



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

CTK Co., Ltd.

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RF EXPOSURE EVALUATION

Applicant	Samsung SDS Co., Ltd.
Applicant Address	125, Olympic-ro 35-gil, Songpa-gu, Seoul, Korea
FCC ID	P4YSHN-WDD510
Kind of Product	Digital door lock
Equipment model name	SHN-WDD510K/EN
RF power	18.16 dBm Peak Conducted
Antenna type	Wire antenna
Antenna Gain	3.14 dBi
Frequency Range	2405 MHz - 2480 MHz
Number of channels	16 CH



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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:

$\begin{aligned} \text{EIRP} &= P + G \\ \text{EIRP} &= 18.16 + 3.14 \\ &= 21.30 \text{ dBm} \end{aligned}$	Where, P = Power input to the antenna (mW) G = Power gain of the antenna (dBi)
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The numeric gain(G) of the antenna with a gain specified in dB is determined by:

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

$$G = \text{Log}^{-1} (3.14 / 10)$$

$$G = 2.06$$

Power density at the specific separation:

$\begin{aligned} S &= PG / (4R^2\pi) \\ S &= (65.46 * 2.06) / (4 * 20^2 * \pi) \\ S &= 0.0269 \text{ mW/cm}^2 \end{aligned}$	Where, S = Maximum power density (mW/cm²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)
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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:

$\begin{aligned} R &= \sqrt{(PG / 4\pi)} \\ R &= \sqrt{(65.46 * 2.06 / 4\pi)} \\ R &= 3.28 \text{ cm} \end{aligned}$	Where, P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)
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