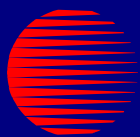


**Multi-Carrier CDMA Cell Extender  
CE-1819-125MC**

**Operational Description**



**COMMUNICATION  
COMPONENTS INC**

*Extending Wireless Coverage*

## Introduction

Communication Components, Inc. PCS CDMA Multi-carrier Cell Extender improves the performance of CDMA Base Stations (BTS) in indoor and outdoor locations, allowing for cost efficient implementation of high capacity radio networks.

By increasing both the downlink power and receive sensitivity, CCI's Cell Extender increases the overall coverage area and improves the performance of the site. The CE-1819-125MC provides up to 125 Watts of combined CDMA output power per feeder line/antenna.

## Technical Description

CCI's Multi-channel CDMA Cell Extender is designed to improve overall site performance by boosting both forward and reverse link parameters in a balanced manner. The system is designed to provide 125 Watts of usable CDMA output power per sector antenna and can serve up to three sectors with two feeder antennas per sector. As such, a CE-1819-125MC system used in six carrier sector with 3 carriers per antenna can deliver 40 W per carrier.

The CE-1819-125MC was specifically designed for very simple interface with macro and mini base stations without any need of retrofitting the original BTS equipment and can be used with any BTS manufacturer equipment. The system can be pad mounted at any convenient location and H-frame or wall mounted when site space is limited.

The Cell Extender system consists of two major blocks that can be easily connected during the initial installation of the BTS or as a retrofit to an operational BTS. The tower top amplifier (TTA) unit is mounted at the top of the tower next to the antennas and is responsible for improving the reverse (uplink) signal from mobile users and increasing the receive sensitivity of the BTS. The

TTA is housed in a moisture proof NEMA 4X enclosure and contains low noise receive amplifiers and duplexers. The TTA is powered via DC power that is coupled onto the center conductor of the coax line. It also communicates TTA operational and alarm status from three multi-carrier sectors via the coax line to the main cabinet alarm system. The Ground Level Unit (GLU) is an outdoor cabinet designed to serve up to three sectors with up to six CDMA carriers per sector. Each sector section consists of high power Duplexers, multi-channel power amplifiers, gain control and bypass circuitry which is activated in case of failure of any critical component of the system.

Fig. 1 shows block-diagram of the typical multi-carrier Cell Extender. As one can see, the duplexed signal from one of the BTS terminals that contains transmit and received signals is connected to the input terminal of the Cell Extender. After that signal is unduplexed and the Forward Link power is amplified by the power amplifier of the Cell Extender. Amplified signal is reduplexed with Reversed Link signal and sent to the one of the sector antennas. The gain control module controls the level of the BTS Downlink signal that is driving the Power Amplifier, and by changing the input attenuator value one can set the system gain. Similar RF signal processing is done on the second BTS terminal, if there are active carriers on that output.

