

Calculation: RF-Exposure for SATEL-TR49 transmitter

HVIN: **SATEL-TR49**

PMN: **SATEL-TA37**

In accordance to **CFR Part 47, §1.1310** and **RSS-102 Issue 5**

SATEL-TR49 operates in the frequency range 410 MHz to 475 MHz:

- S: Limit for power density according to
 - CFR Part 47, §1.1310: 2.7 W/m²
 - RSS-102 Issue 5, Table 4: 1.6 W/m²
- P: 1.1 W (peak value, refer clause 5.1 of test report F172629E1)
- G: 14.0 dBi = 25.1
- D: Duty cycle: 100 % = 1
- R: Distance in what the limit of S is reached (refer also to the manufacturers installation / user manual).

$$S = \frac{P * G * D}{4 \pi * R^2} \Rightarrow R = \sqrt{\frac{P * G * D}{4 \pi * S}}$$

- CFR Part 47, §1.1310:

$$R = \sqrt{\frac{P * G * D}{4 \pi * S}} = \sqrt{\frac{1.1W * 25.1 * 1}{4 \pi * 2.7}} = 0.9 m$$

- RSS-102 Issue 5, Table 4:

$$R = \sqrt{\frac{P * G * D}{4 \pi * S}} = \sqrt{\frac{1.1W * 25.1 * 1}{4 \pi * 1.6}} = 1.17 m$$

The value of the power density is:

- below the limit of CFR Part 47, §1.1310 for the “General population / Uncontrolled Exposure” at a distance of more than 0.9 m from the antenna
- below the limit of RSS-102 Issue 5, Table 4 “General Public (uncontrolled environment)” at a distance of more than 1.17 m from the antenna.

The above calculations are based on the lowest possible frequency in combination with the highest output power of the EUT , no cable loss and an antenna gain of 14 dBi.

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HVIN: **SATEL-TR49**

PMN: **SATEL-TA37**

In accordance to **CFR Part 47, §1.1310** and **RSS-102 Issue 5**

SATEL-TR49 operates in the frequency range 902 MHz to 928 MHz:

- S: Limit for power density according to
 - CFR Part 47, §1.1310: 6.0 W/m²
 - RSS-102 Issue 5, Table 4: 2.7 W/m²
- P: 0.8 W (peak value, refer clause 5.5 of test report F172629E3)
- G: 6.0 dBi = 4
- D: Duty cycle: 48 % = 0.48
- R: Distance in what the limit of S is reached (refer also to the manufacturers installation / user manual).

$$S = \frac{P * G * D}{4 \pi * R^2} \Rightarrow R = \sqrt{\frac{P * G * D}{4 \pi * S}}$$

- CFR Part 47, §1.1310:

$$R = \sqrt{\frac{P * G * D}{4 \pi * S}} = \sqrt{\frac{0.8W * 4 * 0.48}{4 \pi * 6.0}} = 0.14 \text{ m}$$

- RSS-102 Issue 5, Table 4:

$$R = \sqrt{\frac{P * G * D}{4 \pi * S}} = \sqrt{\frac{0.8W * 4 * 0.48}{4 \pi * 2.7}} = 0.21 \text{ m}$$

The value of the power density is:

- below the limit of CFR Part 47, §1.1310 for the "General population / Uncontrolled Exposure" at a distance of more than 0.14 m from the antenna.
- below the limit of RSS-102 Issue 5, Table 4 "General Public (uncontrolled environment)" at a distance of more than 0.21 m from the antenna.

The above calculations are based on the lowest possible frequency in combination with the highest output power of the EUT, no cable loss and an antenna gain of 6 dBi.