YellowFrog 2 (WB) Power Meter

Wideband Manual Version 1.4

Table of Contents

1. Introduction

The Yellow Frog 2 (YF2) Power Meter measures true RMS power over the frequency range of 150 MHz to 2700 MHz for purely sinusoidal (CW) as well as GSM, CDMA and W-CDMA carrier signals. The measurable power range is 15dBm to 50dBm. It has a 0.1dB resolution and an accuracy of 0.5dB. When its output port is terminated by a 50 Ohm impedance, the value of the VSWR observed on its input port is 1.20 or smaller. It has an LCD display displaying the measured power level in Watts or dBm, the battery status and three LED indicators. The YF2 can be used either in stand-alone mode or with a PC (desktop, laptop or notebook) via its USB port, for convenient data output in ASCII format. The interface software and USB drivers provided with the unit are supported by Windows 7, Vista, XP or 2000 Operating Systems.

The YF2 package comes with the following items (see picture on cover page of this manual):

1. YF2 Power Meter unit
2. AC charger for Li-Ion battery
3. DVD medium containing PC Software and Driver
4. USB cable
5. Type N (M-M) adaptor
6. Pelican Carrying Case with foam protection
7. YF2 Power Meter User Manual
8. Calibration certificate

2. System Requirements

The YF2 software will function with the following minimal configuration:

32 bit Windows 7 , Vista, XP or 2000 Operating System running on a PC.

USB port

3MB of available storage space on the hard disk.

3. Yellow Frog 2 Power Meter Quick Start Guide

To Set-Up the YF2 power meter, do the following:

1. Install the YF2 Power Meter software on your PC (or, laptop/notebook), including the USB driver(s) folder.
2. Connect the YF2 unit to the PC via the USB cable provided with the package and follow the steps outlined in Appendix 1 for installing the USB driver on your computer.
3. Start the YF2 Power Meter software; the YF2 unit should be detected and connected within one minute, as seen in the Yellow Frog 2 Power Meter window in Figure 1. When the unit is

connected, **Connected to YellowFrog** will be displayed to the right of "Unit Status". Firmware version, serial number, frequency range and unit status should be displayed in the upper right compartment of the YF2 Power Meter window as seen in Figure 1:

