Assuming the following quantities for a cavity of resonance frequency :

* emission rate to the cavity mode (near-field) of
* cavity radiative lifetime due to leakage to far field photons
* cavity non-radiative lifetime due to losses

Thus, for a photon to reach the far field, there are two independent processes that come one after another: first, the probability density for the quantum well to emit a cavity photon, (with being a step function), and second the probability density for a cavity photon to leak into the far field .

Since the two processes come one after another, we can calculate the far-field photon emission probability as a function of time through

Furthermore, by integrating the equation above over time, we get the cumulative distribution function (CDF) to find the probability (per excitation) that a photon is emitted to the far-field until time ,

From the equation above, we see that the far-field emission is not an exponential decay, and the losses force the maximal value to be smaller than 1.

Now, what I expect, is that so that

Therefore, the rate to the far-field is the same as the nearfield, and the efficiency is just smaller (the emitted power).

What you need to do is:

1. If indeed than keep the rates as they are, just do the table for the distribution between modes.
2. If not, then we need to discuss what to do. It might just be that they don’t care about the far field emission, but only the spontaneous emission, because it will become stimulated fast enough.