# Test sequence and sweep parameters for P900 and P630

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# Contents

## Test sequence

The standard test sequence is showed in figure 1.

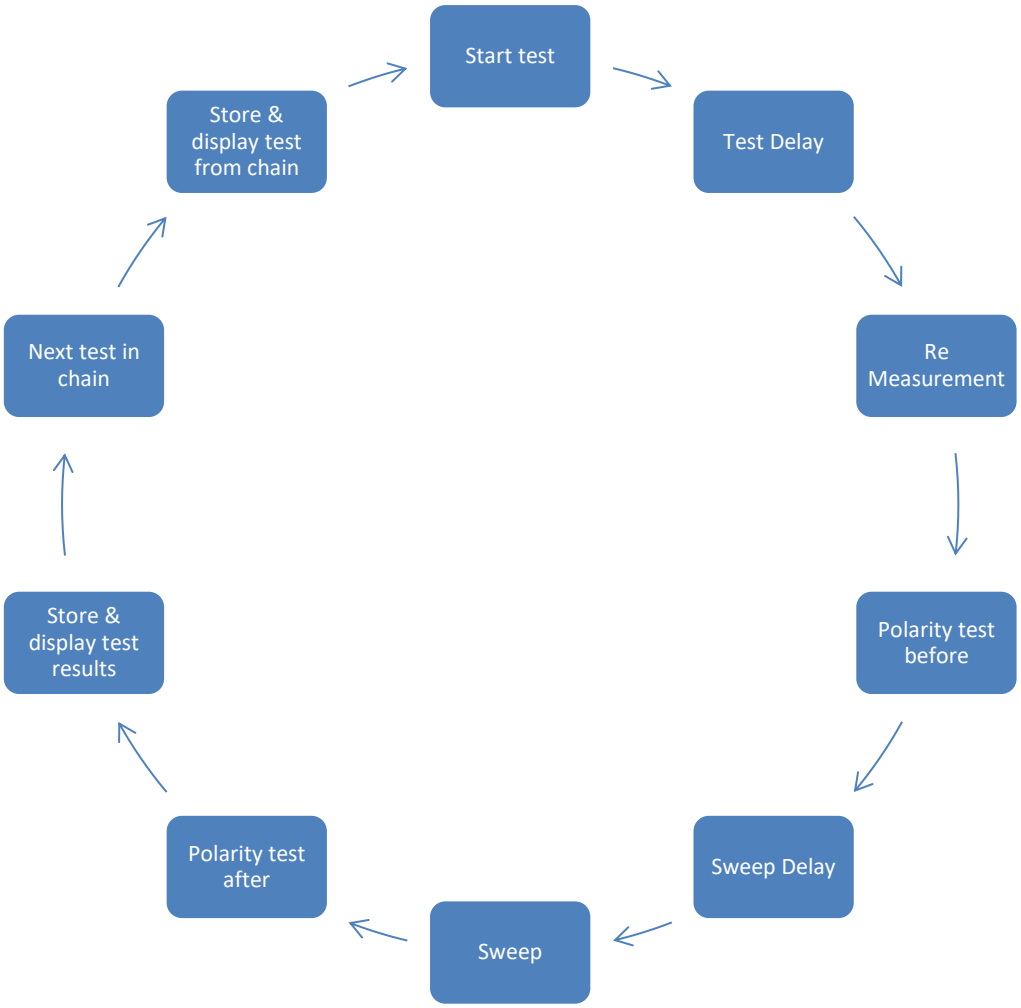


Figure 1: Test sequence

### Start test

When a start signal is received from keyboard or external a control system via an i/o signal the test sequence is started.

### Test Delay

With a test delay it is possible to delay the complete test sequence when a start test signal is received. This enables external devices to be setup before the test begins.
The test delay is set in the Hardware Config menu. Valid values are 0 to 3000 mSec.

### Re Measurement
If activated the Re is measured.
The measurement is activated in setup under R-Test in the sub-menu Q-Set.

### Polarity test - before
If activated the polarity test is processed.
The polarity test is set on in setup menu and the after flag must be off. The times for a polarity test are between 3 to 50 mSec.

