



11696 Sorrento Valley Road, Suite "F"
San Diego, California 92121
(619) 259-4941 Fax: (619) 259-7170

November 2, 1994

FCC
EQUIPMENT APPROVAL SERVICES
P.O. Box 358315
Pittsburgh, PA 15215-5315

Gentleman,

Please find the enclosed Qualification Test Report for the ORA Electronics "CB-15AMP" Bi-directional Amplifier unit. This device is an RF Amplifier intended for use in conjunction with domestic cellular telephones (i.e. mobile subscriber units). We hereby request Type Acceptance to FCC Part 22, Subpart K. To that end, we have also enclosed the FCC Form 731, the artwork showing the design and placement of the FCCID Number, and a check in the amount of \$425 for the Filing Fee.

A Grantee Code for *ORA Electronics (Division), Alliance Research, Inc.* is additionally required. Therefore, a separate check is enclosed (in the amount of \$45) for the issuance of the Grantee Code.

Lastly, please find the enclosed FCC Form 165, which covers the details of the relevant Fees and Fee Type Codes for both the requested Grantee Code Issuance and the Type Acceptance actions.

Your attention to this matter is greatly appreciated. In the event that you have questions or additional data requirements, please do not hesitate to call me collect at (619) 259 - 4952, or toll-free at (800) 337 - 4362.

For and on behalf EESI,

A handwritten signature in black ink, appearing to read 'Harry H. Hodes'.

Harry H. Hodes
President & C.E.O.

EESI Report No. 94FCC010(TR)
23 September, 1994

QUALIFICATION TEST REPORT
FOR:

ORA Electronics
(A Division of Alliance Research, Inc.)

BI- DIRECTIONAL AMPLIFIER
Model No. "CB - 15AMP"

Prepared For:

ORA Electronics
(A Division Of Alliance Research, Inc.)
9410 Owensmouth Ave.
Chatsworth, Ca 91311

Prepared By:

ELECTROMAGNETIC ENGINEERING SERVICES, INC.
11696 Sorrento Valley Road,
Suite F,
San Diego, CA 92121

Electromagnetic Engineering Services Incorporated

1.0 INTRODUCTION

A "bi-directional amplifier unit" manufactured by ORA Electronics (A Division of Alliance Research, Inc.) was tested at Electromagnetic Engineering Services Incorporated's (EESI's) EMC Test Facility. The tests were performed in order to assess the unit's compliance with the relevant requirements of 47 CFR Part 22, Subpart K (for Domestic Public Cellular Telecommunications devices). EESI performed the tests described herein during the period 26 May through 1 August, 1994. This report describes the equipment under test, the test configurations and test methods used to determine compliance, the results of the tests performed, and the conclusions reached after testing.

Electromagnetic Engineering Services Incorporated

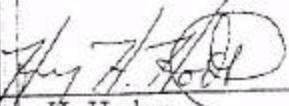
2.0 TEST FACILITIES

All of the testing described herein was carried out at the Electromagnetic Engineering Services Incorporated (EESI) EMC Test Laboratory Facility located in the Sorrento Valley area of San Diego, California. The description of EESI's ANSI C63.4-1992-compliant Open Area Test Site (and its site attenuation characteristics) are on file with the FCC. The measurement-critical items of test equipment used in the tests were in current calibration during the testing; all equipment calibrations were accomplished by independent metrology laboratories in accordance with MIL-STD-45662, and are traceable to NIST. EESI maintains a permanent file containing the Calibration Certificates applicable to all of its measurement-critical items of test equipment.

Electromagnetic Engineering Services Incorporated

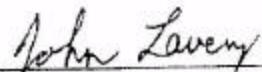
3.0 CERTIFICATION OF TEST DATA AND REPORT

I certify that all of the tests were performed under my supervision, and as described herein, and that this report was prepared under my supervision. To the best of my knowledge and belief, the facts set forth in the accompanying technical data and in this report are true and correct.



Harry H. Hodes
President and C.E.O.

This report has been reviewed, and is hereby approved for release:



John Lavery, Ph.D
Vice President for Technical Operations

Electromagnetic Engineering Services Incorporated

4.0 DESCRIPTION OF THE EUT

The equipment under test (EUT) was an ORA Electronics "CB - 15AMP" bi-directional amplifier intended for use in cellular telephone communications. The term "bi-directional amplifier" describes a unit that amplifies both the transmitted and the received signals. Specifically, the EUT is intended for use in conjunction with low or medium power land mobile cellular telephones (i.e. cellular transmitter/receivers) that employ an external, user-removable antenna. The ORA Electronics "CB - 15AMP" bi-directional amplifier is designed so as to be user-installed between the cellular telephone unit and the external, user-removable antenna.

