

Decibels

Wednesday, 29 April 2009

10:34 PM

Decibels:

- Represents power ratios
- If an amp has 10 watts in and 100 watts out, power ratio is 10:100 or 10x
- A decibel is: "10 to the power of ? = the power ratio in question, times 10"
 - $10^1 = 10$, $1 \times 10 = 10$
 - Therefore a gain of 10x, expressed as db is 10.
- The log function gives us the "to the power of" answer
- On our calculator:
 - $(10 \log) \times 10 = 10$

- If I increase my power output from 100 watts to 600 watts, how many dB do I gain?
 - $100:600 = 6$
 - $(6 \log) \times 10 = 8$
 - Note: 1 S-unit = 6 dB gain, so your \$1000 amp gave you about 1.5 S-units

- If two parts of your system have gain, expressed in dB; add them to get the total gain
 - Your beam antenna has a gain of 6 dB
 - You stack a second identical beam, which doubles the gain
 - 2x gain = 2
 - What is 2x gain, expressed in decibels?
 - $2 \log \times 10 = 3$
 - Therefore the total antenna gain is 6 + 3, or 9 dB

- Another example:
 - Your new amp has 13 dB gain. What is that as a power ratio?
 - $\text{antilog}(13/10) = 20x$

- Final example:
 - My Icom 703 puts out 5 watts. My Icom 746 puts out 100. What is the dB and S-unit difference?
 - $100 / 5 = 20$
 - $(20 \log) \times 10 = 13 \text{ dB}$
 - $13 / 6 = 2.1667 \text{ S units}$