

The 43 + 10 log(P) Rule: Why it Always Equals -13 dBm

Many of the FCC's emissions rules require that unwanted emissions be at least 43 + 10 log(P) dB below the level of fundamental emissions. This expression is unnecessarily obtuse and redundant — it *always* reduces to -13 dBm regardless of what P is. Here's why:

The FCC defines P as the total power in watts. Therefore, to be 43 + 10log(P) dB below this power means:

$$\text{Unwanted Emissions Power (dBW)} \leq 10 \log(P) - [43 + 10 \log(P)]$$

where the first expression on the right is the fundamental power in dBW and the second expression is the number of dB below the fundamental that the emissions must be according to the rules.

$$\text{Unwanted Emissions Power (dBW)} \leq 10 \log(P) - 43 - 10 \log(P).$$

The 10 log(P) factor cancels out, and the expression simply becomes

$$\text{Unwanted Emissions Power} \leq -43 \text{ dBW}$$

or

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|---|
| $\text{Unwanted Emissions Power} \leq -13 \text{ dBm.}$ |
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Therefore the attenuation of the fundamental by 43 + 10 log(P) dB *always* reduces to a power of -13 dBm regardless of P .