### Sweep Delay
The sweep delay makes a delay when the sweep begins. Under the delay signal is present on output with the frequency at the start frequency of the sweep. The delay is set in setup under sweep.
The delay can be between 0 – 9999 mSec.

### Sweep
The sweep is done as setup settings under sweep. Parameters there have to be set to set are:
Start frequency
Stop frequency
Number of test / measuring points
Sweep time
Sweep forward / reverse
Normal sweep / slow

### Polarity test – after.
If activated the polarity test is processed.
The polarity test is set on in setup menu and the after flag must be on. The times for a polarity test are between 3 to 50 mSec.

### Store & display results
The test data and results are stored if activated and the test results are displayed.
If enabled the result is and test is gated to i/o ports.

### Next test in chain
If a chain test is activated test in the chain is activated.

### Store & display results from chain
The test data and results are stored if activated and the test results are displayed.
If enabled the overall result is and test is gated to i/o ports.

## Sweep parameters

To make a sweep following parameters must be setup.

- Start and stop frequency of the sweep
- Sweep delay
- Sweep time
- Points. No of test & measuring points
- Sweep forward / reverse
- Sweep normal / slow

### Sweep overview

The qualities of a sweep are a product of the no of test points, the sweep speed, the frequency range and the sweep format. The sweep format is designed to give best measured result regarding dynamic rage and shortest test time. For each measurement on a frequency point number of sample are needed to give a stabile measurement. Especially for a rub and buzz measurement time are needed to give a stabile measurement due to settling time for each frequency step / point.

### Sweep Delay

The sweep delay makes a delay when the sweep begins. Under the delay signal is present on output with the frequency at the start frequency of the sweep. This enable device to be stabile if the device has a settling time. Typical value of this sweep delay is 0 mSec. Some devices need a delay on 150 mSec. For our old P522 test system it was typical 350 mSec due to long settling time of this old test system.

### Sweep format

The make a measurement on one sine on 10 Hz it takes 100 mSec. If the next test point is with 20 Hz it takes 50 mSec for one sine. For a measurement with one sine on 1000 Hz it takes 1 mSec. Measurement at lower frequencies takes much longer time than at higher frequency. For that reason the sweep sequence takes longer time at lower frequency and shorter at higher frequencies. The optimum for a sweep is a logarithmic sequence. However a pure logarithmic sequence gives an acoustic delay problem at the high end of a sweep. A 20000 Hz sine takes 0.05 mSec. The sweep is made as a semi-logarithmic. When step rate get to fast the sweep turn over to a linear sweep.

### Points

The number if test points can be set for a sweep. If the test points / stepping points are few the resolution of measurement is bad however the test speed can be fast. To get a prober resolution for example a sweep from 20 to 20000 Hz a least 200 test points is needed. As standard do not go below 250 test points. To obtain a prober resolution on test with woofers 500 test points can be a solution. More test points take longer time to get a prober measurement.

### Sweep frequency range

Start frequency of the sweep have to be set so low that all parameters of wants system can be measured. However the start frequency must be high as possible to not lose test parameters to save test time. Lower start frequency need longer test time.

Stop frequency of sweep must be set so all parameters for a test is fulfilled.

### Sweep time

The sweep time must be so long that all parameters can be tested properly. To save time on a complete test sequence the test time can be optimized. To fast test time the rub & buzz element can be lost in measurement due to energy / time element.
Note due to sound delay between speaker and microphone, the sound speed is 340-343 mSec, the higher frequencies, is shifted to right of displayed measurement. If the test is a relative measurement it is allowed however if the measurement have to be compared with other test brand the sweep test time must be increased.

### Sweep reverse

The sweep reverse enable a sweep from stop frequency to start frequency. Note that not all test parameters is allowed on a reverse sweep.

### Sweep slow

This function changes the sweep format so the semi-logarithmic are converted to a linear sweep at an early time than normal. As standard the linear part is started if the step rate is faster than 0.4 mSec. The slow option changes the linear rate faster than 2 mSec. This eliminates some of the frequency shift to right on display.

## Sweep to fast

Depending start frequency of the sweep and number of test points and again due to sweep time a sequence can done too fast. First of all detection of rub and buzz will be depressed and false information is added to test. The number of samples in each test point will be too few and a risk for the sweep frequency itself will be modulated with the test signal.

