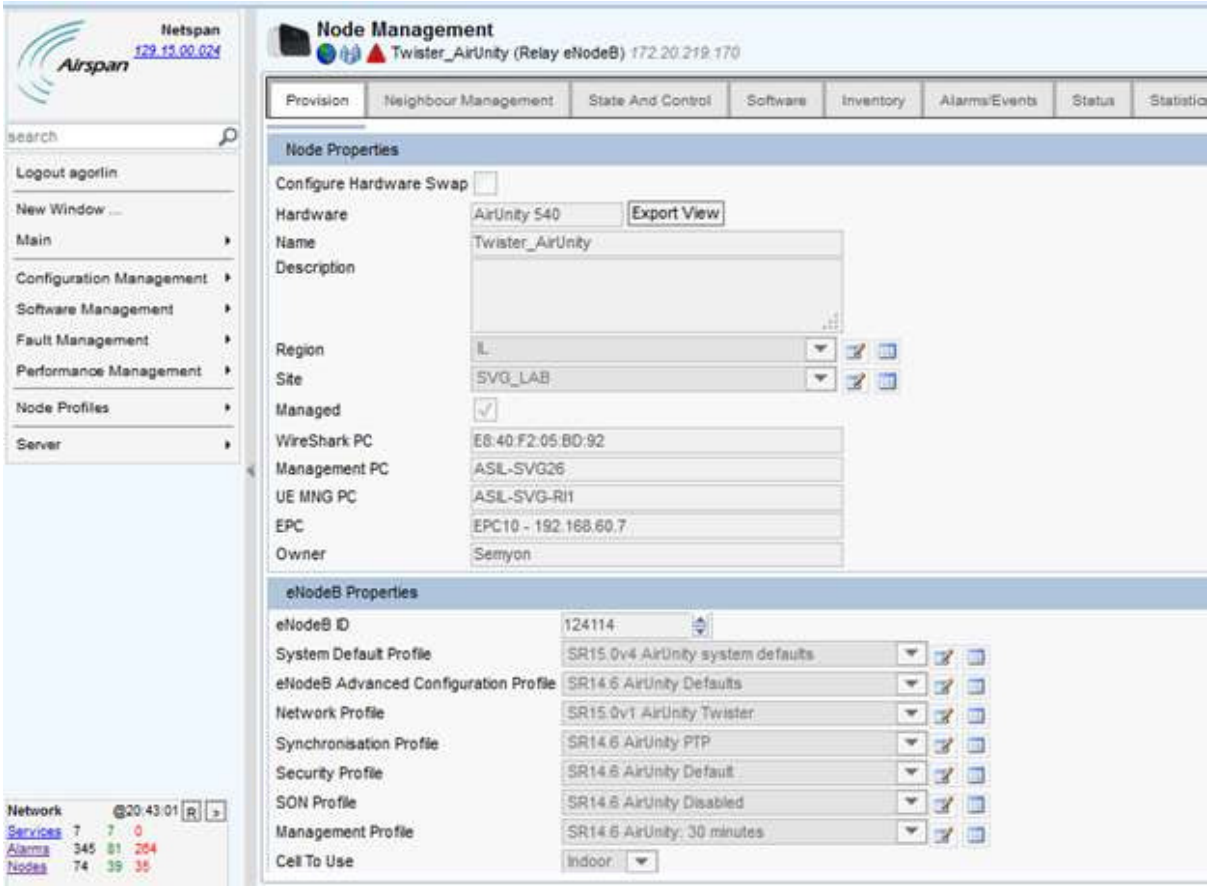


Figure 6: Node Management – Cell Properties

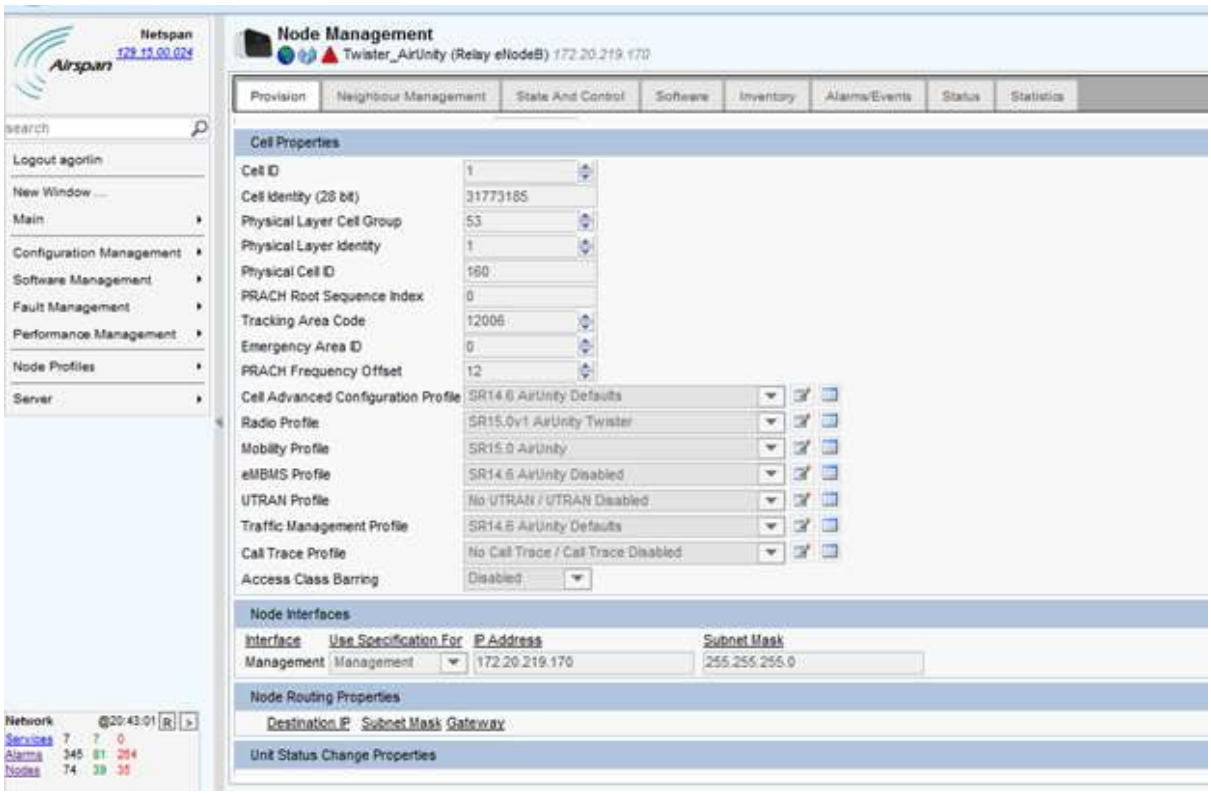


Figure 7: Node Management - Enable LED

