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## **XECOM APPLICATION NOTE:**

### **EMC COMPLIANCE**

All of Xecom's modem and controller products incorporate high speed system clocks. As a result, your system which utilizes these components will be subject to FCC Part 15 regulations. FCC Part 15 rules regulate the unintended radiated and conducted emissions permitted from any electronic device with a clock frequency greater than 9 KHz. Below are some system design guidelines to assist you in meeting these requirements.

#### **RADIATED EMISSIONS**

Proper Printed Circuit Board (PCB) layout is the key to controlling radiated emissions. This is particularly true of systems which utilize a modem, because the telephone cable makes such a fine, unintended antenna.

- 1) The most important factor in preventing radiated emissions is the location and geometry of the power and ground traces on the board. Xecom recommends that separate power and ground planes be used on any PCB which carries a high frequency system clock. There should be as few breaks in the power and ground planes as possible.

NOTE: To maintain the required isolation between your system and the telephone line do not place the power and ground traces directly beneath the modem module, DAA module or Tip and Ring Traces.

- 2) As additional protection against radiated emissions Xecom suggests the use of filters on the Tip and Ring traces. These filters should be mounted close to the RJ11 Jack for maximum effectiveness. These filters include a high voltage capacitor and a

ferrite bead. The high voltage capacitor provides a low impedance path to ground for any high frequency on the Telephone line. The ferrite bead provides a relatively high impedance at high frequency (100 ohms at 100 MHz) to attenuate the high frequency signals on the line.

#### **CONDUCTED EMISSIONS:**

Conducted emissions occur when when a high frequency signal finds its way onto the power or ground traces. They commonly occur when the AC line cord hangs near to an interface cable. The line cord acts as an antenna, picking up any high frequency radiation from the interface cable. The power source itself can also generate high frequencies.

- 1) To prevent the AC Line cord from picking up any high frequency signals from other sources, it is wise to use ferrite beads to block the high frequency signals from entering the system through the line cord.
- 2) Switching power supplies are notorious for applying high frequency signals onto the power lines. If you must use this type of power supply, be sure that a line filter is integrated into the power supply design to prevent conducted emissions.

Xecom cannot indemnify you from FCC Part 15 compliance problems. We can tell that any of our products can be designed into a system without EMC problems if the guidelines described here are followed. If you do encounter FCC Part 15 compliance issues, please contact Xecom Technical Support for assistance. We will be happy to review your design and to make appropriate recommendations