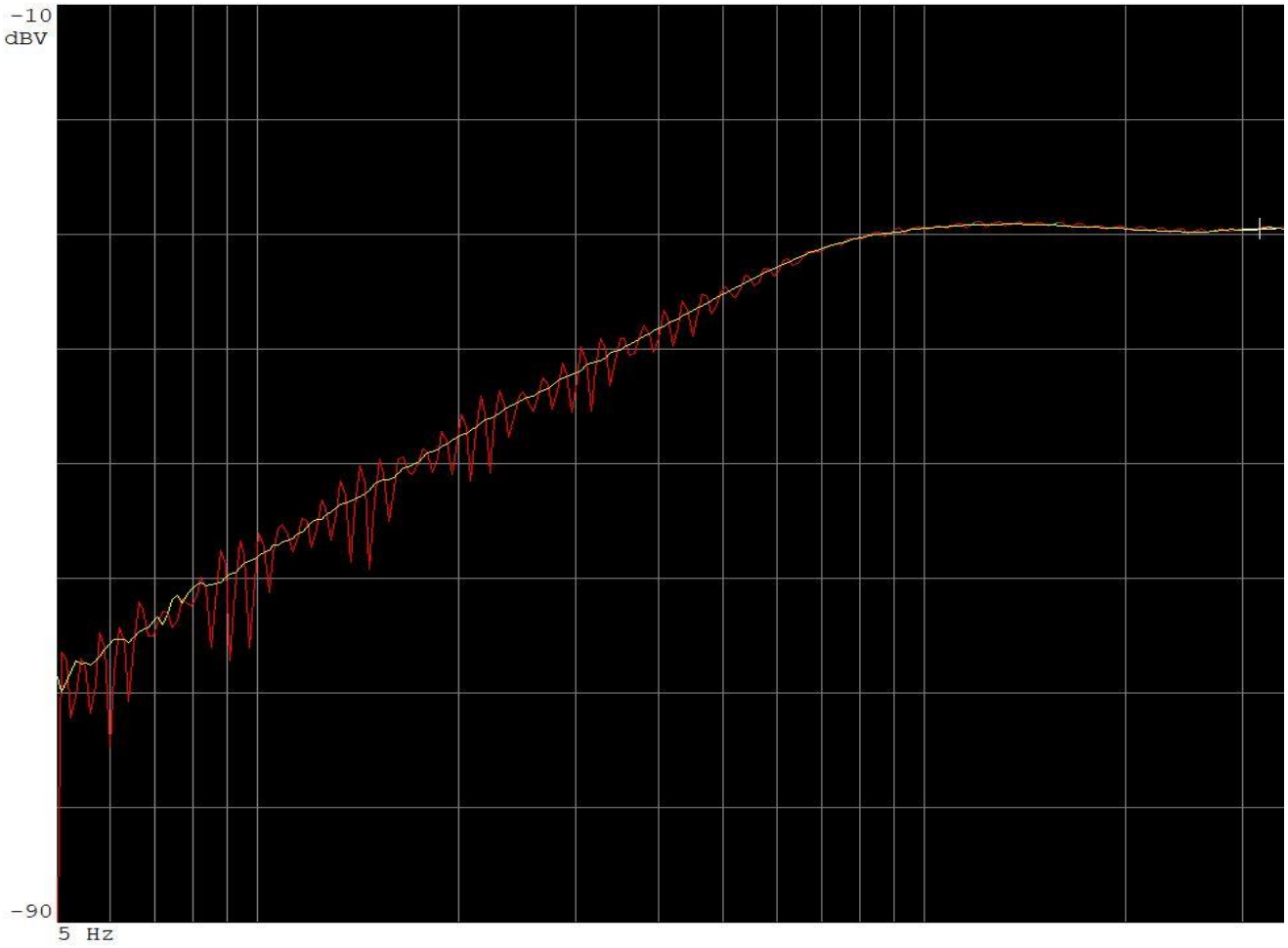


Figure 2: Sweep to fast. Sweep from 5 – 20000 Hz. Frequency response displayed.
The red curve is too fast. The yellow is ok.

