A. DEVICE UNDER TEST

The product is a body worn medical device used to transmit force/weight readings to a companion receiver (OP4ATS-R418). This product is designed to operate under the provisions of Part 15.231(e) of the FCC rules. The transmit frequency is 418 MHz. nominal. The modulation mode is on/off keying. Power for the device is provided by two internal alkaline “AAA” cells.

B. MEASUREMENT PROCEDURE: RADIATED EMISSIONS

Transmitter field strength measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). Testing was conducted with fresh batteries and monitored periodically to insure that the battery voltage (under load) was maintained at 95% of nominal or better.

The device under test was placed on a rotating turntable 0.8 meters high, centered at 3 meters distant from the measurement antenna. The device was placed in the center of the turntable and tested in two positions shown in the test setup photographs.

This product is designed to be worn on the foot similar to a shoe and will not transmit unless it is affixed to the foot and downward pressure is applied. A side angle test position (shown in the photograph) was included to insure that there were no hot radiation angles. For the purpose of testing, the micro-controller in the test sample was programmed with a special subroutine to transmit a pulse stream continuously without having to apply pressure to the strain gauge.

The field strength measurements were taken using an HP8596E spectrum analyzer, EMCO 3121C dipole set, an EMCO 3115 double ridge guide horn and an Avantek UJ210 preamp. The device was scanned from 30MHz. to 9.2GHz. and all emissions were noted. In this case the only emissions detected were those harmonically related to the fundamental transmit frequency.

At each detected frequency of emission, the device was measured by rotating the turntable and adjusting the antenna height over a range of 1 to 4 meters to obtain the maximum output level. This procedure was performed with both horizontal and vertical antenna polarizations with the device in the positions described above. The peak reading for each frequency was recorded in the second

column on the data sheet. The measurement for emissions at the 6th harmonic was performed by reducing the distance from the measurement antenna to 1 meter and factoring –9.54dB into the calculation. No emissions were detected above 2.6 GHz.

C. DUTY CYCLE CALCULATIONS

The transmission format for this device is RS-232 rendered in a pulse position format. Each data packet consists of 26 bits that represent the device address and the data for the applied pressure reading. The worst case transmission occurs when a force of 256 pounds is applied to the strain gauge transducer. This reading was used for the plots and to calculate the duty cycle correction factor.

The data pulses are nominally 92uS. long, but due to rise and fall time errors, some pulse stretching occurs. To allow for this, the pulse and packet measurements were taken at points 12dB. down from peak to insure worst case. The packets are 8.25mS. duration and repeat at 50mS. intervals. The worst case on total time for one packet is 5.35mS.

The duty cycle is calculated as follows:

$$\begin{array}{rl} & 5.35\text{mS.} \quad \text{(total on time for 1 packet)} \\ \underline{X} & \underline{2 \text{ packets} \quad \text{(repeat interval)}} \\ & 10.70\text{mS.} \end{array}$$

$$20\log(10.7\text{mS.}/100\text{mS.}) = -19.4\text{dB}$$

The duty cycle correction factor used for the calculations on the data sheet is –19.4dB. As provided in Part 15.35 of the FCC rules.