

# INSTALLATION

## AND

# OPERATING INSTRUCTIONS

## FOR

# MW-CBDA-PCS-X-1W65-A

# CELLULAR

# BI-DIRECTIONAL AMPLIFIER



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## **BDA OVERVIEW:**

The Bi-Directional Amplifier (BDA) assembly provides an exceptional repeater/booster performances to extend the coverage area of radio communications in buildings and RF shielded environments.

Features such as high linearity power amplifiers are contributing for the overall improved system linearity performances. The unit is based on a duplexed path configuration, having sharp out of band attenuation for improved isolation between the receiving and transmitting paths.

## **BLOCK DIAGRAM DESCRIPTION:**

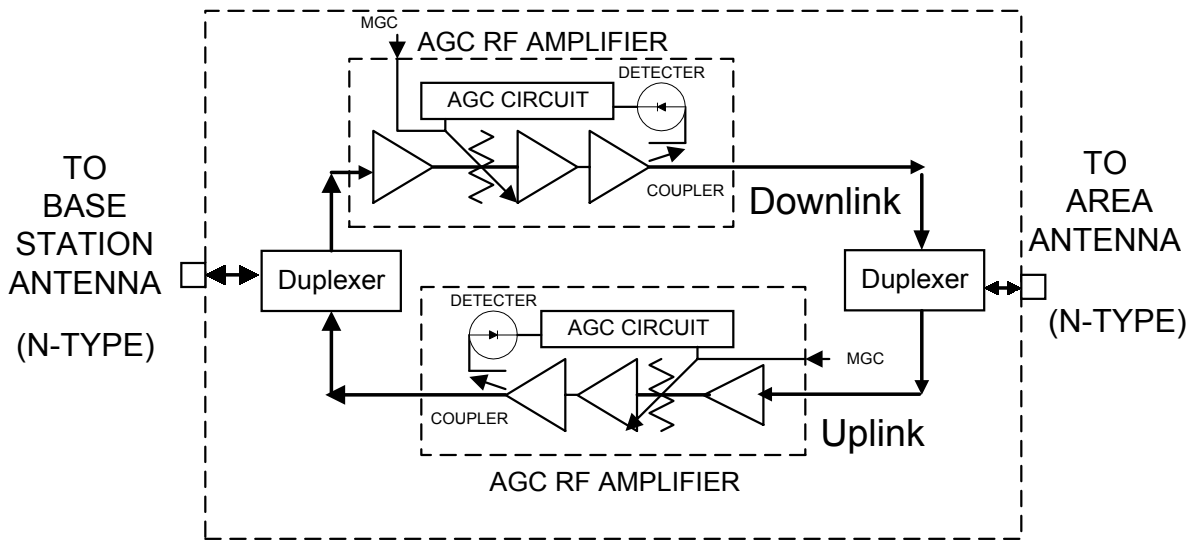
The CBDA Downlink path receives the RF signals from base station amplifies them and transmits them to the subscriber. The BDA Uplink path receives the RF signals from the subscriber amplifies them and transmits them to the base station. Two duplexers frequency separate the signals to the proper amplifying path and isolate the two signals.

For each path there is an AGC amplifier. The amplifier has an AGC option switch. When switched on, the AGC circuit limits the amplifier output power. The AGC circuit senses the output power and introduces more attenuation, when the output power exceeds the preset level. This way the gain of the amplifier is reduced, its output power is limited and the intermodulations products are kept below the desired level.

In this manner the output power cannot exceed the preset power and the IMD levels are always kept below  $-13$  dBm.

The AGC amplifier has a Power LED lamp that illuminates when the output power has reached the preset power limit.

In addition the BDA has a trimmer that enables continuous reduction of the gain by over 15 dB.



## BDA with AGC & MGC RF BLOCK DIAGRAM

### BDA OPERATION

The RF connection is made via two type "N" female connectors. The RF connector labeled "Base" must be connected to the antenna pointing to the base station. The RF connection labeled "Mobile" must be connected to the antenna pointing into the area to be covered by the BDA.

The isolation between the base station antenna and the mobile antenna should be at least 12 dB higher than the BDA gain. If the isolation were less than the BDA gain, oscillation would start and would saturate the amplifier. Isolation few dB higher than the BDA gain cannot start oscillations but would causes gain ripple in the band.

