

## General Operational Description Node C843 and Node M843

The Node M/C is designed to amplify signals between multiple UEs and a Base Transceiver Station in a CDMA system. The unit consists of a filter and amplifier chain in the downlink and one or two filters and amplifier chains in the uplink (primary and diversity). The uplink and downlink paths are connected via a duplexer on both ends of each path.

In the primary uplink path, a signal originating from the UE is separated from the downlink signal via the primary UL IN duplexer. It is then amplified by an integrated low noise amplifier (LNA) and forwarded to the uplink Digital Channel Module (DCM). The DCM down-converts the signal to base-band, digitally filters it, amplifies it and then up-converts it. In addition the interference cancellation technology is implemented in the DCM. Finally, the signal is sent to the final amplifier and combined with the downlink input signal in the DL IN duplexer. The optional diversity uplink path (via a second filter) is identical except signals enter via the diversity UL IN duplexer and are combined in the DCM with the primary path.

In the downlink path, a signal originating from the Base Transceiver Station is separated from the uplink signal in the DL IN duplexer. It is then amplified by an integrated low noise amplifier (LNA) and forwarded to the downlink digital channel module (DCM). The DCM down-converts the signal to base-band, digitally filters it amplifies it and then up-converts it. In addition the interference cancellation technology is implemented in the DCM. Finally, the signal is sent to the final amplifier and combined with the uplink input signal in the primary UL IN duplexer. The downlink DCM is also responsible for communication and control of the entire unit.

**PRODUCT  
SPECIFICATION**



## Node M 843 RF Enhancer

### Large Area Coverage, Capacity, and High Speed Data for 850 MHz UMTS Networks

An excellent choice for any area, from the urban core to rural highway

**N**ow designers of UMTS systems can get an RF enhancer with intelligence and performance.

The Andrew Node M 843 is an RF enhancer for UMTS systems with up to 4 adjacent carriers.

This primary network element is ideal for the first phase of the network rollout and for any subsequent phase where cost, coverage, and quality need to be optimized. Although the Node M's

primary function is to increase signal strength between a mobile and a base station in areas where high-quality voice or high-speed data service is not available, it also enhances air-interface capacity and increases the network data rate. The Node M is a dedicated UMTS device. It requires no additional hardware upgrades as a network migrates from UMTS to HSPA and beyond.

The programmable radio may be up-graded locally through an Ethernet-based web connection or remotely via a wireless modem, and the modem may be circuit switch or packet data based. This provides the network management system with on-demand, alarm generated, or heartbeat monitoring via the always-connected packet features. Features and functions may be locally or remotely monitored and changed via a web browser. In addition, Andrew provides A.I.M.O.S., a dedicated OMC and has implemented a standard SNMP based MIB that can easily integrated into any 3rd

party OMC platform. The graphical browser provides an intuitive setup menu, including a wizard that allows users, regardless of skill level, to correctly setup the equipment without any additional equipment.

The Andrew Node M 843 is self-diagnosing, self-adaptive, and virtually maintenance free. It is designed to provide more than 10 years of service under virtually any condition.

- Auto wizard setup for easy installation
- Digital filtering for multiple sub-band selection
- Uniform phase and magnitude amplification
- Automatic interference cancellation for decreased isolation requirements
- Virtual test instruments
- UMTS quality diagnostics
- HSPA approved
- SNMP and web-based GUI

# Node M 843 RF Enhancer – Product Specifications

## Electrical

Frequency range, MHz		
	Uplink	824 to 849
	Downlink	869 to 894
UMTS carriers		1-4
Maximum downlink output power, dBm (WCDMA and HSPA with PAR 8.5 dB)		
	1 carrier	+43.0
	2 carriers	+40.0
	4 carriers	+37.0
Maximum uplink composite output power, dBm		+23
Output power step size, dB		1
Output power accuracy over all conditions, dB		±2
Maximum downlink input power at full output power, dBm		-60
Maximum input power without damage, dBm		+20
Maximum input power without overdrive, dBm		-30
Minimum antenna isolation for maximum gain, dB		83
Uplink noise figure, dB		3.5
Delay, µs		
	Standard filter	6.4
	High rejection filter	8.0
Maximum gain (automatic setting), dB		103
Gain adjust range, dB		50 in steps of 1
Return loss, dB		15
Adjacent channel leakage, dBc		
	1st adjacent channel	-45
	2nd adjacent channel	-50
EVM (without ICE)		6%
Out of band gain (rejection), dB		
	Standard filter	Gain -40 in 200 kHz
	High rejection filter	Gain -70 in 200 kHz
Far off selectivity, dBc		-70
Power supply		
	Standard	100 to 230 Vac/40-60 Hz
	Optional	36 to 72 Vdc

