

# RF Exposure Warning

Exposure to radio frequency (RF) energy has been identified as a potential environmental factor that must be considered before a radio transmitter can be authorized or licensed. The FCC and IC have therefore developed maximum permissible exposure (MPE) limits for field strength and power density, listed in FCC 47 CFR § 1.1310 and IC RSS-102 Issue 2 Sect 4. The FCC has furthermore determined that determination of compliance with these exposure limits, and preparation of an Environmental Assessment (EA) if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into certain risk categories, listed in FCC 47 CFR § 1.1307 (b), Table 1. All other facilities, operations and transmitters are categorically excluded from making such studies or preparing an EA, except as indicated in FCC 47 CFR §§ 1.1307 (c) and (d).

Revised FCC OET Bulletin 65 (Edition 97-01) and IC RSS-102 Issue 2 provide assistance in determining whether a proposed or existing transmitting facility, operation or device complies with RF exposure limits. In accordance with OET Bulletin 65, FCC 47 CFR § 1.1307 (b) and RSS-102 Issue Sect 2.5, the Codan Radio Communications transmitter manufactured in Canada is categorically excluded from routine evaluation or preparing an EA for RF emissions and this exclusion is sufficient basis for assuming compliance with FCC/IC MPE limits. This exclusion is subject to the limits specified in FCC 47 CFR §§ 1.1307 (b), 1.1310 and IC RSS-102 Issue 2 Sect 4. Codan Radio Communications has no reason to believe that the excluded transmitter encompasses exceptional characteristics that could cause non-compliance.

## Notes:

- The FCC and IC's exposure guidelines constitute exposure limits, not emission limits. They are relevant to locations that • are accessible to workers or members of the public. Such access can be restricted or controlled by appropriate means (i.e., fences, warning signs and others).
- The FCC and IC's limits apply cumulatively to all sources of RF emissions affecting a given site. Sites exceeding these • limits are subject to an EA and must provide test reports indicating compliance.

## RF Safety Guidelines and Information

Base and Repeater radio transmitters are designed to generate and radiate RF energy by means of an external antenna, typically mounted at a significant height above ground to provide adequate signal coverage. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. The following antenna installation guidelines are extracted from Appendix A from OET Bulletin 65 and must be adhered to in order to ensure RF exposure compliance:

### Non-building-mounted Antennas:

- Height above ground level to lowest point of antenna  $\geq 10$  m
- Power  $\leq 1000$  W ERP (1640 W EIRP)

### Building-mounted Antennas:

Power  $\leq 1000$  W ERP (1640 W EIRP)

The following RF Safety Guidelines should be observed when working in or around transmitter sites:

- The minimum safe distance the user should be from the transmitter antenna while transmitting is 57 cm amplifiers 30W or less. This assumes a maximum antenna EIRP of 15 dBi.
- Do not work on or around any transmitting antenna while RF power is applied.
- Before working on an antenna, disable the appropriate transmitter and ensure a "DO NOT USE" or similar sign is placed on or near the PTT or key-up control.
- Assume all antennas are active unless specifically indicated otherwise.
- Never operate a transmitter with the cover removed.
- Ensure all personnel entering a transmitter site have electromagnetic energy awareness training.

For more information on RF energy exposure and compliance, please refer to the following:

- FCC Code of Regulations; 47 CFR §§ 1.1307 and 1.1310
- FCC OET Bulletin 65, Edition 97-01, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields"
- <http://www.fcc.gov/oet/rfsafety/>
- IC RSS-102 Issue 2, "Radio Frequency Exposure Compliance of Radio Communication Apparatus"

### **FCC Part 90.203(e) Compliance**

This radio complies with 47 CFR Part 90.203(e) in that the operator cannot program and transmit on frequencies, other than those stated by the manufacturer, service or maintenance personnel, using the equipment's external operation controls. It is noted that the FCC rules would be violated if this radio is used to operate on frequencies outside of FCC (Part 90 and Part 22) Frequency Bands for users other than the (Federal Government).

