

Prediction of MPE and ERP/ EIRP

As to the product Tachograph made by Continental Automotive GmbH, we declare that it complies with the Basic restrictions/Reference levels for electric, magnetic and electromagnetic fields as specified in the following standards:

| Nr. | Standard |
|-----|------------------------------------|
| 1 | 47CFR FCC Part 1 (10-1-13 Edition) |
| 2 | RSS-102 (Issue4, March 2010) |

The compliance is demonstrated based on the following calculation model assessment:

1. The power density according to far-field model is:

$$S = \frac{PG}{4\pi R^2}$$

where:

S = power density (in appropriate units, e.g. mW/cm²)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

2. For single or multiple RF sources, the calculated power density should comply with the following:

$$\sum_{i=1}^n \frac{S_{eqn}}{S_{limn}} = \frac{S_{eq1}}{S_{lim1}} + \frac{S_{eq2}}{S_{lim2}} + \dots + \frac{S_{eqn}}{S_{limn}} \leq 1$$

where:

S_{eqn} = the power density when f is i .
 S_{limn} = the reference level requirement for power density when f is i

3. The calculation of the power density or safe distance is:

- Note 1 The RF exposure is based on the far-field and the radiation exposure is over-estimated.
- Note 2 The maximum output power level is taken into account as a worst case for the purpose of the calculation of power density or safe distance.
- Note 3 The minimum antenna feed cable loss (assumed no cable loss) is taken into account as a worst case for the purpose of the calculation of power density or safe distance
- Note 4 The maximum antenna radiation exposure orientation and maximum antenna gain is taken into account as a worst case for the purpose of the calculation of power density and safe distance.

Calculation GSM 850:

$$S \leq \frac{P \cdot G (EIRP) \cdot t \cdot Dc}{4 \cdot \pi \cdot R^2} = 0.46 \text{ W/m}^2$$

$$\frac{S}{S_{lim}} \leq 0.046 \text{ mW/cm}^2 \text{ (less than 1, complied)}$$

Where:

| | | |
|--------------------|--------|---------------------------------|
| $EIRP (P \cdot G)$ | = | 1.29 W (31.1dBm) |
| t | = | Tune up tolerance (+0.5/-1.0dB) |
| Dc | = | Duty Cycle (GFSK) |
| R | \geq | 0.20m |
| S_{lim} | = | 10 W/m ² |

Calculation GSM 1900:

$$S \leq \frac{P \cdot G (EIRP) \cdot t \cdot Dc}{4 \cdot \pi \cdot R^2} = 0.56 \text{ W/m}^2$$

$$\frac{S}{S_{lim}} \leq 0.056 \text{ mW/cm}^2 \text{ (less than 1, complied)}$$

Where:

| | | |
|--------------------|--------|---------------------------------|
| $EIRP (P \cdot G)$ | = | 1.58 W (32.0dBm) |
| t | = | Tune up tolerance (+0.5/-1.0dB) |
| Dc | = | Duty Cycle (GFSK) |
| R | \geq | 0.20m |
| S_{lim} | = | 10 W/m ² |

Declaration prepared by:

David Lang
Specialist
Radio Communications & EMC