

INSTALLATION

AND

OPERATING INSTRUCTIONS

FOR

MW-CBDA-TDMAB-1W60-A

CELLULAR

BI-DIRECTIONAL AMPLIFIER



TABLE OF CONTENTS

| PARAGRAPH | PAGE No |
|---------------------------|----------------|
| BDA OVERVIEW | 3 |
| BLOCK DAIGRAM DESCRIPTION | 3 |
| BDA OPERATION | 4 |
| AGC & MGC FUNCTION | 5 |
| RF EXPOSURE WARNING | 6 |
| ELECTRICAL SPECIFICATIONS | 7 |
| MECHANICAL SPECIFICATIONS | 7 |
| ENVIRONMENTAL CONDITIONS | 7 |

LIST OF DRAWINGS

| DRAWING | PAGE No |
|---|----------------|
| BDA (WITH AGC) RF BLOCK DIAGRAM DRAWING | 4 |
| AGC & MGC CONTROL | 5 |
| MECHANICAL OUTLINE | 8 |

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:

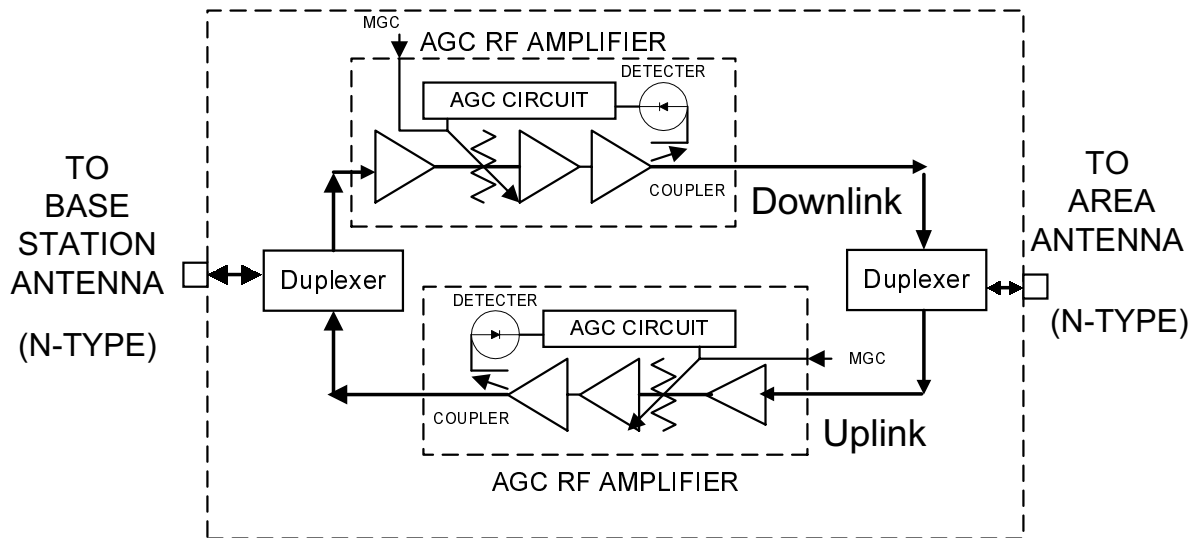
The CBDA Downlink path receives the RF signals from base station amplifies them and transmits them to the subscriber. The BDA Uplink path receives the RF signals from the subscriber amplifies them and transmits them to the base station. Two duplexers frequency separate the signals to the proper amplifying 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 +24 dBm preset power and the IMD levels are 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 15 dB.



BDA with AGC & MGC DETAILED RF BLOCK DIAGRAM

BDA OPERATION

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.

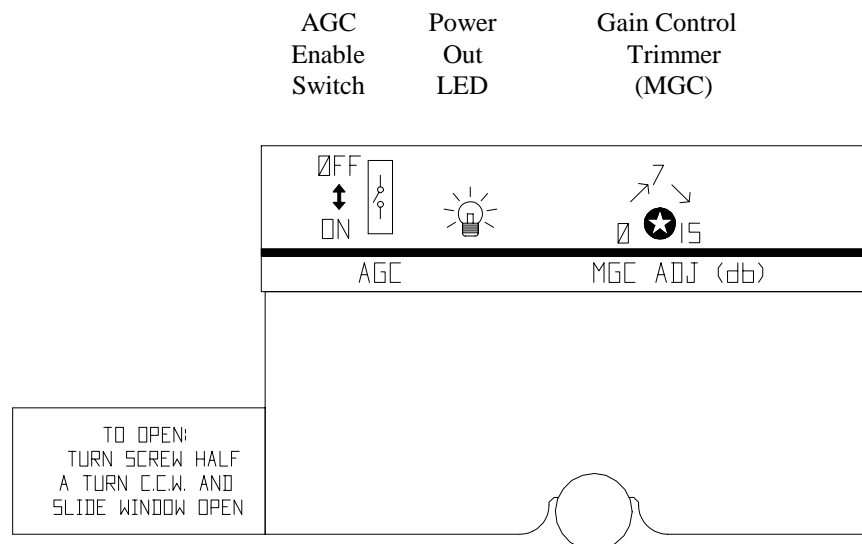
AGC & MGC FUNCTION

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 10 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 0.3 m (30 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:

