

MPE Analysis Report

The Equipment Under Test (EUT) is a Wi-Fi Transceiver for a LED board.

The Equipment Under Test (EUT) operates at frequency range of 2412MHz to 2462MHz with 11 channels and 2422MHz to 2452MHz with 9 channels.

The EUT is powered by 2 x 11.1V Lithium Rechargeable Batteries.

For Maximum Permissible Exposure (MPE) evaluation of the unit, the maximum power density at 20 cm from this transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65 and meet the requirement listed in KDB447498 D04 v01.

For the 2.4GHz RF portion of the unit, the measured powers among all the measured channels were within its production tolerance. The maximum source-based time-averaging duty factor is 100%. From these data and its operating configuration, the exposed power density at a distance (R) of 20 cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Wi-Fi Portion

The Wi-Fi portion was tested in according with the following power output and in actual application the below limit shall not be exceeded.

Operating Mode	Nominal Power	Range of Peak Conducted Power
802.11b	15.0dBm	10dBm to 20dBm
802.11g	13.5dBm	10dBm to 20dBm
802.11n(HT20)	13.2dBm	10dBm to 20dBm
802.11n(HT40)	13.8dBm	10dBm to 20dBm

An internal, integral antenna has been used.

Antenna Gain: -3.88dBi

For Maximum Permissible Exposure (MPE) evaluation of the EUT, the maximum power density at 20 cm from this mobile transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65.

For the Wi-Fi portion, maximum conducted power was 22dBm. The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. And the maximum source-based time-averaging duty factor is 100%. From these data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

The radiated power = 20.0dBm – 3.88dBi = 16.12dBm (40.93 mW)

The radiated (EIRP) source-based time-averaging output power
= (40.93 * 1) mW
= 40.93 mW

The power density at 20 cm from the antenna
= EIRP / $4\pi R^2$
= 0.008143 mW cm⁻²

In the frequency range of 1,500 - 100,000MHz, the MPE limit is 1.0 mWcm⁻² for general population and uncontrolled exposure. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structures and body of the user or nearby persons. The following RF exposure statement is proposed to be included in the user manual:

“ FCC RF Radiation Exposure Statement

Caution: To maintain compliance with the FCC’s RF exposure guidelines, place the unit at least 20cm from nearby persons.”