Power Spectral Density (PSD) Measurements with the HP 35670A Dynamic Signal Analyzer

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Brief/Short Step-by-Step Instructions:

1. Define Frequency Span:

a. MEASUREMENT: press **FREQ** button (**K**)

b. RHS CRT Buttons: press **SPAN (F1)**, use entry keypad or wheel to enter (*e.g.*) **3.2**

c. RHS CRT Buttons: press **KHz (F1)** (*e.g.* for a frequency range of **0-3.2 KHz**)

n.b. **N** (Hz) = (**N + 1)/2** (Hz)

e.g. the spans are: (highest) **51.2 KHz**, **25.6 KHz, 12.8 KHz,** *etc.*

d. RHS CRT Buttons: press **Resolution (lines) (F9)**, and enter 1600

e. RHS CRT Buttons: press **Record Length (F8)**, and enter the appropriate time for each frequency span

e.g. for **3.2 KHz**, record length should be **500 ms**, for **25.6 KHz**, record length should be **62.5 ms**

f. RHS CRT Buttons: press **Start (F3)**, and enter the starting frequency of the span (default = 0 Hz)

n.b. Do **NOT** start the frequency at a half integer multiple of the size of the bin

i.e. the frequency bin size is **SPAN/Resolution lines**

e.g. for **25.6 KHz**¸ the bin size is **16 Hz**, so the **Start** frequency should **NOT** be an integer multiple of **8**.

2. Define # of Averages:

a. MEASUREMENT: press **AVG** button (**T**)

b. RHS CRT Button: press **(F1)** to highlight **Average ON**

c. RHS CRT Button: press **NUMBER AVERAGES (F2)**

d. use ENTRY KEYPAD: enter **1000** (*e.g.* for **1000** averages)

e. **RHS CRT Button**: press **ENTER (F1)**

f. RHS CRT Button: highlight **FAST AVG (F4)**

g. RHS CRT Button: highlight **OVLD REJ ON (F8)**

h. RHS CRT Button: press **UPDATE RATE (F5)** and specify how often to update display

3. Define Scale:

a. DISPLAY: press **SCALE** button (**D**)

b. **RHS CRT Button**: press **AUTOSCALE (F1)** to **ON**

4. Enable X Marker:

a. MARKER: press **MARKER** button **(A)**

b. Turn knob to set marker position

5. Set Coordinates:

a. DISPLAY: press **TRACE COORD (C)**

b. RHS CRT Button: press **Y UNITS (F8)**

c. RHS CRT Button: press **V^2/HZ (PSD) (F8)**

6. Set Window:

a. MEASUREMENT: **press WINDOW**

b. RHS CRT Button: press **HANN** (default is **FLAT TOP**) (**F1**)

7. Calibration:

a. SYSTEM: press **SYSTEM UTILITY (V)**

b. RHS CRT Button: press **CALIBRATION (F2)**

c. RHS CRT Button: turn **AUTO CALIBRATION** off (**F1)**

d. RHS CRT Button: press **SINGLE CAL** (**F1)**

8. CONTROL: press START button:

a. Take data until have/achieve a statistically well-defined plot

b. Press **PAUSE** to pause measurements

9. Autosave Your Settings:

a. SYSTEM: press **SAVE/RECALL (Z)**

b. RHS CRT Button: press **SAVE MORE (F3)**

c. RHS CRT Button: press **SAVE AUTOSTATE (F9)**

n.b. The conditions on memory **DO NOT** save with Autosave

Transfer files to PC

1. Create \xxx directory in NVRAM (skip this step if the target directory already exists)

a. SYSTEM: press **DISK UTILITY (Y)**

b. RHS CRT Button: toggle **CATALOG** to **ON (F8)**

c. Be sure you are in the \ directory (See Step 4 if you are not)