| | |
|---|-------------------------------------|
| Frequency Range | Up Link : 835 849 MHz |
| | Down Link : 880 894 MHz |
| Passband Gain @ min attenuation | 60 dB minimum |
| Passband Ripple | 1.5 dB typical |
| Output Power AGC Set | +24 1 dBm |
| AGC Dynamic Range | 30 dB min |
| MGC (Manual Gain Control) Dynamic Range | 15 dB min |
| Noise Figure @+25 C at max gain | 6.0 dB max |
| 3rd Order Intercept point | +45 dBm typical |
| IMD @2 tone @+20 dBm/carrier | 50 dBc typical |
| Isolation between Up/Down Link | 75 dB min |
| Impedance Level | 50 Ohms |
| VSWR | 1.5 : 1 max |
| Power Supply | 80 to 240 VAC; 50 to 60 Hz; @500 mA |

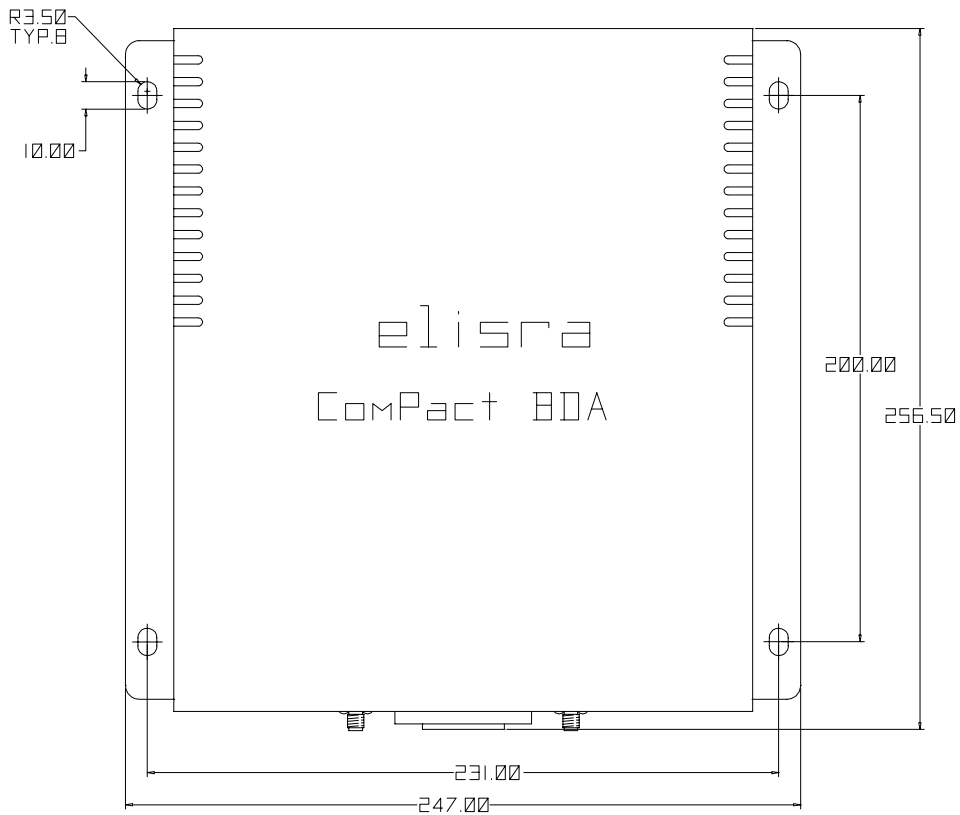
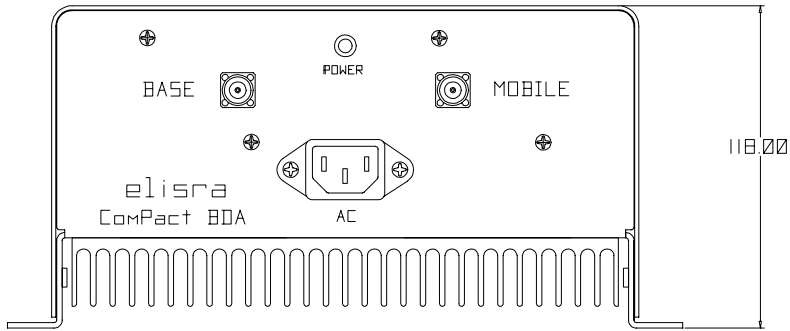
MECHANICAL SPECIFICATIONS:

| | |
|---------------|--|
| 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. |

ENVIRONMENTAL CONDITIONS:

The unit is designed for indoor applications:

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



MECHANICAL OUTLINE