# Multi-Carrier Cell Extender Up to six carriers per sector.

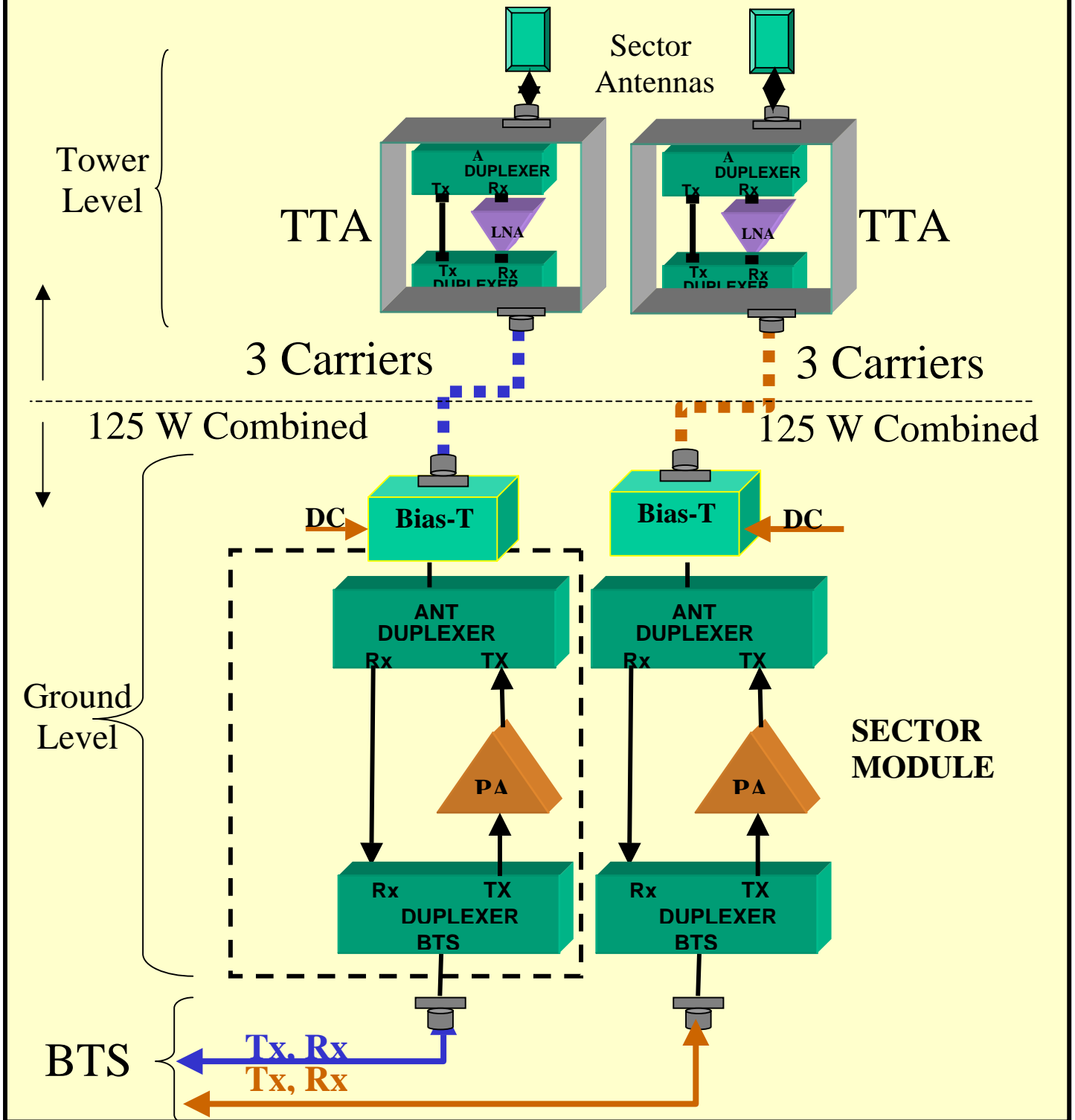


Fig.1 Multi-carrier Cell Extender Block Diagram. One sector serving two active antennas is shown.

