

# Narrow Pulse Measurements

## MF2414C

### Microwave Frequency Counter

*By Anritsu Sales Staff*

#### Introduction

This application note describes the steps necessary to measure narrow 100ns pulses using Anritsu's MF2414C microwave frequency counter. Narrow pulse measurements evaluate mobile radio communications devices and circuits, pulsed radar and traditional carrier wave measurements for applications that include component and power amplifier testing.

The MF2414C is designed for technicians who measure radar pulses or microwave frequencies. It is used to test systems that employ pulse modulation or that experience pulse modulated interference when deployed. Anritsu's MF2414C displays the carrier frequency, pulse width or pulse repetition period of a pulse modulated signal quickly and accurately. It measures pulse-modulated signals in one easy-to-use instrument. This eliminates the need for detectors, oscilloscopes and spectrum analyzers, thus reducing costs. Other unique features include:



- High accuracy burst measurement function.
- A template function that is useful for assessing quickly whether or not measurement results fall within the upper and lower frequency limit specifications.
- An easy-to-use automatic measurement system that can be configured using a GPIB function.
- Automatic acquisition of frequency and pulse measurements.

#### Narrow Pulse Measurements

Narrow pulse measurement is a technique that uses narrow, fast-rise-time pulses; these are applied to both the gate and the drain of a GaAs MESFET to obtain the drain characteristics of the device. For example, to ascertain which characteristics correspond to frequencies that are higher than those that respond to surface and substrate traps. This technique is significantly different from measurements using conventional long pulse and DC measurement techniques.

#### Conduct Narrow Pulse Measurements with the MF2414C

1. Connect signal source to Input 1 (600 MHz to 40 GHz), maximum input level 10 dBm.
2. For narrow pulse measurements, those with a pulse width of less than 1 $\mu$ s, set the trigger to Internal by pressing the Trig button under Menu. Highlight the Mode within the display by pressing the resolution left/right buttons and press Enter.
3. Set frequency acquisition to Manual by pressing the Freq button under Menu. Highlight the Mode within the display by pressing the resolution left/right button and pressing the Enter key to toggle to Manual. Enter the carrier frequency by toggling the right Resolution key until Set Freq is highlighted, then press the Enter key and input the carrier's frequency.

4. Set burst to narrow by pressing the Burst key under Menu. Toggle the resolution key until Width is highlighted within the display, then press Enter to select Narrow. Choose whether to view pulse repetition period or pulse width along with the carrier frequency by highlighting the Mode key within the display and pressing Enter for the preferred measurement.
5. Set the gate to the value of the pulse width by pressing the GW button under Menu and pressing the Sample Rate up/down keys, until the pulse displayed on the MF2414C is bracketed by the gate width-markers. The value of the gate width will be displayed in the lower right hand corner.
6. In the Measurement Mode area of the front panel, select Burst and press the Return to Measurement button. The values will be displayed.

## **Conclusion**

Narrow pulse measurements evaluate mobile radio communications devices and circuits, pulsed radar and traditional carrier wave measurements for applications that include component and power amplifier testing. This application note describes the steps necessary to measure narrow 100ns pulses using Anritsu's MF2414C microwave frequency counter, which tests systems that employ pulse modulation or that experience pulse modulated interference when deployed. The MF2414C provides fast and accurate measurement of pulse modulated signals in one easy-to-use instrument. This eliminates the need for detectors, oscilloscopes and spectrum analyzers, which reduces costs. Another competitive aspect of this product is its automatic acquisition of frequency and pulse measurements.



Specifications are subject to change without notice.

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