



CDN Power Rating

The power rating on the label of the CDN refers to the total internal power dissipation capability of the CDN.

The CDN power rating does not refer to the power of the amplifier used to generate the conducted disturbance signal coupled through the CDN. However, worst case scenarios involving the amplifier and loads on the EUT port of the CDN were taken into account when setting the CDN power rating.

For example, consider the IEC 61000-4-6 Edition 3.0 open circuit (U_0) voltage test level which corresponds to the open circuit voltage of the amplifier which had a 50 ohm source impedance (any attenuation between the amplifier output and the CDN is ignored). The worst case (although unlikely) scenario would be for the load at the EUT port of the CDN being a short circuit as this would result in the maximum current flow through the CDN. For a 30 volt U_0 (CW, un-modulated) at the amplifier, the total current flowing through the CDN (which looks like a 100 ohms series resistance) would be $30 \text{ volts} / (50\Omega + 100\Omega) = 0.2 \text{ amps}$. This 0.2 amps, which will divide up between the internal CDN resistors, is used to set the power rating of these resistors.

Edition 4.0 of IEC 61000-4-6 has added a measurement (section 6.4.2) wherein the U_0 cited above is increased by 5.1dB to verify acceptable amplifier linearity. For the 30 volt case cited above, increasing by 5.1 dB results in a voltage of 54 volts. However, for this measurement, Edition 4.0 requires 150 ohms be placed on the EUT port of the CDN (series 100 ohms plus the 50 ohms of the measuring equipment). So the open circuit voltage of the amplifier (54 volts) sees a load of its own 50 ohms source impedance, the 100 ohms of the CDN and the 150 ohms on the EUT port. The amplifier current flowing through the CDN is therefore $54\text{V} / (50\Omega + 100\Omega + 150\Omega) = 0.18 \text{ amps}$. This is less than the 0.2 amps cited above and used to set the power rating of the CDN resistors. So the CDN is capable of being used for this new Edition 4.0 measurement.

The CDN power rating discussed above is based on the un-modulated rms CW voltage and is therefore average power. Under 80% modulation, as shown in IEC 61000-4-6 Ed 4.0, the rms voltage goes up by about 12% with an associated increase in average power. The power rating of the CDN has been selected to handle this increase in dissipated power resulting from 80% modulation.

Note that this CDN power rating is different from the power rating required of the amplifier. The amplifier power rating needs to take into account the peak voltage the amplifier is required to generate under maximum modulation and the presence of any attenuator between the amplifier and the CDN.