The external dimensions and geometry of the Unit are shown in the Top View, Side View and Front (turned vertical) View Line Drawings contained in Figure 4.0 - 1. Color Photographs showing the exterior of the Unit in 3/4 Top View, 3/4 Bottom View, Front View, and Rear View are provided in Figures 4.0 - 2a and b, and 4.0 - 3a and b, respectively.

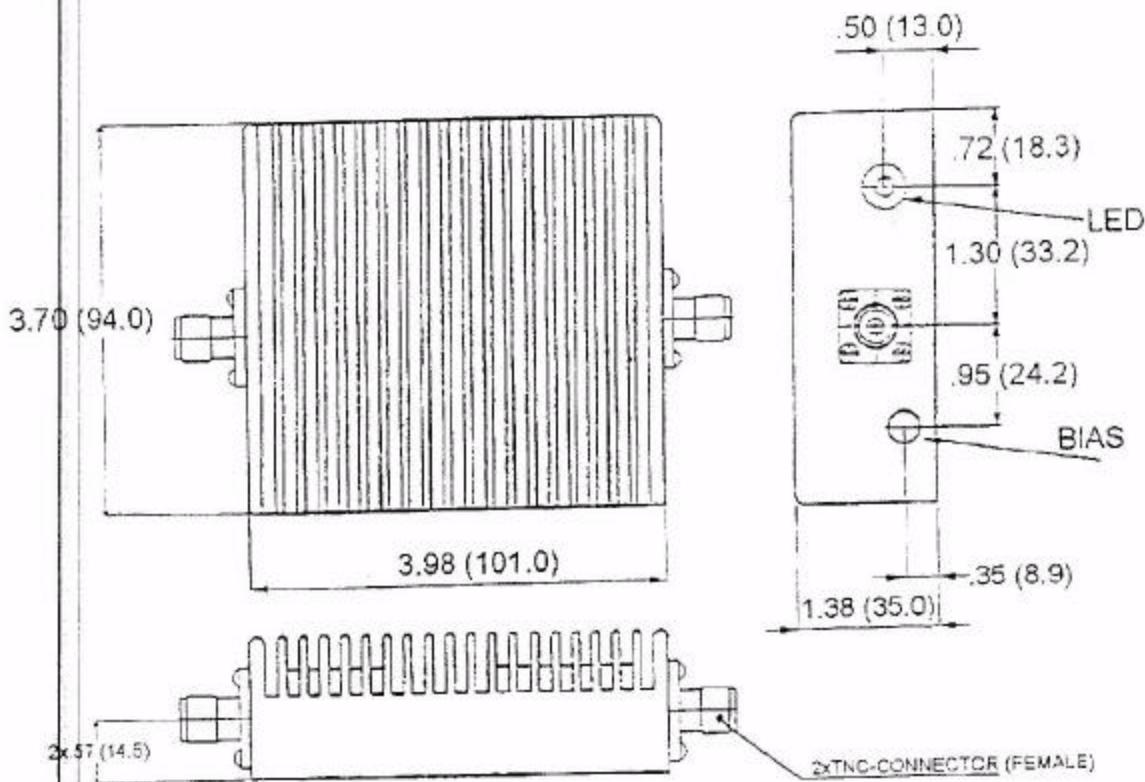
The unit requires a (nominal) 12 Volt DC Amplifier Bias power input in order to operate; a permanently attached 2-conductor lead (with an in-line fuse holder on the Positive (+) input lead) is incorporated into the unit so as to allow the user to connect it to the 12 V DC wiring of an automobile or other source of DC Power. (Note: the Unit is NOT equipped with an AC-to-DC converter, nor is it equipped with any other power source).

The unit is equipped with two Type TNC RF Connectors; one of these is mounted on the front of the Unit and the other on the rear of the Unit. The front-mounted connector is labeled "INSIDE ANTENNA", and the rear-mounted connector is labeled "OUTSIDE ANTENNA". The user's cellular telephone is intended to be connected (via a user-supplied coaxial cable) to the "INSIDE ANTENNA" port. The external, user-supplied antenna is intended to be connected to the "OUTSIDE ANTENNA" port (via either a user-supplied coaxial cable, or via a coaxial cable that is an integral part of the user-supplied antenna, or directly). The labeling of these ports is visible in the color photographs (cf. Figures 4.0 - 3a and b).