Power consumption, Watts		
	Idle	250
	Full output power	350
RF connectors		
	Standard	7-16 DIN female
	Optional	N female

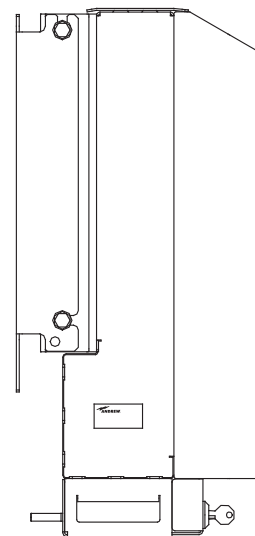
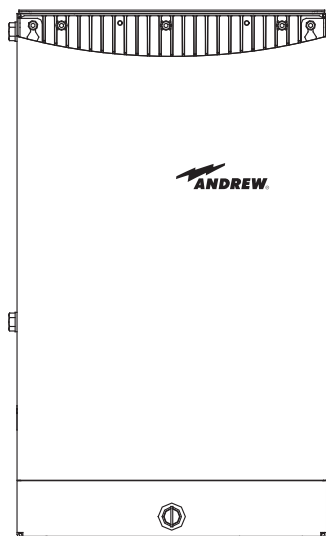
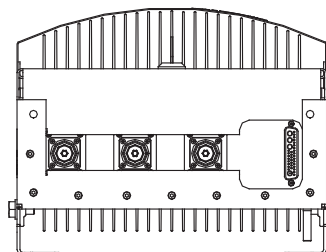
## Environmental

Operating temperature range	-33° C to +50° C
Ingress protection	IP66

## Mechanical

Height, width, depth, mm (in)	546 x 320 x 310 (21.5 x 12.6 x 12.2)
Weight, kg (lb)	28 (61.5)

All figures are typical values



Node RF Unit

# Node M 843 RF Enhancer – Product Specifications

## Features

- Items measured ..... Measurement of pilot power, synch. power, Ec/Io, VSWR, RSSI, multipath signals, system identification, EVM and channel usage.
- Weekly statistic ..... Collecting data (min., max., average, standard deviation) of items measured in a 15 minutes interval.
- Interference cancellation equipment (ICE) ..... Electronic improvement of antenna isolation. Channel and multichannel capable of greater than 35 dB of enhancement.
- Diversity ..... Spatial to time diversity implementation.
- Auto configuration ..... Setup based on downlink power requirements, not gain. Uplink gain is automatically setup based on the downlink settings.
- Access ..... Web browser based local access and remote access Packet data and circuit switched data options. OMC connectivity via SNMP.
- External alarm clamps ..... Up to 4 alarms, high or low active setable via software.
- Mounting ..... Wall or pole mounting kit.

**Technician\_Setup - Microsoft Internet Explorer**  
 Address: http://1.2.1.1/technician\_setup.htm

**ID Number:** 157902443  
**Serial Number:** 000203411  
**Phone Number:** 0019195551212  
**IP Address:** 172.100.144.92  
**Date:** 12/08/2003

**Location:**  
 The Most Important Network  
 100 Board Walk Place  
 Anywhere in the World  
 Technician: John Doe

Description	Current Configuration	New Value
Filter Selection (20MHz Maximum Bandwidth)	824 - 829 / 869 - 874 MHz	Ch 1 No Change
	None	Ch 2 No Change
	None	Ch 3 No Change
Pilot Power to Total Power Ratio	6%,-12dB	No Change
Downlink Power	2.0W, 33dBm	Power No Change
Downlink Gain	Not Defined	Gain No Change
Relative Uplink Gain		No Change
Absolute Uplink Gain		
Downlink DCM Path		
Uplink DCM Path		
Uplink PA		
Uplink PA		
Complete Repeater		
Interference Cancellation		

Setup Menu

**Alarm\_Main - Microsoft Internet Explorer**  
 Address: http://1.2.1.1/Alarm\_Main.htm

**ID Number:** 157902443  
**Serial Number:** 000203411  
**Phone Number:** 0019195551212  
**IP Address:** 172.100.144.92  
**Date:** 19/05/2006

**Location:**  
 The Most Important Network  
 100 Board Walk Place  
 Anywhere in the World  
 Technician: John Doe

Picture	ID	Module	Current Status	Alarm Count
	1	Power Supply, Battery	Green	2
	2	Power Amplifiers	Green	1
	3	LNA	Green	1
	4	Digital Channel Module	Green	2
	5	Modem, EAC, Communication PCM	Green	0
	6	RSSI, VSWR, ALC, Interference	Green	1
	7	External, Doors	Green	1