## AGC & MGC FUNCTION

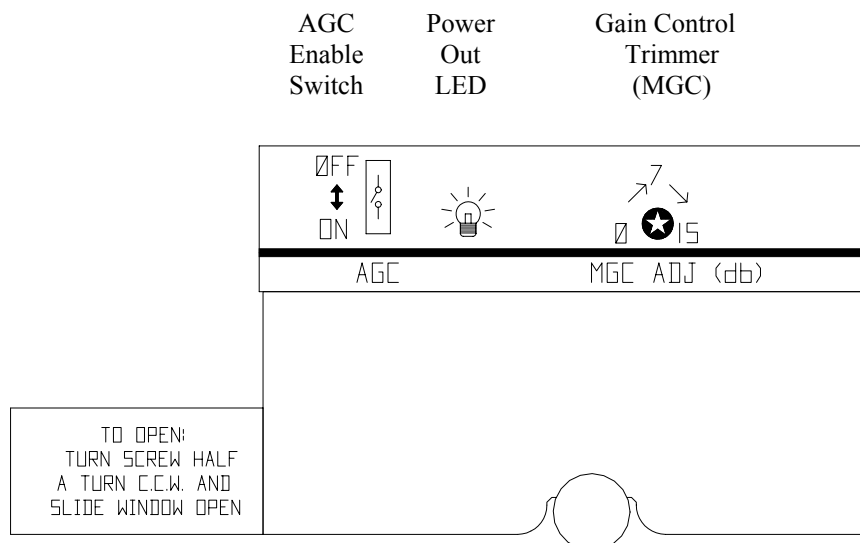
The BDA has AGC function. Their amplifier has a directional coupler and a detector at the output of the high power amplifier to monitor the output power. When a high signal is received the automatic level control detects the amplitude and sends a feedback signal to a voltage variable attenuator which attenuates the signal level so that the output power of the amplifier does not exceed the preset limit. The LED on the amplifier illuminates when the power out the amplifier is within the set limit (both when the AGC is On and when the AGC is OFF).

The switch on the RF amplifier enables the AGC function. If the AGC is disabled then the amplifier gives maximum gain.

**MGC:** The RF gain of the BDA can be reduced by about 15 dB using the continuous trimmer on the amplifier. The RF gain is at maximum when the trimmer is at anti-clockwise direction. To reduce the gain, turn the trimmer clockwise using a screwdriver. Turning it halfway would reduce the gain by 7.5 dB.

The AGC and MGC functions for the uplink path are reached by opening a small cover located on the DBA side adjacent to the Mobile antenna port. For the downlink path the window is located on the side near the Base antenna port.

**Note:** The BDA is shipped with the AGC switch in the OFF position and maximum RF gain.



## AGC & MGC CONTROL (Control Window Located at BDA sides)



## **RF EXPOSURE WARNING**

In order to satisfy the FCC RF exposure requirements, you must ensure that the installation complies with the following:

One antenna is connected via cable that has typical 1~10 dB attenuation (depends on the length of the cable) to the BDA BASE port. This antenna is installed outdoor and has very sharp beam (Yagi type or similar) pointed to the donor (BTS). This type of antenna has about 16 dBi gain. Typical specifications: gain: 8 dBd (=10.1 dBi), VSWR: better than 1.5:1 , Impedance: 50 ohm. The outdoor antenna must be installed to provide a minimum separation distance of 0.5 m (50 cm) from persons within the area.

The second antenna is connected via cable that has typical 1~10 dB attenuation (depends on the length of the cable) to the CBDA MOBILE port. This type of antenna is omnidirectional (isotropic), or wide beam, with 0 to 2 dBi typical gain and is installed and distributes indoor (in buildings, tunnels, basements, park lots, shopping centers etc.). Typical specifications: gain: 2 dBi, VSWR: better than 2:1 , Impedance: 50 ohm. The indoor antenna must be installed to provide a minimum separation distance of 0.2 m (20 cm) from persons within the area.



## **ELECTRICAL SPECIFICATIONS:**

	Uplink	Downlink
Frequency Range (MHz)	See Table	See Table
CDMA Total Output Power	+24 dBm typ	+27 dBm typ
AGC Factory Power Preset	+24± 1dBm	+27±1 dBm
3rd Order Output Intercept point	+45 dBm typical	+48 dBm typical
3rd Order IMD (dBc typ)	50 dBc @ two tones +20 dBm each	50 dBc @ two tones +23 dBm each
Passband Gain @Min attenuation	65 dB min	
Passband Ripple	± 1.5 dB max	
Manual Attenuation Range (Continuous)	15 dB min	
Noise Figure	5.0 dB max	
Impedance level	50 ohms	
V.S.W.R In/Out	1.8 : 1 max	
AGC Selection	By ON/OFF Switch	
AGC Attenuation Range	30 dB typical	
AGC LED Indication	LED turn ON when power reaches AGC Set Power Level. (both at On and Off positions).	
Power Supply	: 110/220V AC, 50-60 Hz /1A	

