

When average detector function limits are specified for a pulse-modulated transmitter, the average level of emission may be found by measuring the peak level of the emissions and correcting them with the duty cycle as follows:

- 1) Turn on the transmitter, and set it to transmit the pulse train continuously.
- 2) Tune a spectrum analyzer to the transmitter, carrier frequency, and set the spectrum analyzer resolution bandwidth wide enough to encompass all significant spectral components. The video bandwidth should be at least as wide as the resolution bandwidth.
- 3) Set the spectrum analyzer vertical scale (amplitude) to the linear mode and the analyzer frequency scan to 0 Hz. If necessary, move the receiving antenna closer to the device to obtain a convenient signal level.
- 4) Connect a storage oscilloscope to the video output of the spectrum analyzer that is used to demodulate and detect the pulse train. (Although the pulse train may be viewed by using just a spectrum analyzer with a scan width of 0 Hz, the use of an oscilloscope facilitates viewing the pulses and allows a more accurate measurement of their width.)
- 5) Adjust the oscilloscope settings to observe the pulse train, and determine the number and width of the pulses, as well as the period of the train.
- 6) Adjust the transmitter controls, jumper wires, or software to maximize the transmitted duty cycle.
- 7) Measure the pulsewidth by determining the time difference between the two half-voltage points on the pulse.
- 8) When the pulse train is less than 100 ms, including blanking intervals, calculate the duty cycle by averaging the sum of the pulsewidths over one complete pulse train. Alternatively, or when the pulse train exceeds 100 ms, calculate the duty cycle by averaging the sum of the pulsewidths over the 100-ms width with the highest average value. [The duty cycle is the value of the sum of the pulse widths in one period (or 100 ms), divided by the length of the period (or 100 ms)].
- 9) Multiply the peak-detector field strength (expressed in $\mu\text{V/m}$) of an emission from a transmitter using pulsed modulation by the duty cycle just measured to determine the average detector field strength of that emission for comparison to the average detector limit.