Figure 2 shows a measurement there have too few sample point to give a stabile measurement. The reason the product of start frequency – test time – sample points is to less. Solution, increase the start frequency and / or rise the test time.

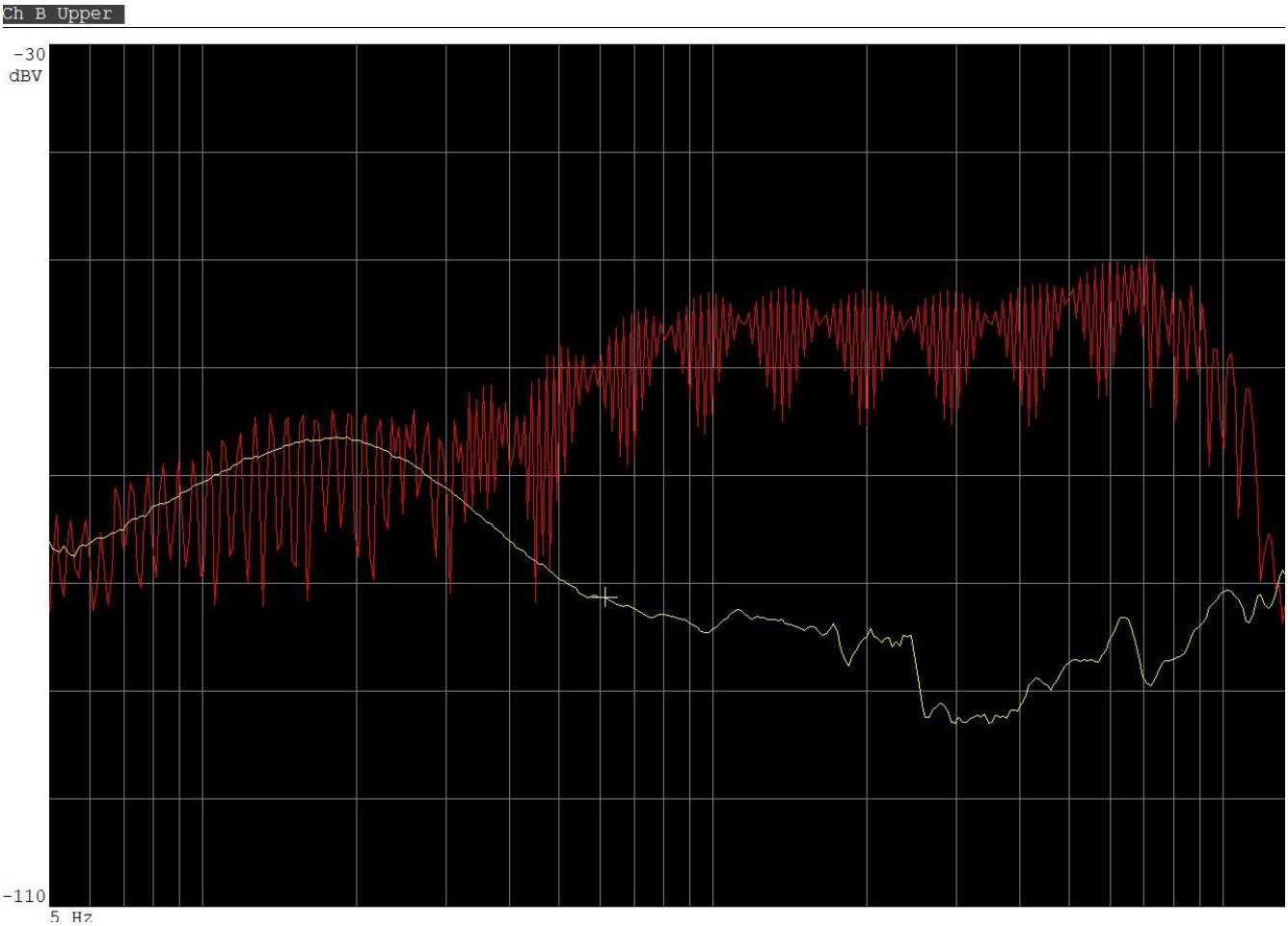


Figure 3: Sweep to fast. Sweep from 5 – 20000 Hz. Rub & buzz displayed.
The red curve is too fast. The yellow is ok.

