



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

CTK Co., Ltd.

386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
Tel: +82-31-339-9970 Fax: +82-31-339-9855
www.e-ctk.com

RF EXPOSURE EVALUATION

Applicant : LG Electronics, Inc.

Applicant Address : 327-23, BdMS R&D Team, LG Electronics
Gasam R&D Campus, Gasam-Dong,
Geumcheon-Gu, Seoul 153-802, Korea

Kind of Product : Smart Gateway

Equipment model name : HG10ZZ0.ENCXLUS

Antenna type : WLAN - Chip antenna Gain 2.1 dBi
: Zigbee - Dipole antenna Gain 4.1 dBi

Frequency Range : 2400 - 2483.5 MHz

Number of channels : WLAN - 802.11b/g/n(20 MHz) : 11
802.11n(40 MHz) : 7
: Zigbee - 16

**** 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:

$\text{EIRP} = P + G$ $\text{EIRP} = 21.08 + 4.10$ $= 25.18 \text{ dBm}$	<p>Where,</p> <p>P = Power input to the antenna (mW)</p> <p>G = Power gain of the antenna (dBi)</p>
--	---

The numeric gain(G) of the antenna with a gain specified in dB is determined by:

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

$$G = \text{Log}^{-1} (4.10 / 10)$$

$$G = 2.57$$

Power density at the specific separation:

$S = PG / (4R^2\pi)$ $S = (128.23 * 2.57) / (4 * 20^2 * \pi)$ $S = 0.066 \text{ mW/cm}^2$	<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>
---	---

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:

$R = \sqrt{PG / 4\pi}$ $R = \sqrt{(128.23 * 2.57 / 4\pi)}$ $R = 10.24 \text{ cm}$	<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>
---	--