



# Agilent AN 1200-12

## Peak Deviation and Center Frequency Measurements For CT2 and DECT Radios

Application Note

### Agilent Technologies 53310A Modulation Domain Analyzer

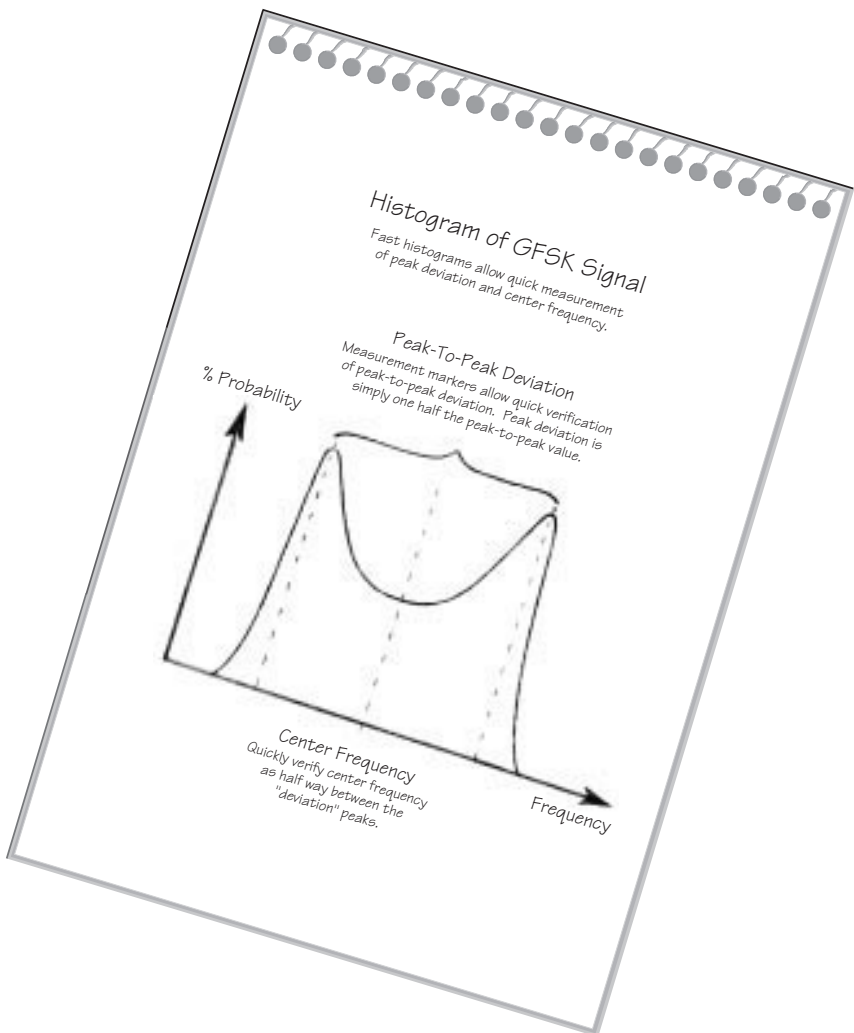
#### Easy Analysis of GMSK Modulation for CT2 and DECT Radios

##### Situation

The use of digital modulation in mobile communications systems is growing rapidly. Information in the form of 1s and 0s is often transmitted as two different frequencies. This is known as Frequency Shift Keying (FSK), or Gaussian Frequency Shift Keying (GFSK) if the data is filtered. In most systems Time Division Multiple Access (TDMA) techniques are also used to increase the number of users on each frequency channel. This TDMA, or bursting, means that the transmitter is only on for a few hundred microseconds at a time.

##### Problem

Measuring the peak deviation and center frequency of such signals is required to meet the regulatory standards. However, measuring the deviation accurately on a bursted signal is difficult or impossible with conventional modulation analyzers. In addition, pulse counters only "average" the frequency within a burst, so the center frequency value will be a function of the particular data sequence transmitted. With wide deviations, discriminator techniques are cumbersome. Complete CT2 or DECT transmitter characterization is limited using conventional test techniques.



**Agilent Technologies**

Innovating the HP Way

## Solution

The Agilent 53310A Modulation Domain Analyzer with Option 031 automatically measures center frequency and peak deviation on bursted CT2 and DECT carriers. Results are automatically calculated from histogram plots which show the probability distribution of thousands of fast frequency measurements. The deviation peaks of the filtered FSK modulation are revealed directly in the histogram. The center frequency is the midpoint of the deviation peaks. Built-in analysis automatically calculates the center frequency and deviation for you.

## Related Applications

- Examining GMSK modulation in GSM and PCN radios
- Examining frequency hopping sequences of hopped cellular radios or secure communication systems
- Examining turn-on time of mobile radios
- Examining channel switching and lock times in mobile radios
- Characterizing VCO and phase-locked loop response

By internet, phone, or fax, get assistance with all your test and measurement needs.

## Online Assistance

[www.agilent.com/find/assist](http://www.agilent.com/find/assist)

## Phone or Fax

United States:  
(tel) 1 800 452 4844

Canada:  
(tel) 1 877 894 4414  
(fax) (905) 206 4120

Europe:  
(tel) (31 20) 547 2323  
(fax) (31 20) 547 2390

Japan:  
(tel) (81) 426 56 7832  
(fax) (81) 426 56 7840

Latin America:  
(tel) (305) 269 7500  
(fax) (305) 269 7599

Australia:  
(tel) 1 800 629 485  
(fax) (61 3) 9272 0749

New Zealand:  
(tel) 0 800 738 378  
(fax) (64 4) 495 8950

Asia Pacific:  
(tel) (852) 3197 7777  
(fax) (852) 2506 9284

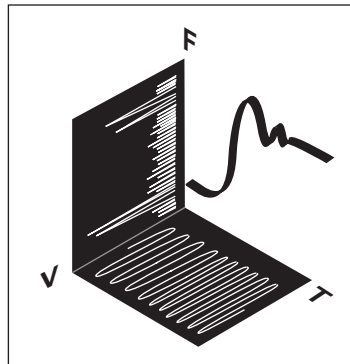
Product specifications and descriptions in this document subject to change without notice.

Copyright © 1998, 2000 Agilent Technologies  
Printed in U.S.A. 8/00  
5966-4484E

### The Modulation Domain gives you a new way to view your complex signals

Better ways to analyze your complex signals don't come along often. Now Agilent brings you the Modulation Domain—a way of looking at frequency or time interval measurements that directly and clearly reveals both intentional and unintentional modulation.

For frequency analysis, it's the missing piece of the puzzle. The Time Domain shows you amplitude (voltage) vs. time. The Frequency Domain gives you amplitude vs. frequency. The Modulation Domain plots frequency vs. time—an intuitive and insightful way of examining your signal's dynamic frequency modulation.



For timing measurements, the Modulation Domain's view of time interval vs. time allows you to both see and quantify timing jitter directly—taking you one step beyond the Time Domain's qualitative view.



**Agilent Technologies**

Innovating the HP Way