# Gain Structures
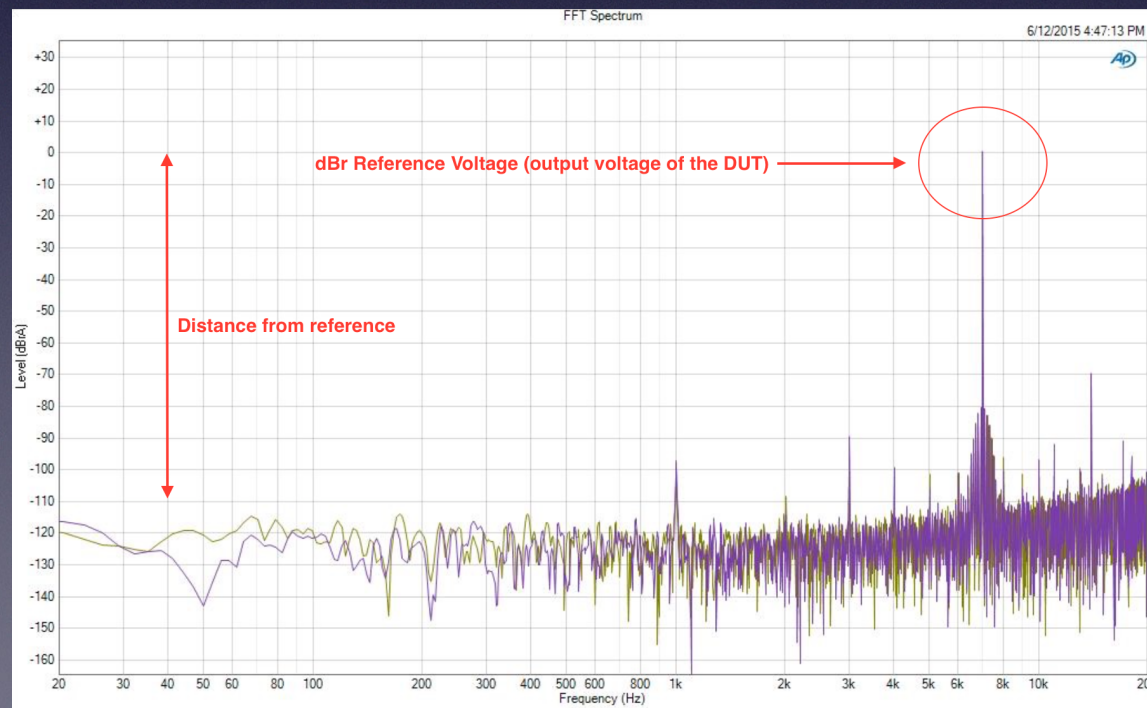
- **dBr** = a Logarithmic voltage ratio with a reference of any given Vrms

- **dBu** = a Logarithmic voltage ratio with a reference of 0.7746 = 0dBu

- **dBv** = a Logarithmic voltage ratio with a reference of 1Vrms

# Gain Structures

Audio Standards

- **dBr** = Is used to measure a logarithmic voltage ratio between a reference voltage. For example when making a FFT measurement of 7kHz on a amplifier that outputs 9Vrms, then 0dB (Reference line) is dBr = 9V. You measure the relative distance of surrounding harmonics relative to the amplifiers output voltage.
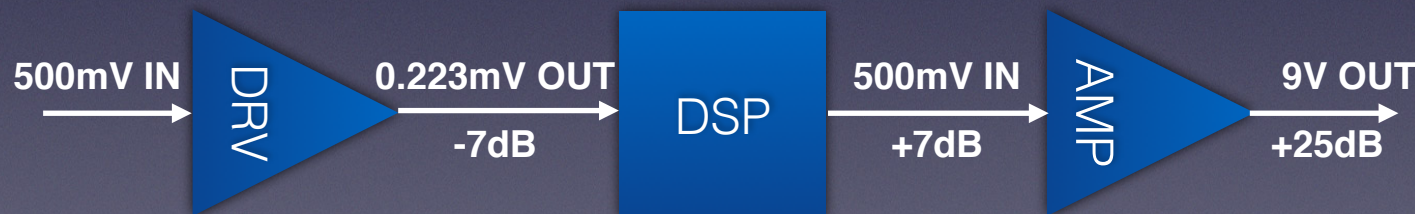
# Gain Structures

Audio Standards

- **dBu** = a Logarithmic voltage ratio with a reference of 0.7746 = 0dBu
  - **Pro audio standard is +4dBu = 1.228Vrms**

- **dBv** = a Logarithmic voltage ratio with a reference of 1Vrms = 0dBv
  - **Consumer audio standard = -10dBv = 0.316Vrms**

# Gain Structures

## Voltage Gain in dB

- Gain (amplification factor) is the extend of boosting or attenuating a signal.

  - Convert Voltage gain to dB scaling
    - **Level in dB = 20 x Log (voltage ratio Vout/Vin)**
    - Example: 500mVrms in and 9Vrms out: Voltage gain is 18Vrms = 25.1 dB

| 500mV IN | DRV | 0.223mV OUT | DSP | 500mV IN | AMP | 9V OUT |
|---|---|---|---|---|---|---|
| | | -7dB | | +7dB | | +25dB |

- **Input Sensitivity: 500mV**
- **System Gain: 25dB**