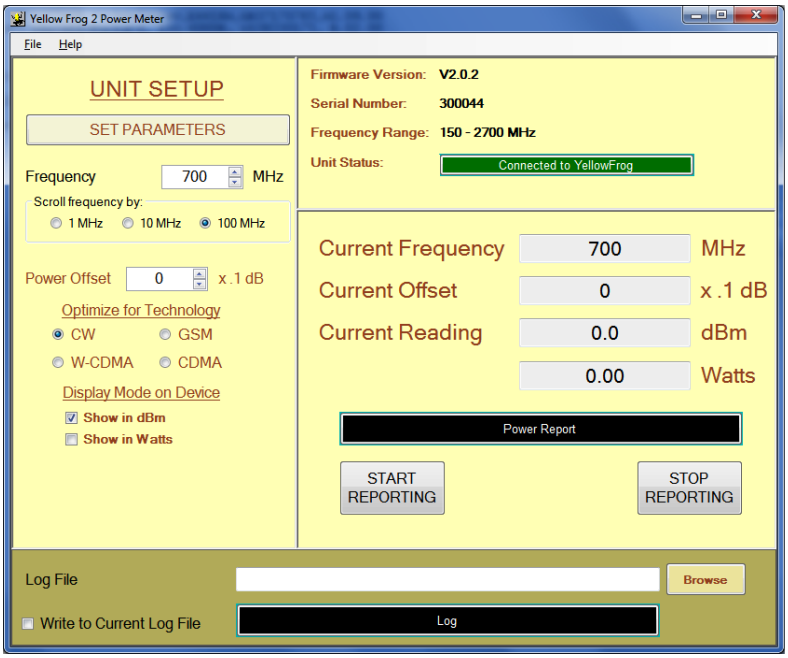


Figure 1. Yellow Frog 2 Power Meter Window

4. If the YF2 unit is not detected within one minute, uninstall the driver, disconnect the unit and repeat steps 2 and 3.
5. Proceed with unit setup by entering: frequency (in MHz), power offset (, signal type and units of measurement in the "UNIT SETUP" compartment of the user interface window and press the "SET" button. Once set, these parameters will be "remembered" by the YF2 unit even if the unit is turned OFF and ON again. The current values of these parameters will be displayed on the lower right hand side compartment of the YF2 Power Meter window, as seen in Figure 1 above. To change them, enter new values by repeating this step.
6. Connect the YF2 unit input side (this is the side with the power switch and engraved serial number of the YF2 unit) to the RF source and the output side (this is the side with the USB port) to a 50 Ohm load or termination.
7. To start reading power level, click the "START REPORTING" button. This will result in the flashing of the indicator " **Power Report** " in green background and the display of measured power level in dBm and/or Watts next to the "Current Reading" label. The frequency and power offset settings of the YF2 unit will also be displayed next to their respective labels. To stop reading, press the "STOP REPORTING" button.
8. To record the measured data, left-click the "Browse" button at the bottom compartment in the YF2 Power Meter window and create a "log" file in the desired directory by pressing "Save" and checking the box in front of "Write to Current Log File" as seen in Figure 2 below. As long as the "START REPORTING" button is pressed, the data will be recorded, accompanied by the flashing of the label" **Log** " in green background. To stop recording (and/or reporting), press the "STOP REPORTING" button.

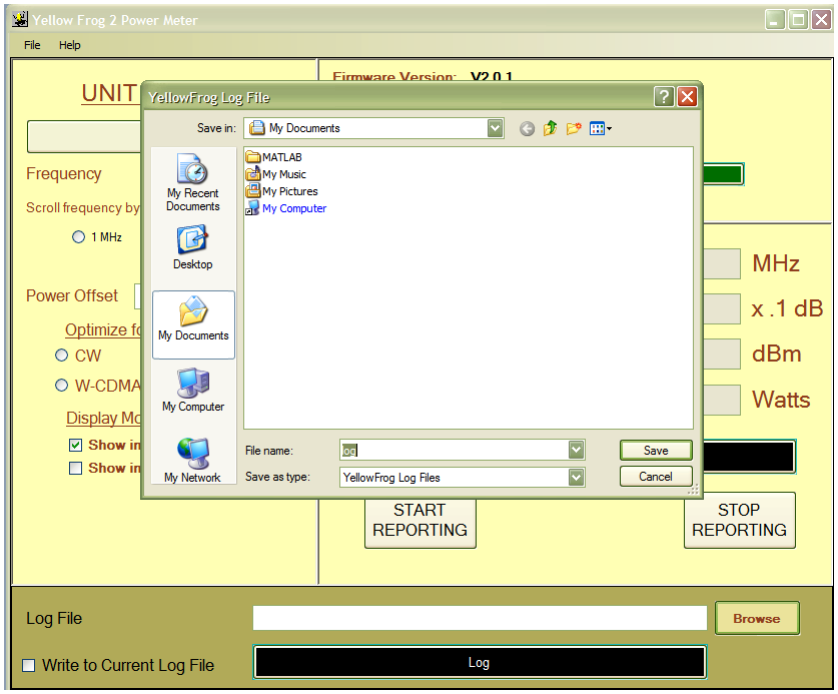


Figure 2. Initiating the Log File for Recording Measured Data

NOTE:
When used with a PC (or laptop or notebook), the unit Power Switch does not have to be turned on, because it will use power from the 5VDC supply available from the computer's USB port. However, the user should periodically check the status of the unit's Lithium-Ion battery by turning the Power Switch ON; if the unit charging LED (next to the charging jack on the input side of unit) turns ON, the battery has to be charged using the AC charger provided with the unit. Otherwise the battery does not need charging.

4. Yellow Frog 2 PC Software Installation

Prior to the use of the YF2 via the USB interface with a computer, the following steps need to be performed:

a) Copy the application software and the unit driver folder "YellowFrog2USBDrivers" (provided on DVD medium) to the PC, preferably under the "C:\Program Files\YF2\" directory.

b) Install the unit USB port driver as shown in Appendix 1.

c) Run the application software

After step "c)", the Yellow Frog 2 Power Meter window should display the window in Figure 1.