### **FCC RF Exposure Requirements**

CAUTION: This transmitter must be restricted to work related operations in a Controlled RF exposure environment. All qualified end-users of this device must have the knowledge to control their exposure conditions and/or duration, and the exposure conditions and/or duration of their passengers and bystanders, to comply with the General Population / Uncontrolled MPE limit and requirements.

### **IC RSS-GEN, Sec 7.1.2 Warning Statement- (Required for Transmitters)**

#### **ENGLISH:**

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

#### **FRENCH:**

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

### **IC RSS-102, Sec 2.6 Warning Statements**

#### **ENGLISH:**

The applicant is responsible for providing proper instructions to the user of the radio device, and any usage restrictions, including limits of exposure durations. The user manual shall provide installation and operation instructions, as well as any special usage conditions, to ensure compliance with SAR and/or RF field strength limits. For instance, compliance distance shall be clearly stated in the user manual.

The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

#### **FRENCH:**

Le demandeur est tenu de fournir des instructions appropriées à l'utilisateur de l'appareil de radio, et des restrictions d'utilisation, y compris les limites de durée d'exposition. Le mode d'emploi doit fournir installation et de fonctionnement des instructions, ainsi que les conditions d'utilisation particulières, pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF. Par exemple, la distance de conformité doit être clairement indiqué dans le mode d'emploi.

Le manuel d'utilisation de dispositifs destinés à un usage contrôlé doit également contenir des

informations sur les caractéristiques de fonctionnement de l'appareil, les instructions de fonctionnement pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF; informations sur l'installation et le fonctionnement des accessoires pour assurer le respect SAR et / ou les limites d'intensité de champ RF, et les informations de contact où l'utilisateur peut obtenir des informations sur l'exposition canadienne de radiofréquences et la conformité. Autres renseignements connexes peuvent également être inclus.

# Power Amplifier AMP-4-800-30-00

## 1. General description.

The power amplifier (PA) is a one stage unit, working in AB-class operation mode. In addition to the power amplifier section, the PA contains the power control, status monitoring and protecting circuitry, as well as voltage regulation for supplying the RF and main control circuits.

The output power may be controlled either by the external analog signal (remote control), or by potentiometer, accessible from the front panel (local control).

The PA is provided with a forced air cooling system and is protected against overheating, overvoltage and overcurrent.

Two LEDs on the front panel indicate the unit status. The green LED "TX" shows that the output power is present at the amplifier's output. The red LED "G/F" (general fault) turns on during overheating, overvoltage or overcurrent.

The PA has two outputs (open collector) for remote status monitoring. In an alarm state, the level is pulled low.

## 2. General parameters.

- Frequency range, MHz ..... 768 - 869;
- Output power, W;
  - o nominal .....  $\geq 30$ ;
  - o minimum set by local or remote control .....  $\leq 20$ ;
- Harmonic level at the output, dBc .....  $< -70$ ;
- Input power, W:
  - o nominal ..... 2.0;
  - o maximum ..... 3.0;
- Remote control voltage, V:
  - o working range ..... 10 – 17;
  - o guaranteeing the nominal output power .....  $> 11$ ;
- Enhancer:
  - o input and output impedances . . . . .50 ohms;

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

## 3. Construction.

Unit is realized as a module.

There are at the front panel:

- RF connectors;
- Fan, which pushes the air across an internal heatsink;
- TX and General Fault LEDs;
- Access hole to the power set potentiometer;
- Handle for moving the unit into/from a subrack;
- Four quick release fasteners for fastening the unit in a subrack.

Front panel dimensions are 5.585”(W) x 5.055”(H). The full length of PA does not exceed 8.2”.

The PA contains two PCB assemblies: the Main Board Assembly and the Control Board Assembly.

The Main Board is placed inside the shielded compartment and is bolted directly to the heatsink to facilitate cooling.

The Main Board contains RF. The Control Board includes the LEDs, power controlling potentiometer, a fan voltage regulator and the DC supply connector to the Main Board. The control, monitoring and supply lines between the Main Board Assembly and the Control Board Assembly are connected through an 8-pin connector.