The CB - 15AMP bi-directional amplifier has a maximum RF output power of 1.6 Watts, and has harmonic output characteristics that are as good as an "F Grade" amplifier. The CB - 15AMP bi-directional amplifier will provide its rated output power when operated with a transmit-side input signal of as little as 30 milliwatts. The maximum input power allowed is 2 Watts (input powers at higher levels will cause immediate and permanent failure of the drive amplifier). Thus, the unit is intended to operate with mobile subscriber equipments of Class II and/or Class III (as per FCC OST Bulletin 53), or, for similar applications at like power levels. The CB - 15AMP bi-directional amplifier provides 13 dB nominal receive side-gain so as to enhance the reception quality during periods of low signal to noise ratio operations. The manufacturer's stated nominal characteristics for the CB - 15AMP bi-directional amplifier are provided in Table 4.0 - 1.

Electromagnetic Engineering Services Incorporated

FIGURE 4.0 - 1:
Line Drawings showing the External Dimensions And Geometry of the CB -
15AMP Bi-directional Amplifier Unit (Top View, Side View and Front-
turned-vertical View)



Electromagnetic Engineering Services Incorporated

Figure 4.0 - 2a:
Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in 3/4 Top View:

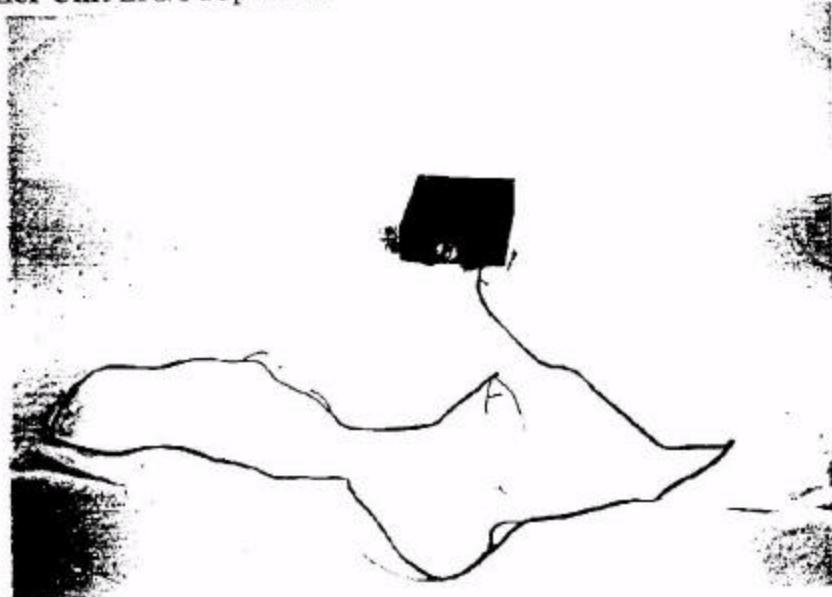
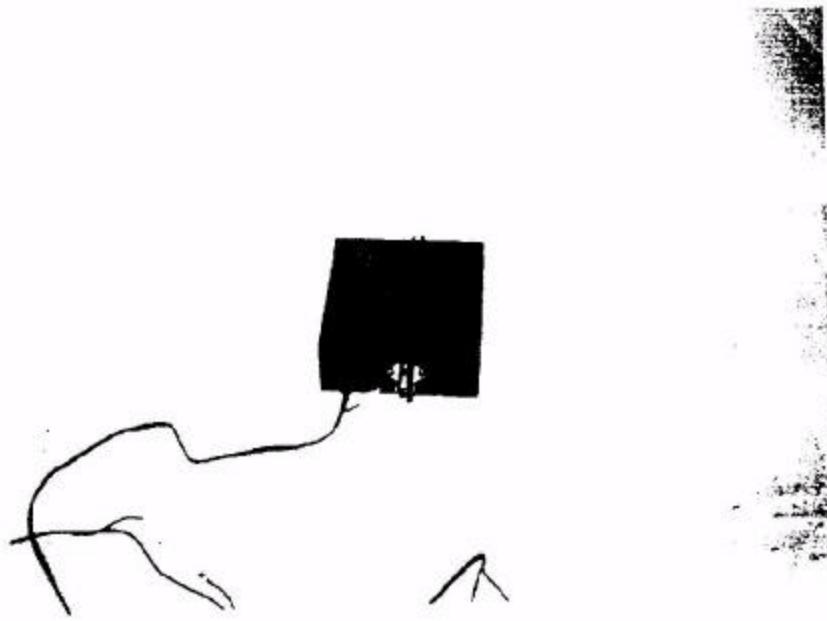
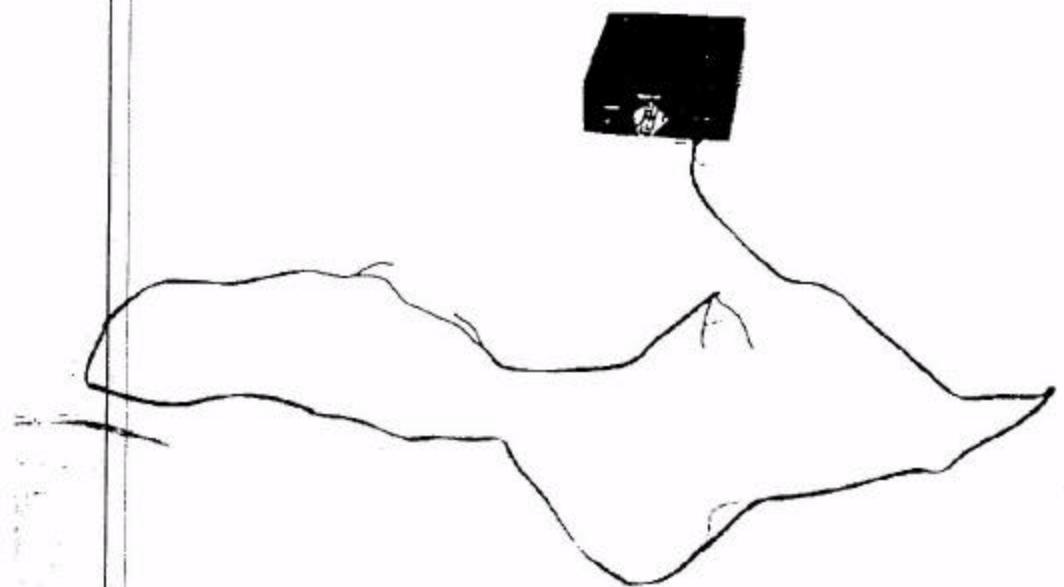