Legend: Critical (Red), Major (Orange), Minor (Yellow), Warning (Light Blue), Clear (Green), Disabled (Grey)

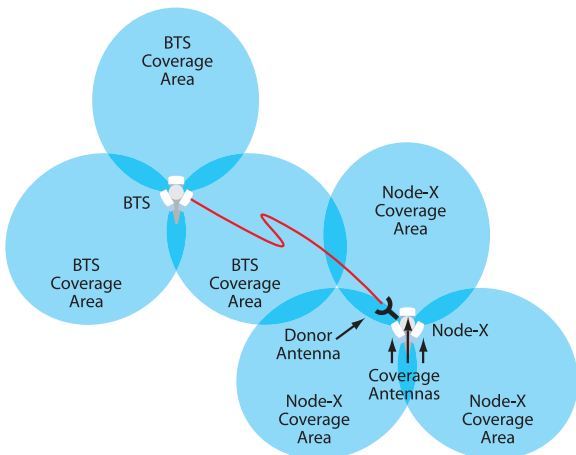
Buttons: Clear Alarm Count, Download Alarm Log, Clear Alarm Log

Navigation: Home Wizard Technician Connectivity Alarms Status SerialNumbers Summary Logout

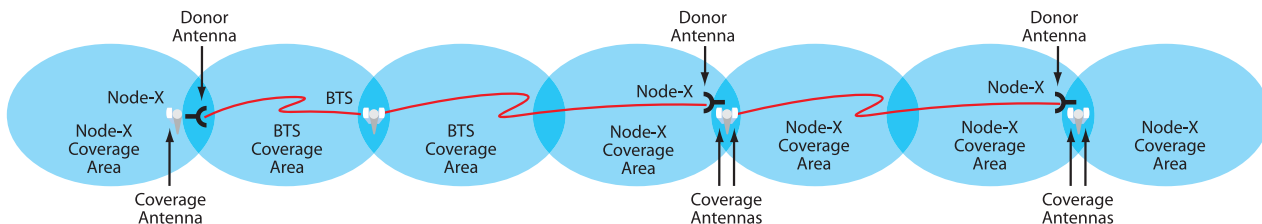
Alarm Menu

# Node M 843 RF Enhancer – Product Specifications

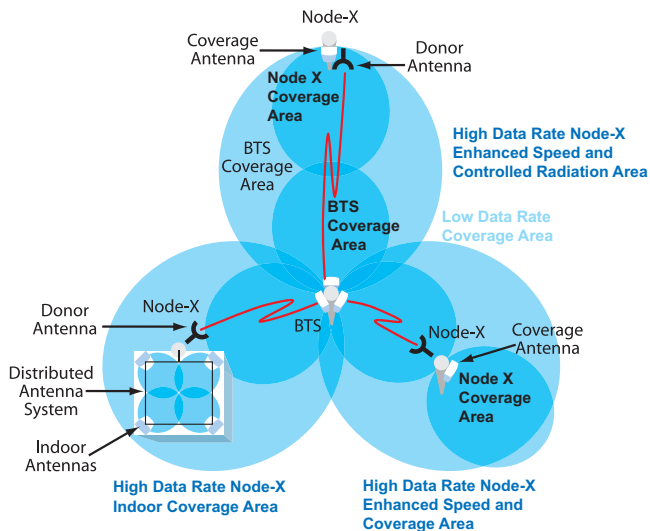
Scenario 1: 3 Sector Coverage for suburban and urban wide area coverage



Scenario 2: Road and Rail Coverage



Scenario 3: Urban hole filling and speed enhancement



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**PRODUCT  
SPECIFICATION**



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**N**ow designers of 850 MHz CDMA systems can get an RF enhancer with intelligence and performance.

The Andrew Node C 843 is an RF enhancer for CDMA systems with up to 20 MHz of adjacent spectrum. This primary network element is ideal for the first phase of the network rollout and for any subsequent phase where cost, coverage, and quality need to be optimized. Although the Node C's primary function is to increase signal strength between

## Node C 843 RF Enhancer

Large Area Coverage, Capacity, and High Speed Data for 850 MHz CDMA Networks

a mobile and a base station in areas where high-quality voice or high-speed data service is not available, it also enhances air-interface capacity and increases the network data rate.