## **SYSTEM FREQUENCY RANGE:**

<b>BLOCK</b>	<b>Model No.</b>	<b>Up Link</b>	<b>Down Link</b>
A	MW-CBDA-PCS-A-1W65-A	1850-1865	1930-1945
B	MW-CBDA-PCS-B-1W65-A	1870-1885	1950-1965
C	MW-CBDA-PCS-C-1W65-A	1895-1910	1975-1990
D	MW-CBDA-PCS-D-1W65-A	1865-1870	1945-1950
E	MW-CBDA-PCS-E-1W65-A	1885-1890	1965-1970
F	MW-CBDA-PCS-F-1W65-A	1890-1895	1970-1975



## **ENVIRONMENTAL CONDITIONS:**

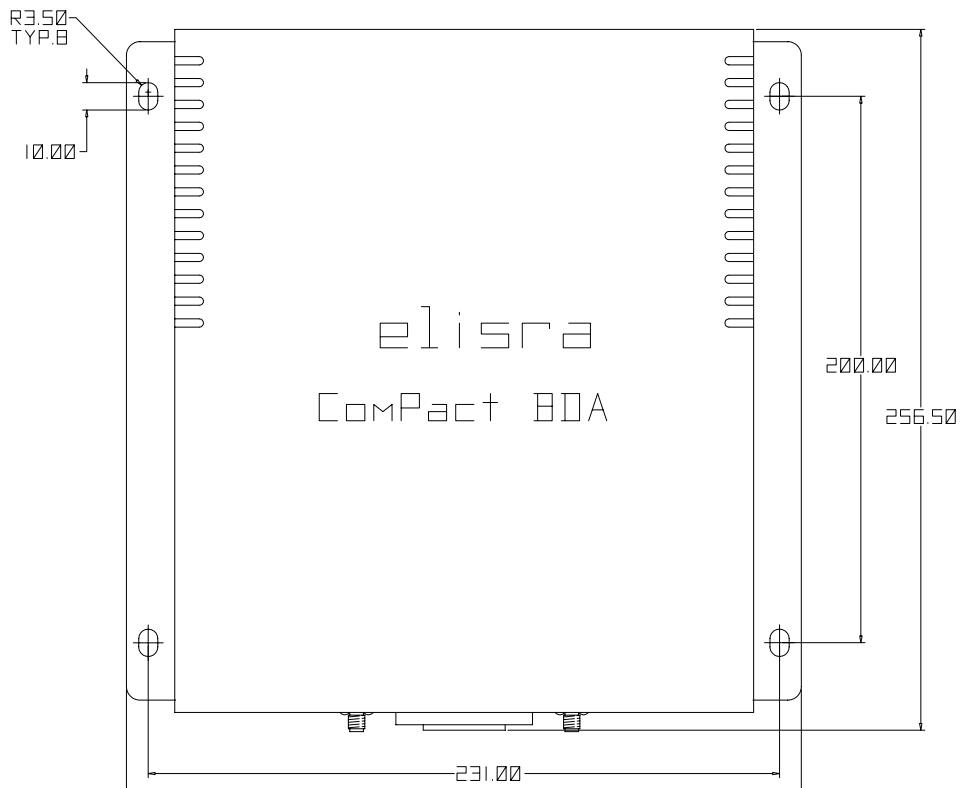
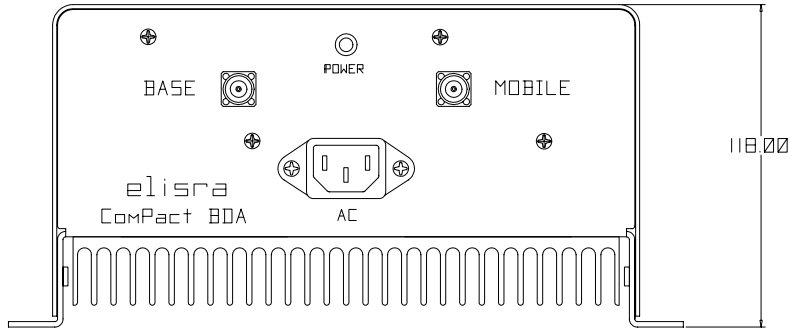
The unit is designed for indoor applications:

Operating temperature	: - 30°C to + 50°C
Storage temperature	: - 50°C to + 80°C

## **MECHANICAL SPECIFICATIONS:**

Size	: 10 x 10 x 5 inch approx. (250 x 250 x 120 mm approx.)
RF Connectors	: N-type Female
Weight	: 15 Lbs. (7 kg.) approx.





## MECHANICAL OUTLINE