Figure 3 shows a measurement there have too few sample point to give a stabile measurement and the sweep frequency is modulated with signal. The reason the product of start frequency – test time – sample points is to less. Solution, increase the start frequency and / or rise the test time.

## Display drift

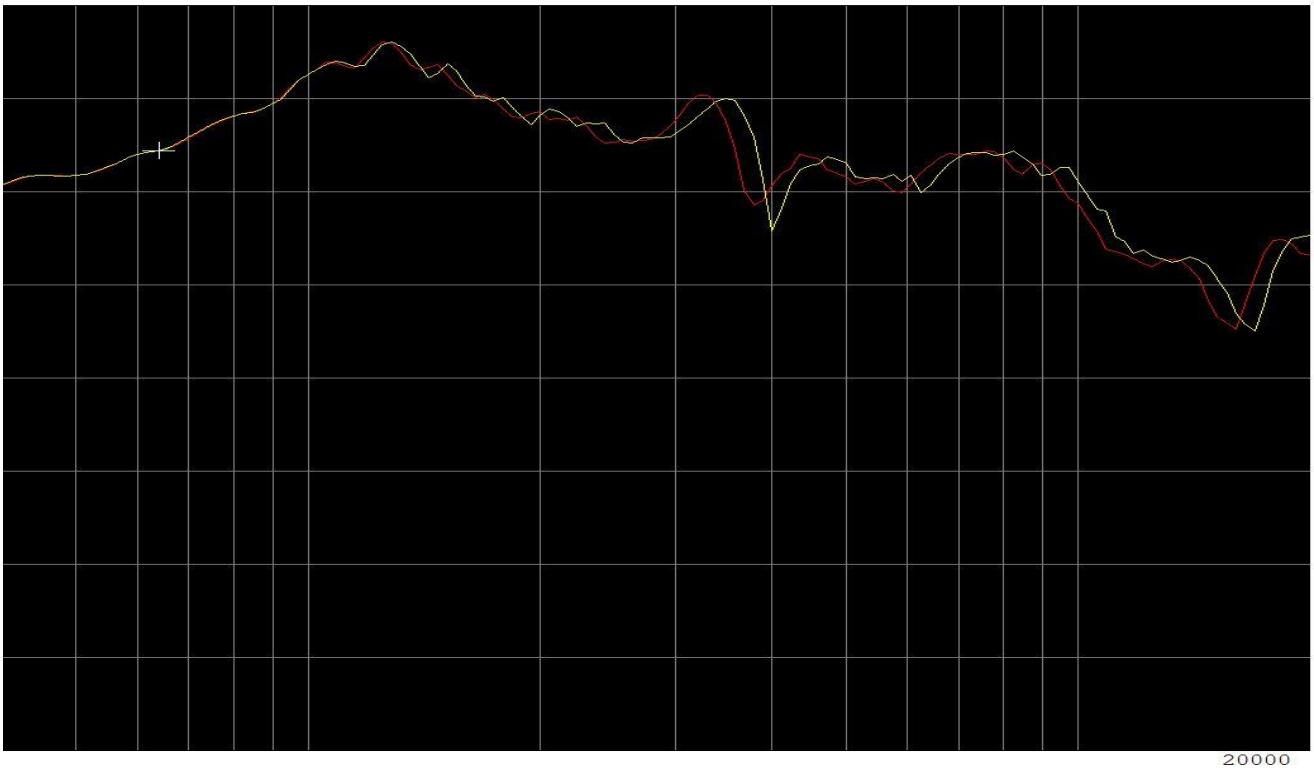


Figure 4: The end of a frequency sweep.
The yellow show the sig drifted to right due to delay. The red is ok.

Figure 4 show a drift of frequency signal to right. The drift to right comes from the delay from speaker to microphone due to the speed of sound. The delay depends of the distance from speaker and microphone. For a near field measurement the sweep format can help by enable the slow format. Figure 4 show the difference the sweep format as normal and slow. Another solution is to make the sweep time longer.