



CTK Co., Ltd.
The First Leader of Global Regulatory Compliance

CTK Co., Ltd.

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RF EXPOSURE EVALUATION

Applicant : SAMSUNG TECHWIN CO., LTD

Applicant Address : 145-3 Sangdaewon 1 dong, Chungwon-ku, Sungnam City, Kyungki-do, Korea

Kind of Product : UHF RFID Fixed Reader

Equipment model name : URF-SA010

Antenna type : Patch antenna Gain 5.19dBi

Frequency Range : 902.75MHz ~ 927.25 MHz

Number of channels : 50CH

Channel Spacing : 0.5 MHz



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** MPE Calculations **

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user. The MPE calculation for this exposure is shown below.

The peak radiated output power (EIRP) is calculated as follows:

$\text{EIRP} = P + G$ $\text{EIRP} = 31.06 \text{ dBm}$	<p>Where,</p> <p>P = Power input to the antenna (mW)</p> <p>G = Power gain of the antenna (dBi)</p>
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The numeric gain(G) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

$$G = \text{Log}^{-1} (5.19 / 10)$$

$$G = 3.30$$

Power density at the specific separation:

$S = PG / (4R^2)$ $S = (597.04 * 3.30 / (4 * 20^2))$ $S = 0.392 \text{ mW/cm}^2$	<p>Where,</p> <p>S = Maximum power density (mW/cm²)</p> <p>P = Power input to the antenna (mW)</p> <p>G = Numeric power gain of the antenna</p> <p>R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)</p>
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The Maximum permissible exposure (MPE) for the general population is 1 mW/cm².

The power density at 20cm does not exceed the 1 mW/cm² limit.

Estimated safe separation:

$R = \sqrt{PG / 4}$ $R = \sqrt{(597.04 * 3.30 / 4)}$ $R = 12.53 \text{ cm}$	<p>Where,</p> <p>P = Power input to the antenna (mW)</p> <p>G = Numeric power gain of the antenna</p> <p>R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)</p>
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