Considerations in Testing 750 MHz Amplifiers

When a system is rebuilt to 750 MHz, different components are required throughout the cable system. This includes new amplifier modules, pads, equalizers, possibly new housings, new cable, connectors, taps, etc., and system sweeping requires test equipment that can test at least to 750 MHz. There are some additional considerations for testing to 750 MHz or higher. The test process is only as good as the weakest link and all components used in the test must be examined. Testing to 750 MHz using a type F barrel connector that is only rated below 500 MHz can result in unpredictable response and poor return loss characteristics, especially at higher frequencies. This contributes to the appearance of standing waves at the high end of the response. The return loss of the amplifier test point and the quality of the test cable must be considered. When the F connector on your test equipment needs to be replaced, be sure to only replace it with a high quality, high frequency F connector. Consider all components being used. A "push-on" or "quick-F" connector center conductor tends to be of a wider diameter, and can cause the pins of the female connector to spread out and affect the quality of future connections. If the amplifier manufacturer provides a probe, use it! (see fig. 1) These probes are specially designed to mate well with the test point. Not using the probe will result in unpredictable response characteristics.

In spite of taking the above mentioned precautions, and in situations where the amplifier manufacturer doesn't provide a probe, there may be standing waves at UHF frequencies (see fig. 2). These standing waves are a direct result of imperfect impedance matches between the amplifier test point and the input to the sweep receiver (including cables, type F barrel connectors, etc.). A quick, efficient way to eliminate these characteristics, is to use a 6 dB pad at the input to the sweep receiver or at the amplifier test point (see fig. 3). This performs a similar function to conventional test point probes in improving the match at the test point.

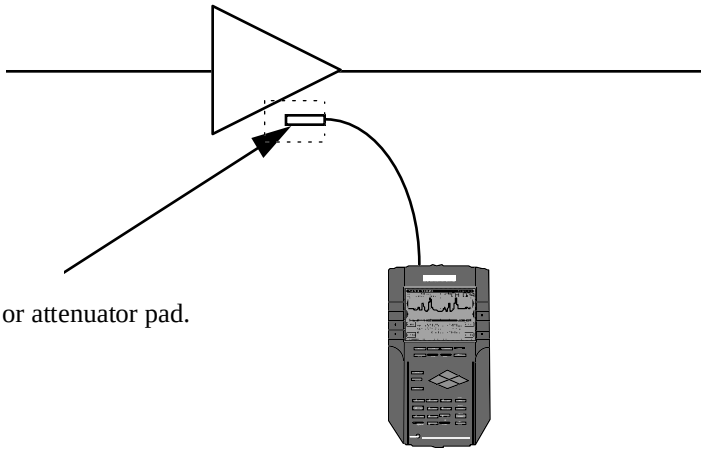

Figure 1. Probe or attenuator pad recommended.

Any response characteristic contributed by the pad will automatically be eliminated from the sweep measurement in the normalization process (assuming the pad is used when the reference is stored). The pad must have a good frequency response, however, to enable accuracy in signal level measurement mode. The loss of the pad may be offset using the test point compensation feature available on most modern sweep receivers. Because most 750 MHz amplifiers have high gain, and high absolute levels at the test point, the pad will have no effect on C/N measurement range.

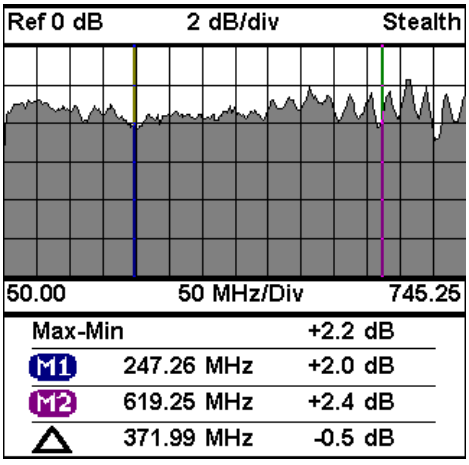

Figure 2. Test point reflections without pad.

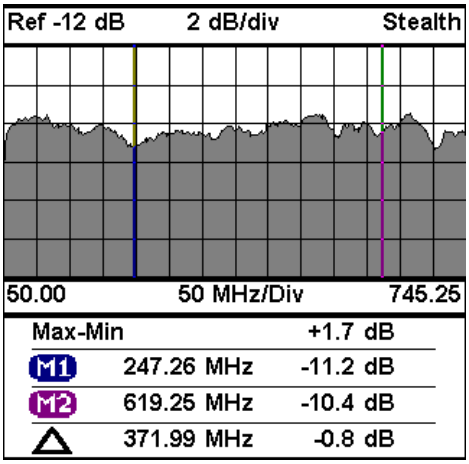

Figure 3. Pad in line with test point.