CLAIMS

1. An apparatus for providing signals to a station of a process chamber configured to perform semiconductor fabrication processes, comprising:

a plurality of signal generators configured to generate signals having first and second frequencies;

a measurement circuit configured to measure a voltage standing wave ratio (VSWR); and

a match reflection optimizer having a reactive component configured to be adjusted responsive to an output signal from the measurement circuit.

2. The apparatus of claim 1, wherein the reactive component is configured for adjustment so as to modify the measured VSWR from a first value to a second value.

3. The apparatus of claim 1, wherein the measurement circuit to measure the VSWR corresponds to a phase-sensitive voltage/current measurement circuit.

4. The apparatus of claim 1, wherein the reactive component corresponds to a variable capacitor.

5. The apparatus of claim 1, further comprising a second measurement circuit to measure a second VSWR at one or more input ports of the station.

6. The apparatus of claim 1, further comprising an isolation RF filter to provide between 25 and 40 dB of isolation between high-frequency and low-frequency portions of the apparatus.

7. The apparatus of claim 1, wherein the match reflection optimizer is configured to reduce the VSWR to a value of less than a threshold value.

8. The apparatus of claim 7, wherein the threshold value of the VSWR corresponds to 1.15:1.

9. The apparatus of claim 7, wherein the threshold value of the VSWR corresponds to 1.10:1.

10. A method of coupling a plurality of signals from a corresponding number of signal generators to a plurality of stations of a process chamber, the method comprising:

measuring a voltage standing wave ratio (VSWR) at an input port of a power divider; and

responsive to the measured VSWR, adjusting a value of a reactive component of a match reflection optimizer, the adjustment of the reactive component to bring about a second VSWR lower than a first threshold value.

11. The method of claim 10, wherein the reactive component comprises a variable capacitor.

12. The method of claim 10, wherein adjusting the VSWR comprises lowering the VSWR to a value less than 1.15:1.

13. The method of claim 10, wherein the measuring comprises measuring the VSWR of a first signal, having a first frequency of about 400 kHz, and a second signal, having a second frequency of about 27.12 MHz.

14. The method of claim 13, further comprising attenuating the signals having the second frequency, at a signal generator of the first frequency of the plurality of signal generators, by an amount of between 25 and 40 dB.

15. The method of claim 10, further comprising:

measuring a VSWR at an input port of one or more of the plurality of the stations of the of the process chamber; and

adjusting a value of a reactive component of a RF power control circuit, the adjustment of the reactive component of the RF power control circuit to bring about a VSWR lower than a second threshold value.

16. The method of claim 10, further comprising adjusting a value of a reactive component of a pi-match circuit to lower the VSWR of a signal at a first frequency of between 360 kHz and 440 kHz.

17. The method of claim 10, further comprising adjusting the value of a reactive component of a L-matching circuit to lower the VSWR at a second frequency of between about 26.5 MHz and about 27.5 MHz.

18. A fabrication chamber for processing semiconductor wafers, comprising:

one or more signal generators configured to generate a corresponding number of RF signals to process stations of the fabrication chamber;

a measurement circuit configured to measure the voltage standing wave ratios (VSWRs) of the RF signals; and

a control module to control values of reactive components disposed between the one or more signal generators and the process stations of the fabrication chamber, the values of the reactive components configured to be adjusted so as to reduce each of the VSWRs of the RF signals to a value below a threshold VSWR value.

19. The fabrication chamber of claim 18, wherein the threshold value of the VSWR value corresponds to 1.15:1.

20. The fabrication chamber of claim 18, wherein the threshold value of the VSWR value corresponds to 1.10:1.