dBu decibel (in the audio world)

The dB scale is always about a ratio, so how to calculate decibels of different types? It all depends on the different points of reference (0 dB mark). dBm was all about power and had the reference point measured in watts. The problem is that many of the equipment used in the audio world, are not that concerned with the power levels but are very sensitive to voltage levels. For this reason, a new unit of measuring was devised, the dBu decibel, which has the reference point of 0 dBu = 0.775 volts. The value was chosen to avoid confusion with the dBm standard. So, for a 600-ohm load, both dBm and the dBu decibel are referenced to 1 mW of power.

Example: The maximum output of this preamplifier is +20 dBu.

- +20 dB increases the output tenfold (because we are talking about volts now). So:

    - 0 dBu = 0.775 V

    - +20 dBu = 7.75 V

- Another way is to use the formula: $dB = 20 * \log (E_1 / E_0)$.
    - $20 = 20 * \log (E_1 / 0.775) \rightarrow E_1 = 7.75$ V

dBv and dBV

As you might of guess dBV represents a ratio of voltages. The reference voltage is 1-volt RMS. You're probably wondering if the lower-case variant (dBv) is the same as the upper case (dBV). The answer is no. Because of some different convenience factors in the past, dBv describes voltage values just like the dBu decibel. This means that dBv has a reference value of 0.775 V. Just to recap:

- dBv is the same as dBu, with 0 dBv = 0.775 volts.

- dBV has a voltage reference of 0 dBV = 1 volt.

Example: The nominal output level is +4 dBv / dBV. We will use the same formula as for dBu.

- For dBv: $4 = 20 \log (E_1 / 0.775) => E_1 = 1.23$ volts.

- For dBV: $4 = 20 \log (E_1 / 1) => E_1 = 1.6$ volts.

http://audiojudgement.com/how-to-calculate-decibels/

Added note: dB or decibels in Audio

Audio signal or sound levels are measured using a decibel (dB) system. The dB system is used to compare two levels or a change in signal voltage or power. One dB is the level change that is just noticeable by most people. A 6-dB change is about twice the volume.

Sound signal level in dB can be considered either as a power or as a voltage. The level in decibels is 10 times the logarithm of the ratio of two power levels. Where P is the measured power in watts and $P_{Ref.}$ is a reference power in watts.

Sound signal level in dB can be considered as a voltage ratio. The level in decibels is 20 times the logarithm of the ratio of two voltage levels. Where V is the measured voltage and $V_{Ref.}$ is a reference voltage.

The resistance is assumed to be the same so calculations using either the power or voltage formula agree.

Units of Sound Level Measurement

Sound signal level is expressed using various dB units of measurement including:

dBm: decibels or dB referenced to 1 milliwatt (.001 watt) dBu or dBv: decibels or dB referenced to 0.775 volt (dBu is more commonly used) dBV: decibels or dB referenced to 1 volt. Note: 0.775 volt is the voltage across 600 ohms equal to 1 mW.

$$dB = 10 \log (P/ P_{Ref.})$$

$$dB = 20 \log (V/V_{Ref.})$$

These dB measurements all provide a dB value that indicates the level of the audio signal. The suffix letter indicates the reference used to determine the dB value. The "m" indicates a dB reference based upon 1 milliwatt. The dBu or dBv indicates the same reference which is 0.775 volt. You will see dBu used much more often. The "V" indicates a dB reference based upon 1 volt.

https://www.av-iq.com/avcat/images/documents/pdfs/measdigaudlvls.pdf