

FCC RF Exposure Information

Operational Description

The AMS ScramGPS GPS-610 is an ankle worn offender monitoring and tracking device. The device ~~combines cellular, GPS, and RF technologies~~ to ascertain the offender's current location and verify compliance with program requirements. This information can be gathered at variable rates with the nominal maximum location data rate of 1 locate per minute and the maximum transmission frequency of 1 per minute. The time required to transmit a single packet of location data is constant regardless of the transmission frequency. A typical rate plan locates an offender once each minute and transmits the location data once every 10 minutes.

RF Exposure Conditions

The GPS-610 offender monitoring and tracking device is intended for operation in the general population ~~in an uncontrolled RF exposed~~ environment.

Antenna Separation Distances

~10.16mm from cellular antenna to ankle

~~~25.95mm from GNSS antenna to ankle~~

### Transmission Mode

The Locator utilizes an internal cellular CDMA EvDO/1x RTT transmitter as well as an FHSS transmitter ~~for communication back~~ to the base station.

### Duty Cycle

**The device features variable location and transmission rates with a maximum location rate of once per minute and a transmission rate of once per 10 minutes.** The on air transmission time of each transmission is 3 seconds. This leads to an on air duty cycle of 0.5%.

Derived by direct measurement of the transmit completion time on the device of nominal operation for various rate plans. A typical rate plan of 1 location per minute and transmits on 10 minute intervals is shown below

$$\text{Duty Cycle} = \text{Transmission Time} / \text{TOTAL Time} = 3\text{s}/600\text{s} = 0.005$$

$$\text{Duty Cycle} = 0.5\%$$



## RF Output Power Comparison

Per KDB 447498 D01 v06 4.3.1-a "For 100 MHz to 6 GHz and *test separation distances*  $\leq 50$  mm, the 1-g and 10-g SAR *test exclusion thresholds* are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{\text{(GHz)}}}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR,<sub>30</sub> where  $f_{\text{(GHz)}}$  is the RF channel transmit frequency in GHz"

### Cellular ERP CDMA/EVDO

Frequency = 848MHz

Maximum Measured Conducted Output Power = 24.74dBm, 298mW

Source Based Time Averaged Duty Cycle = 0.5%

Source Based Time Averaged Output Power = 298mW x .005 = 1.49mW

$(1.49\text{mW}) / (10\text{mm}) \times \sqrt{(.848\text{GHz})} = .149 \times .920869 = 0.137 \leq 7.5$ ; exempt from 10-g extremity SAR

### Cellular ERP CDMA/1x RTT

The module is required to fall back to CDMA 2000 1x RTT mode if an EvDO network is not available.

Frequency = 836.31MHz

Maximum Measured Conducted Output Power = 24.4dBm, 275.4mW

Source Based Time Averaged Duty Cycle = 0.5%

Source Based Time Averaged Output Power = 275.4mW x .005 = 1.38mW

$(1.38\text{mW}) / (10\text{mm}) \times \sqrt{(.8361\text{GHz})} = .138 \times .9144 = 0.126 \leq 7.5$ ; exempt from 10-g extremity SAR

### FHSS Radio - 903MHz ISM Band

Frequency = 903MHz

Maximum Measured Conducted Output Power = 0.711mW

Source Based Time Averaged Duty Cycle =  $(1.25\text{ms}) / (15.9\text{ms}) \times 100\% = 7.9\%$

Source Based Time Averaged Output Power = 0.711mW x 0.079 = 0.0056mW

$(1\text{mW}) / (26\text{mm}) \times \sqrt{(0.903\text{GHz})} = 0.036 \leq 7.5$ ; exempt from 10-g extremity SAR



### Simultaneous Transmission Consideration

Both the cellular antenna and FHSS antenna can transmit at the same time. Per KDB 447498 D01 v06 4.3.2 "When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration."

CDMA/EvDO operation

$0.137 + 0.036 = 0.173 \leq 7.5$ ; exempt from 10-g extremity SAR.

or

CDMA/1x RTT operation

$0.126 + 0.036 = 0.162 \leq 7.5$ ; exempt from 10-g extremity SAR.

