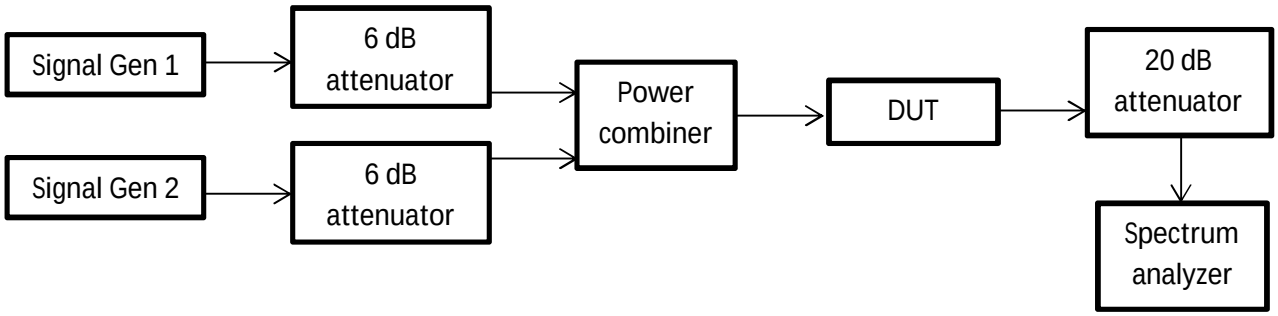
Radio Engineering Laboratory course S-26.3120 Lab 4 measurement instructions:

Measurements to be performed:

1. Gain measurement of the amplifier with respect to frequency.
2. 1 dB Compression point measurement of the designed amplifier.
3. Intermodulation and IP3 measurements.
4. Noise figure measurement.

Instructions:

1. Connect the designed amplifier to the VNA and measure both the frequency response and 1 dB compression point. For frequency response, the DUT is to be operated in the linear region (e.g. input power < -15 dBm).
2. Measure the intermodulation distortion and IP3 for the given amplifier. Measurement setup as shown in the block diagram is used (Operate in linear region of the DUT). Generate two distinguishable closely separated frequency components using the signal generators and observe the spectrum to measure the IMD. (Refer to Anritsu application note in Additional reading section in Noppa for further details). The 20 dB attenuator can also be placed before the DUT so that it doesn't go into compression. Note that the input power to the DUT should be sufficient such that the intermodulated products are above the noise floor.



3. Follow the instructions given in noise measurement document. (Different noise source than the one mentioned in the document is used for the measurements).

Note: Take into account effect of cable losses while performing the measurements. Attenuation of the attenuators indicates nominal values. Remember to calibrate the VNA before measurement. It is a good practice to set current limit for the drain current of the amplifier so that the transistor doesn't draw large current and get damaged if there are any problems. Supply negative gate voltage initially before providing drain supply and while switching off, first decrease the drain supply followed by the gate voltage as large current may be drawn if the gate voltage is brought to zero first.

Note:
Avantek Preamplifier supply voltage: +12V DC
Agilent noise diode supply voltage: +28 V DC
Operating frequency: 2.5 GHz
The supply voltages and drain current vary for each group.