The Node C is a dedicated CDMA device. It requires no additional hardware upgrades as a network migrates from J-STD-8 to CDMA2000 to 1xRTT, to EV-Do and beyond. The programmable radio may be upgraded locally through an Ethernet-based web connection or remotely via a wireless modem, and the modem may be circuit switch or packet data based. This provides the network management system with on-demand, alarm generated, or heartbeat monitoring via the always-connected packet features.

Features and functions may be locally or remotely monitored and changed via a web browser. In addition, Andrew provides A.I.M.O.S., a dedicated OMC and has implemented a standard SNMP based MIB that can easily be integrated into any 3rd party

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- Auto wizard setup for easy installation
- Digital filtering for multiple sub-band selection
- Uniform phase and magnitude amplification
- Automatic interference cancellation for decreased isolation requirements
- Virtual test instruments
- CDMA quality diagnostics
- 1xRTT and EV-Do approved
- SNMP and web-based GUI

# Node C 843 RF Enhancer - Product Specifications

## Electrical

Frequency range, MHz	
Uplink	824 to 849
Downlink	869 to 894
CDMA carriers	1 - 16
	1.23 MHz carriers
Maximum downlink output power, dBm	
1 carrier	+43.0
2 carriers	+40.0
4 carriers	+37.0
Maximum uplink composite output power, dBm	+23
Output power step size, dB	1
Output power accuracy over all conditions, dB	±2
Maximum downlink input power at full output power, dBm	-60
Maximum input power without damage, dBm	+20
Maximum input power without overdrive, dBm	-30
Minimum antenna isolation for maximum gain, dB	83
Uplink noise figure, dB	3.5
Delay, µs	
Option 1	5.7
Option 2	8.0
Maximum gain (automatic setting), dB	103
Gain adjust range, dB	50 in steps of 1
Return loss, dB	15
Spectral emission mask, dBc	-45 @ 750 kHz
	-60 @ 1.98 MHz
Out of band gain (rejection), dB	
Option 1	Gain -40 in 1.25 MHz
Option 2	Gain -70 in 1.25 MHz

Modulation accuracy	RHO 0.98
Spurious emission, dBm	-13
Far off selectivity (ultimate rejection), dBc	-70
Power supply	
Standard	100 to 230 Vac/40-60 Hz
Optional	36 to 72 Vdc
Power consumption, Watts	
Idle	250
Full output power	350
RF connectors	7-16 DIN female
	N female

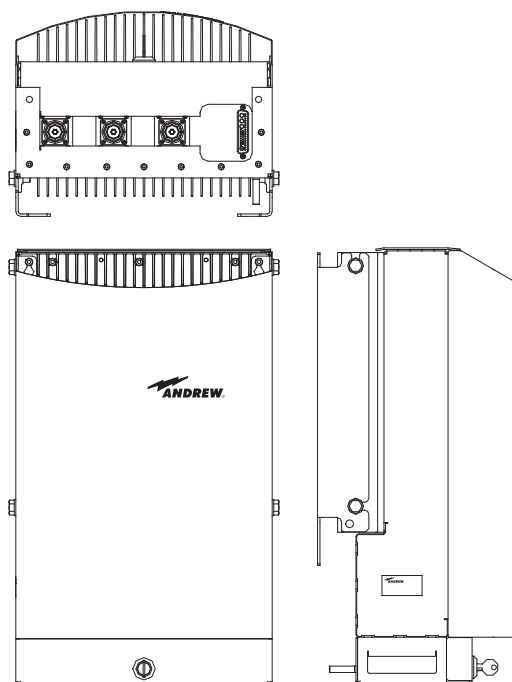
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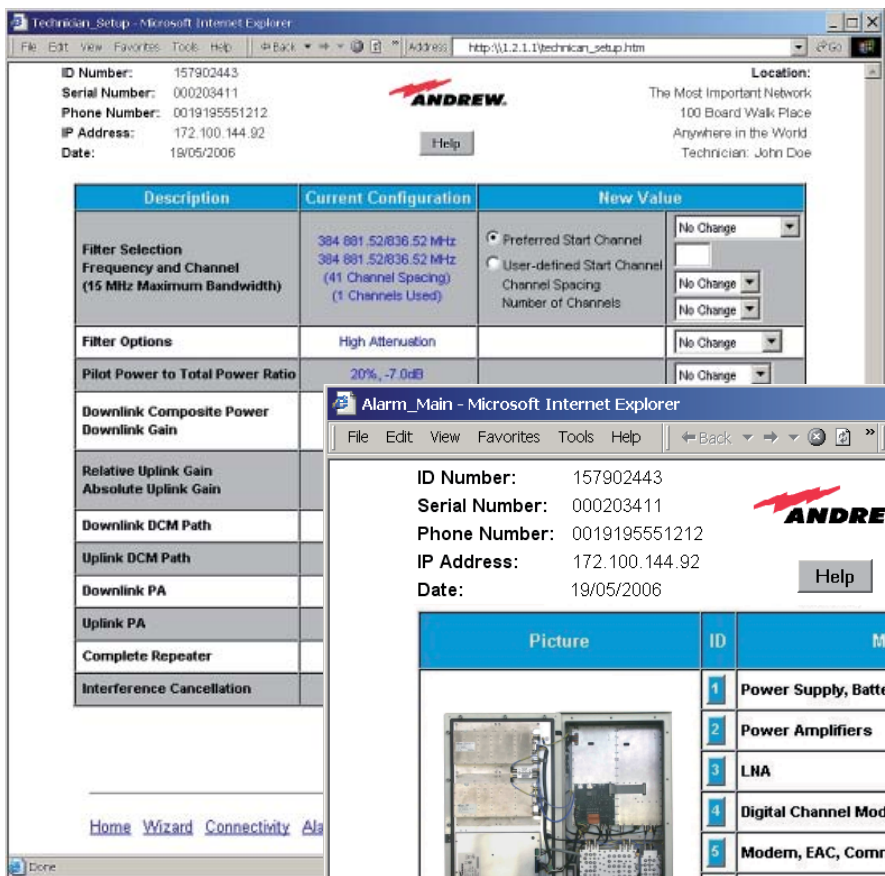