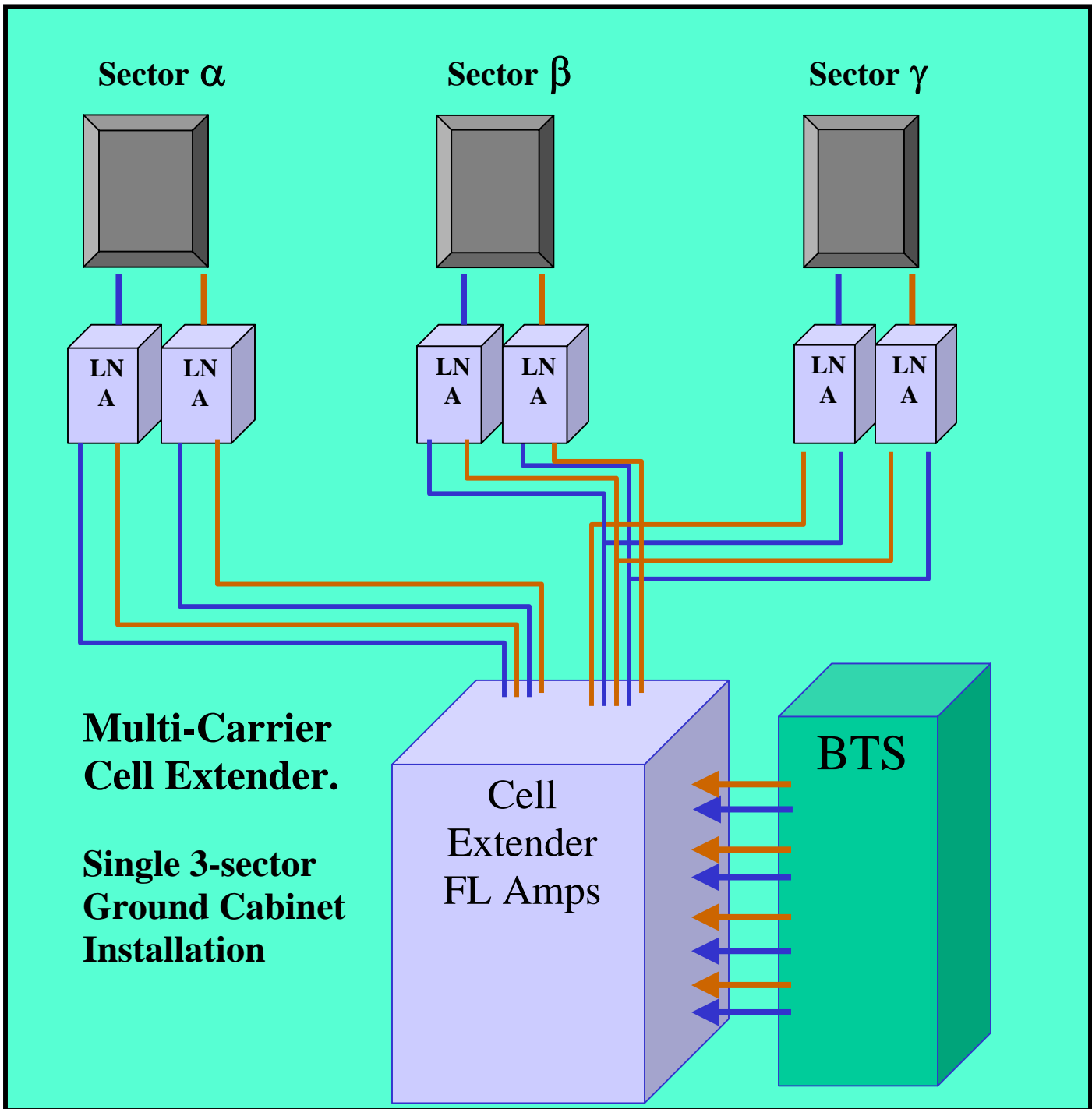
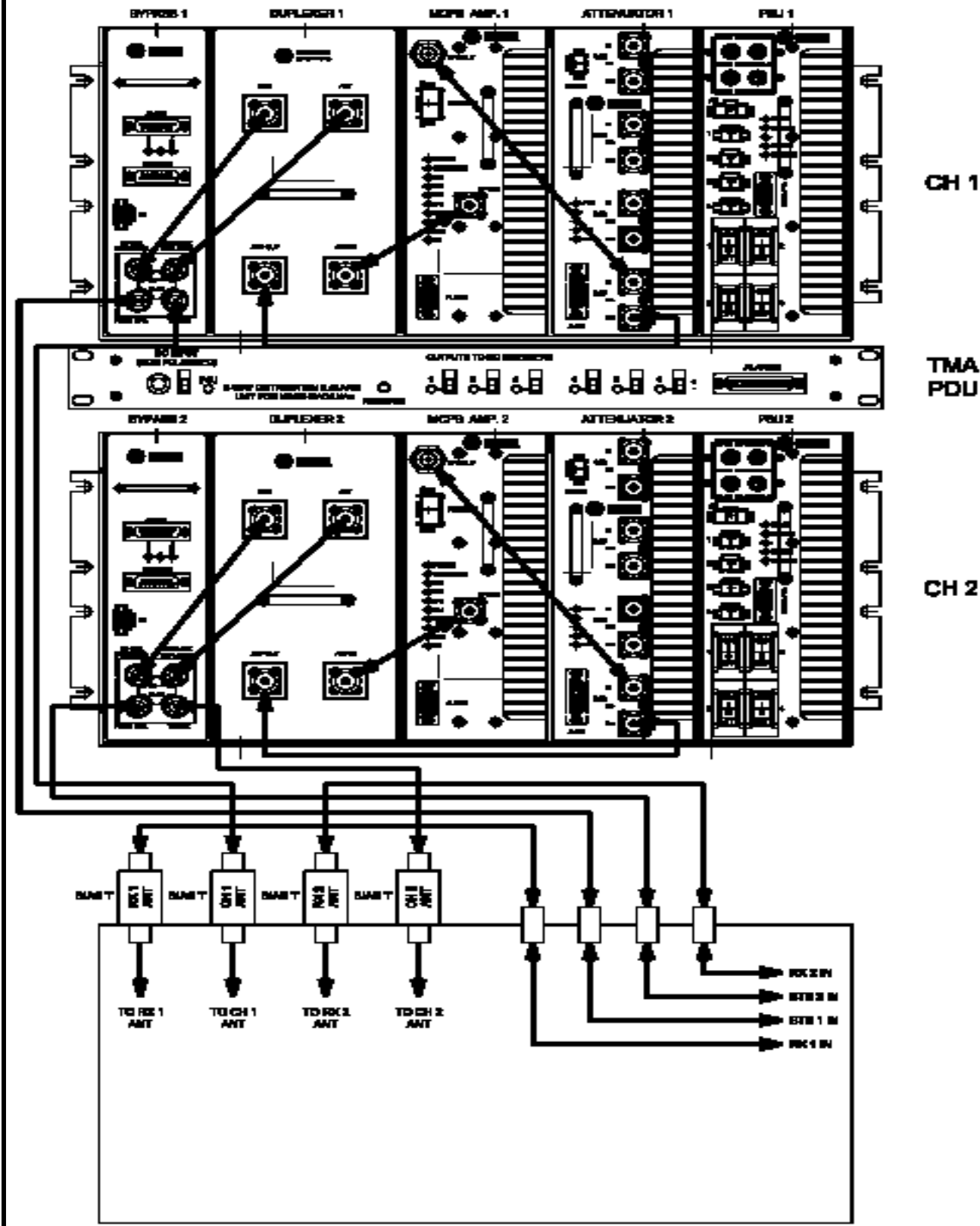