Figure 4.0 - 2b:
Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in 3/4 Bottom View:



Electromagnetic Engineering Services Incorporated

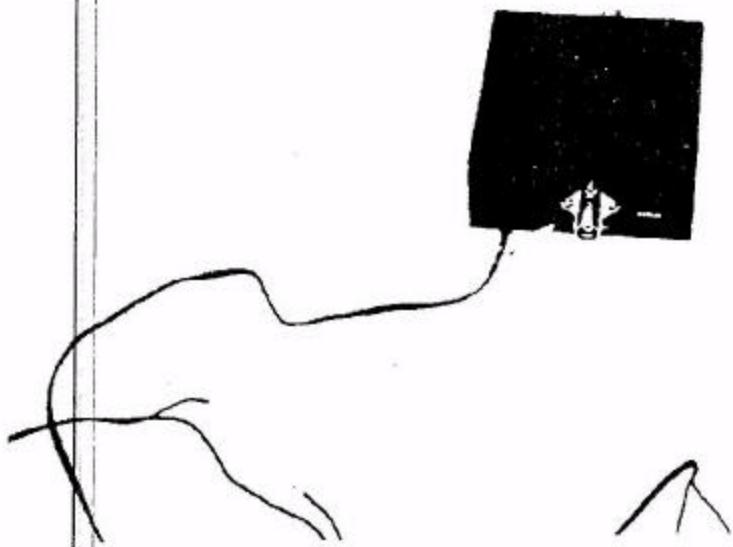
Figure 4.0 - 2a:
Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in 3/4 Top View:



Electromagnetic Engineering Services Incorporated

Figure 4.0 - 2b:

Color Photograph showing the exterior of the CB - 15AMP Bi-directional Amplifier Unit in 3/4 Bottom View:



Electromagnetic Engineering Services Incorporated

Figure 4.0 - 3a:
Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in Front View:



Figure 4.0 - 3a:
Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in Rear View:



Electromagnetic Engineering Services Incorporated

Figure 4.0 - 3a:
**Color Photograph showing the exterior of the CB - 15AMP Bi-directional
Amplifier Unit in Front View:**