d. RHS CRT Button: press **DEFAULT DISK (F9)**

e. RHS CRT Button: press **CREATE DIRECTORY (F7)**

f. Type in the name of the directory

g. RHS CRT Button: press **ENTER (F1)**

2. Changing Directories from \ directory

a. SYSTEM: press **DISK UTILITY (Y)**

b. RHS CRT Button: toggle **CATALOG** to **ON (F8)**

c. RHS CRT Button: press **DEFAULT DISK (F9)**

d. Use knob to highlight desired directory

e. RHS CRT Button: press **DEFAULT DIRECTORY (F6)**

f. RHS CRT Button: press **ENTER (F1)**

3. Save files to NVRAM

a. DISPLAY: press **ACTIVE TRACE (F)**

b. RHS CRT Button: press **[A] (F1)**

c. SYSTEM: press **SAVE/RECALL (Z)**

d. RHS CRT Button: press **DEFAULT DISK (F9)**

e. RHS CRT Button: press **NON-VOL RAM DISK (F1)**

f. SYSTEM: press **SAVE/RECALL (Z)**

g. RHS CRT Button: press **SAVE DATA (F1)**

h. RHS CRT Button: switch format to **ASCII (F2)**

i. RHS CRT Button: press **SAVE TRACE (F1)**

j. RHS CRT Button: press **INTO FILE (F9)**

k. Type file_name.txt (n.b. file_name must be <= 8 characters)

l. RHS CRT Button: press **ENTER (F1)**

4. Change to \ directory (n.b. Necessary in order to read out data to PC)

a. SYSTEM: press **DISK UTILITY (Y)**

b. RHS CRT Button: press **CATALOG** to **ON (F8)**

c. RHS CRT Button: press **DEFAULT DISK (F9)**

d. RHS CRT Button: press **NON-VOL RAM DISK (F1)**

e. Use knob to highlight **'..'** (have to scroll up) and press **DEFAULT DIRECTORY (F6)**

Alternatively, press **DEFAULT DIRECTORY (F6)** and type **'..'** into the menu bar

f. RHS CRT Button: press **ENTER (F1)**

5. Conditions on memory must be met before trying to read out data files into PC

a. SYSTEM: press **BASIC (U)**

b. RHS CRT Button: press **INSTRUMENT BASIC (F9)**

c. RHS CRT Button: press **UTILITIES (F6)**

d. RHS CRT Button: press **MEMORY SIZE (F1)**

e. Enter **9000** in DSA keypad and press **ENTER (F1)**

f. RHS CRT Button: press **SECURE (F9)**

g. RHS CRT Button: press **PERFORM SECURE (F4)**

6. Open DataLink software

a. Click on: Find HP 35670A instrument

b. Click on: Search Files

c. Highlight files to transfer and click **TRANSFER FILES TO PC**

7. Save files into single text file

a. Open file_name.x and file_name.txt in Notepad or Wordpad

b. Open MS Excel

c. Copy file_name.x into column A and make sure there is enough space for numbers (*e.g.* Format Cells to "Number" with 6 digits)

d. Copy file_name.txt into column B and allow scientific notation in formatting if necessary

e. Copy the two columns into a separate Notepad document and save file in appropriate folder

n.b. After data files have been read out from DSA via USB interface, DSA is still in remote control, even if get out of DataLink application. To restore DSA to local control: **SYSTEM**: press **Local/GP-IB (X)**.

8. Delete all files in a directory (n.b. helpful for freeing up memory)

a. SYSTEM: press **DISK UTILITY (Y)**

b. RHS CRT Button: press **DEFAULT DISK (F9)**

c. RHS CRT Button: highlight **CATALOG** to on **(F9)**

d. Use knob to highlight a directory from which to delete data

e. RHS CRT Button: press **DEFAULT DIRECTORY (F6)**

f. RHS CRT Button: press **ENTER (F1)**

g. SYSTEM: press **DISK UTILITY (Y)**

h. RHS CRT Button: press **DELETE ALL FILES (F3)**

i. RHS CRT Button: press **ENTER (F1)**

j. RHS CRT Button: press **CONFIRM DELETEALL (F2)**

9. Deleting Directories

a. Step 8 **MUST** be completed before attempting to delete a directory

b. Follow directions in Step 4 to change into \ directory

Once in \ directory:

c. SYSTEM: press **DISK UTILITY (Y)**

d. RHS CRT Button: press **CATALOG** to **ON (F8)**

e. RHS CRT Button: press **DEFAULT DIRECTORY (F6)**

f. highlight directory to delete and press **DELETE DIRECTORY (F8)**

g. RHS CRT Button: press **ENTER (F1)**