Fig.2. Typical installation diagram for three-sector site.

Decreasing the Noise Figure of the BTS at the antenna terminals utilizing low noise Tower Top Amplifiers also enhances the Reverse Link signals. These amplifiers have Noise Figure as low as 1.5 dB, and by installing them at the antenna terminals the Minimum Discernable signal can be decreased by three to six dB depending on the tower cable losses. Typical installation diagram for three-sector system is shown in Fig.2

**MCPB RACK RF - WIRING DIAGRAM  
TWO CHANNEL, PSU SYSTEM WITH 4 CCI TMA**



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## **Setting the RF Output Power on the CE-1819-125MC Cell Extender**

The RF output power is adjustable by the Gain Control Block of Cell Extender. The user must adjust the RF input power to the Cell Extender using appropriate attenuators such that the RF combined output power level with any number of the individual carriers does not exceed the levels shown below in order for the RF output spectral emissions to be compliant with the FCC spurious emissions limit of -13 dBm outside of the assigned frequency block. **These levels must not be exceeded.**

Channel Center Frequency (MHz)	Maximum RF Output (Watt)
<b>1930-1990</b>	<b>125</b>

### **WARNING!**

**THIS EQUIPMENT COMPLIES WITH RESPONSIBLE BUREAU RULES. ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE MANUFACTURER COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.**

### **WARNING!**

**In order to comply with FCC rules for RF exposure, it must be observed that the antenna connected to this equipment be fixed on an outdoor structure and that it must have a minimum separation distance of 10 meters between it and any person.**

	Reverse Link	Forward Link
PCS	1850-1910MHz	1930-1990 MHz
Nomal 20 dB Bandwidth	20 MHz	20 MHz
PCS band specific filters	AD, BE, EFC	AD, BE, EFC
Nominal Pass-Band Gain	Adjustable to 10 dB Max	Adjustable to 10 dB Max.
System Noise Figure:	1.5.0 dB Max.	
System Group Delay:	180 nanosecond Max	
Pass Band Ripple:	+/-0.5 dB Max.	
Output Third Order IM3 @ 1.98 MHz Offset:		-55 dBc/30 kHz
1 dB Compression Point:	+15 dBm Min.	+56 dBm Typ.
Input /Output VSWR:	1.5:1 Max.	1.5:1 Max.
Up-Link-Down-Link Isolation	80 dB	
By-Pass Insertion Loss	0.5 dB for ground level unit, 0.3 dB for tower top unit	
Nominal Mean Output Power:	125 W	
Input and Output Impedance	50 Ohm	
Power Supply Voltage:	220 VAC	
Power Consumption:	1.0 KW Max per sector	
Dimensions	12"L x 5.5" W x 3"D -tower unit 77"H x 24"W x 21"D - ground level unit	
Enclosure	NEMA 3R Weather Proof Cabinet	
Connectors	Input from BTS –type N, F; output to hard lines -7 /16 DIN, F; TTA—7/16 DIN, F	
Weight	TTA –10 Lbs, GLU –100 Lbs for one sector	
Mounting	TTA –antenna pipe, GLU - concrete pad, 2.5'x2.5' area	
Operating Temperature:	-25° to +50° C Ambient	

Fig. 4. Electrical and mechanical specifications of CDMA Cell Extenders