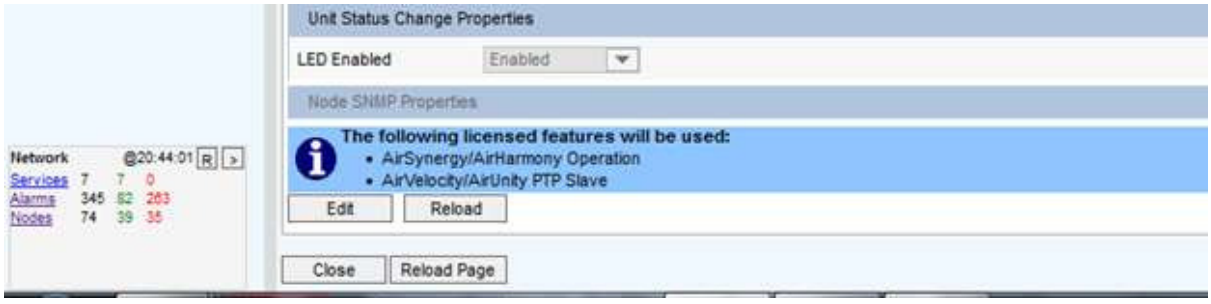


Figure 8: Network Profile - Edit

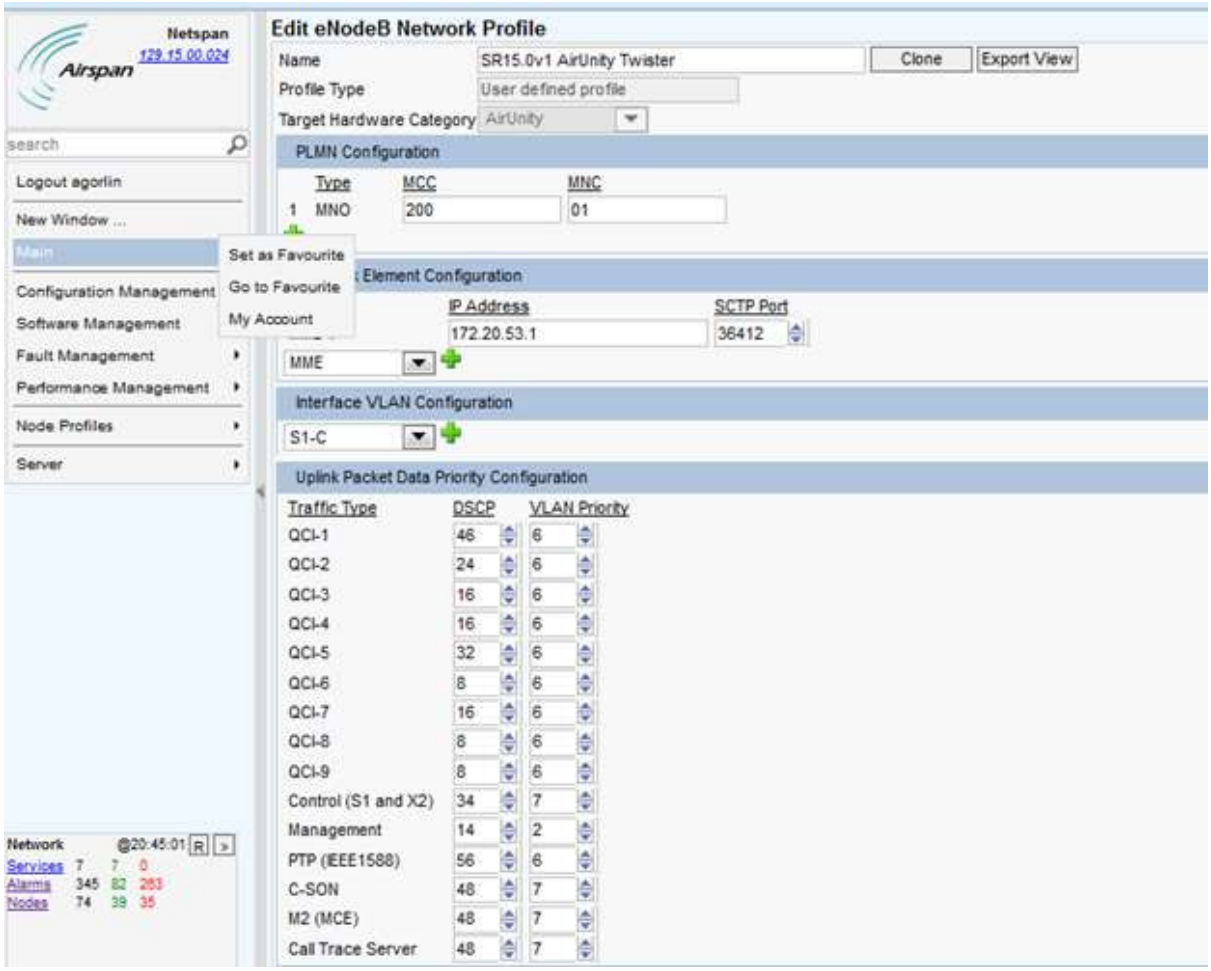
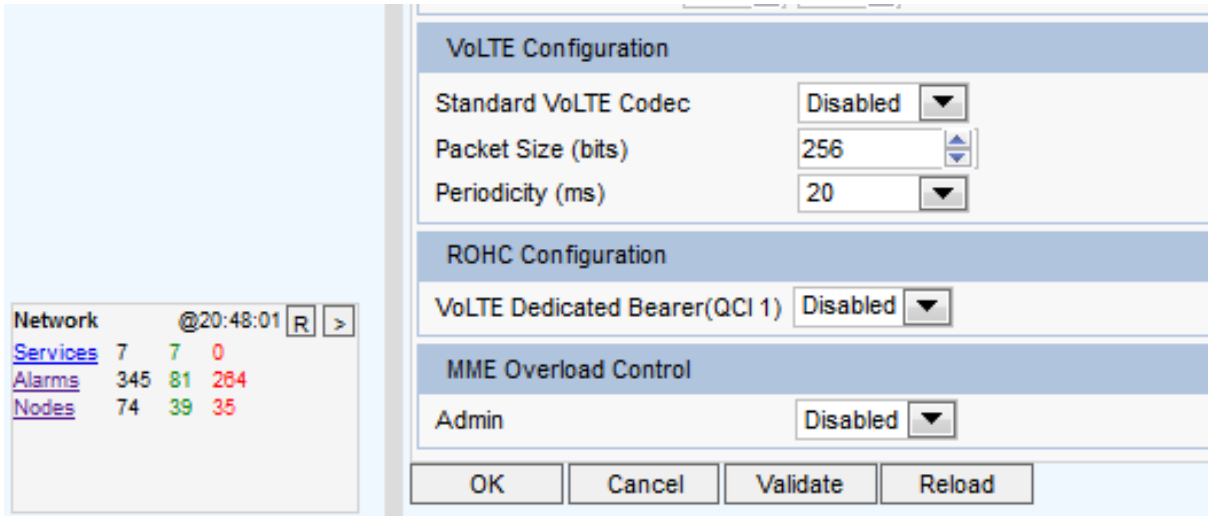


Figure 9: Network Profile – VoLTE Configuration



Note: The Frequency range and the Maximum Total Tx Power is limited by the AU540 eNB's software is in full compliance with to the FCC's requirements.

Figure 10: Cell Radio Profile - Edit