

Prediction of MPE at a given distance

According to 447498 D04 Interim General RF Exposure Guidance v01

The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form as below. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

“f” is in GHz

Simultaneous Transmission with MPE-based Exemptions

For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of following Formula is satisfied.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

As this equipment:

Distance=20cm

f=2.462, f=5.795

So P_{th}=3060mW

Where:

EIRP = P_m + G_i

P_t=10^(EIRP/10)

P_m = measured transmitter output power in dBm,

P_t = transmitter output power in milliwatts,

G_i = numeric gain of the transmitting antenna (unit-dBi)

Ant gain G_i=2 dBi

P_{m1}=28.29 dBm, P_{m2}=22.61 dBm, P_{m3}=21.76 dBm

So P_{t1}=10^(28.29/10) mW =674.53 mW<3060mW

P_{t2}=10^(22.61/10) mW =182.39 mW<3060mW

P_{t3}=10^(21.76/10) mW =149.97 mW<3060mW

Σ= P_{t1}/P_{th} + P_{t2}/ P_{th} + P_{t3}/ P_{th} =0.33<1

The MPE-based test exemption condition is meets the requirements.