

MPE Analysis Report

The MP60 (MP60) is a Smart Plug.

The Equipment Under Test (EUT) is a wireless power strip which is powered by 100-120 VAC, 60Hz. The EUT contains a WIFI module which is for the usage monitoring. There are 6 surge-protected outlet, 2 USB-C and 2 USB-A charging ports.

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

For 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11 Mbps.

For 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps.

For 802.11NHT20 mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 216.7Mbps.

For 802.11NHT40 mode, it operates at frequency range of 2422.000MHz to 2452.000MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 450Mbps.

WiFi Module

Antenna Type: Internal, Integral

Antenna Gain: 2dBi

Antenna 0

Operating mode	Nominal Conducted Power	Production Tolerance	Modulation Type
802.11b	22.20 dBm	+/- 2dB	DSSS
802.11g	23.00 dBm	+/- 2dB	OFDM
802.11n (HT20)	23.40 dBm	+/- 2dB	mcs0
802.11n (HT40)	22.20 dBm	+/- 2dB	mcs0

Antenna 1

Operating mode	Nominal Conducted Power	Production Tolerance	Modulation Type
802.11b	22.20 dBm	+/- 2dB	DSSS
802.11g	23.00 dBm	+/- 2dB	OFDM
802.11n (HT20)	23.40 dBm	+/- 2dB	mcs0
802.11n (HT40)	22.20 dBm	+/- 2dB	mcs0

For Maximum Permissible Exposure (MPE) evaluation of the NODE 2, 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.

1) For the WLAN (WiFi), maximum conducted power measured within its production tolerance was 25.40 dBm (maximum). The antenna gain is 2 dBi = 1.58 (num gain) and the maximum

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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 conducted power = 25.40 dBm (346.7mW)

The radiated (EIRP) source-based time-averaging output power (with antenna gain)
= (346.7 * 1 * 1.58) mW
= 547.8 mW

The power density at 20 cm from the antenna
= EIRP / 4πR²
= 0.109 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 product at least 20cm from nearby persons.”

In addition, for this product with multiple transmitter and antenna (WiFi), the requirement of Simultaneous Transmission evaluation has also been considered and has complied with the following conditions of the worse case;

$$\text{MPE1/Limit1} + \text{MPE2/Limit2} \leq 1$$

Thus,

$$\frac{0.109}{\text{Antenna0}} + \frac{0.109}{\text{Antenna 1}} = 0.218 \leq 1$$

It is concluded that no Simultaneous Transmission evaluation is required.