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# Measurement of FM Carrier Deviation (Provisional)

The following principles are to be used by Industry Canada staff when measuring the maximum frequency deviation of FM stations.

## Principles

### Location for testing

1. The measured signal should be at least 50 dB above the level of noise plus interference. (The required decibel level may depend on the measurement instrument, but 50 dB has been found to be a good minimum value.)
2. The measured signal should not be subject to multipath signal. To verify that multipath signal is not present at a given location, listening tests can be performed. Directional antennas can be used, as needed, to minimize the impact of multipath signal.
3. To avoid possible problems from intermodulation and overload of the measurement instrument, measurements should be performed at field strength levels of less than 115 dB $\mu$ V/m. Inline attenuators can also be used to identify and avoid these problems.

### Methodology

1. The measurement instrument shows a numerical value of the peak frequency deviation or a graph of the peak deviation over time, or both.
2. The duration of the frequency deviation measurement depends on the instrument used.
  - (a) Some instruments are set to continuously output on a graph the peak deviation during short intervals (such as 0.05 second each) over a longer total measurement period (typically, 10 seconds). The short interval is set internally in these instruments as a function of intermediate frequency (IF) bandwidth and frequency resolution. The IF bandwidth should be sufficient to include as much of the FM channel being measured as possible but should be limited to exclude local adjacent channels. In general, the IF bandwidth should be set between 230 and 300 kHz. On digital analyzers, the frequency resolution (resolution bandwidth) determines the number of samples taken during each short interval. Typically, the resolution bandwidth should be set between 10 and 20 Hz.
  - (b) Other instruments are designed to show a numerical value that corresponds to the peak frequency deviation observed during a specified interval. This value is refreshed continuously after each short interval. For example, a minimum workable short interval is 0.5 second. Shorter intervals are considered inappropriate because the numerical value changes too quickly to be properly observed. The IF bandwidth and the frequency resolution should be in accordance with 2(a).
3. The maximum deviation of the station is established according to the peak frequency deviation values sampled over 10-second periods, displayed graphically or as continuously updated numerical values. Observation periods should occur during sequences of programming with intense modulation (for example, during publicity). Transient deviations that occur once or twice over any period of 10 seconds are excluded from establishing the maximum deviation.