Node RF Unit

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- Mounting ..... Wall or pole mounting kit.



Technician Setup Menu

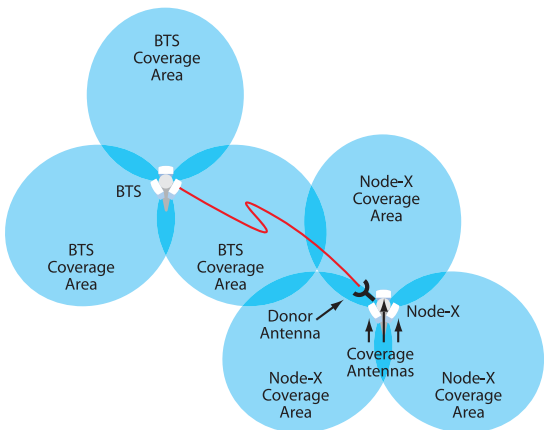


Alarm Menu

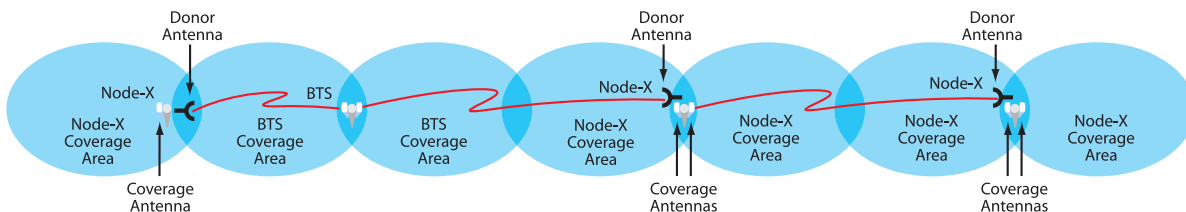


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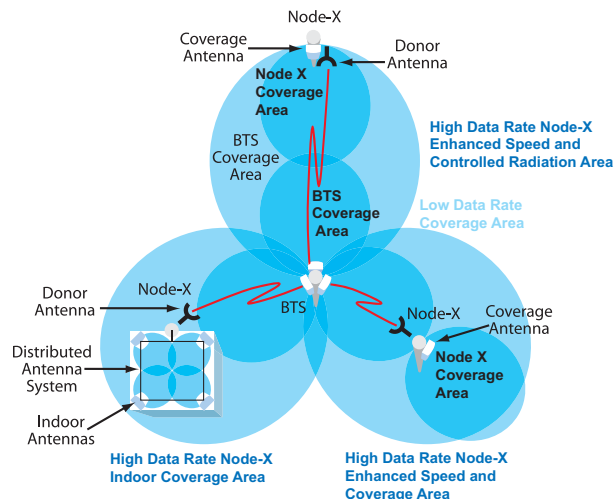
Scenario 1: 3 Sector Coverage for suburban and urban wide area coverage



Scenario 2: Road and Rail Coverage



Scenario 3: Urban hole filling and speed enhancement



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