Unit Properties

The unit will display some of its properties in the top compartment of the YF2 Power

Meter window, as seen in Figure 1, repeated in Table 1 below:

Table 1. Unit Properties

Firmware Version	V 2.0.1
Serial Number	XXXXXX
Frequency Range	150 – 2700 MHz
Unit Status	**Connected to YellowFrog** or **Not Connected**

Other important unit properties (not displayed in the window) are:

Measurement Resolution: 0.1dB steps

Measurement Accuracy: 0.5dB

5. Unit Operation

This section discusses the setup and operation of the YF2 unit in detail (for a quick start, the user is referred to Section 3, "Yellow Frog 2 Quick Start Guide" above). It is assumed that the YF2 USB driver has already been installed as described in Appendix1 below.

Battery Maintenance Note

The only maintenance needed by the YF2 unit is periodic charging of the internal Lithium-Ion Polymer battery whenever the red LED near the DC charging port (on the input side of the unit) turns on. After charging adequately, this LED will turn off. If the unit is used without charging after the battery LED turns on, eventually the message "**LOBAT**" will be displayed in the LCD. This message will disappear when the battery is.

Connections

Connect the YF2 unit input side (this is the side with the power switch and engraved serial number of the YF2 unit) to the RF source and the output side (this is the side with the USB port) to a 50 Ohm load or termination. If the YF2 is used with a computer, the USB port on the YF2 is connected to the computer USB port by the provided cable.

Initialization

The unit is initialized by turning on the power switch. After this, if an input signal is applied and the output of the YF2 is properly terminated by a 50 Ohm load, the reading will be displayed on the LCD and the units (dBm or Watt) are indicated by one of the LEDs to the right of the LCD. If the unit is set to read in both units, then the two LEDs will alternate continuously as the measurements are made.

Setup

Start the YF2 Power Meter software. Enter the unit settings in the following order:

Frequency:
Enter in units of (MHz) either by scrolling the small triangles up/down or by directly entering a number in the Frequency field.

Power Offset:

This field is used to enter the loss in the cable used to connect the input RF port of the unit to the signal source, in multiples of 0.1 dB. If the loss is below 0.1 dB, enter "0".

Signal Type (Optimize for Technology)

The unit will measure true RMS level for a pure sinusoid (CW) or a carrier modulated as a CDMA, GSM or W-CDMA signal. Select one of the four types of signal under "Optimize for Technology"

Units (dBm or Watts)

Select one or both units. If one unit is selected, the reading is displayed steadily on the LCD, with the corresponding LED steadily on. If both units are selected the LCD and the LEDs will alternate to indicate both readings continuously.

After these parameters are selected, press the "SET" button under "UNIT SETUP", to set the unit. Once set, these parameter values will be "remembered" by the YF2 unit until they are changed again at a later time. The current values of these parameters will be displayed on the lower right hand side compartment of the YF2 Power Meter window, as seen in Figure 1 above. To change them, enter new values by repeating this sequence. To start reading power level, click the "START REPORTING" button. This will result in the flashing of the label **Power Report** in green background and the display of measured power level in dBm and/or Watts next to the "Current Reading" label. The frequency and power offset settings of the YF2 unit will also be displayed next to their respective labels. To stop reading, press the "STOP REPORTING" button. This will resume the steady label **Power Report** in black background

Data Logging – ASCII Output File

While the unit is set up for making measurements (ie, "START REPORTING" button pressed) the measured data may be recorded by left-clicking the "Browse" button at the bottom compartment in the YF2 Power Meter window for creating a "log" file in the desired directory by pressing "Save" and checking the box in front of "Write to Current Log File" seen in Figure 2. As long as the "START REPORTING" button is pressed, the data will be recorded, accompanied by the flashing of the label **Log** in green background. To stop recording (and/or reporting), press the "STOP REPORTING" button and the label will appear in black: **Log**. An example of the recorded Output File appears in Figure 3:

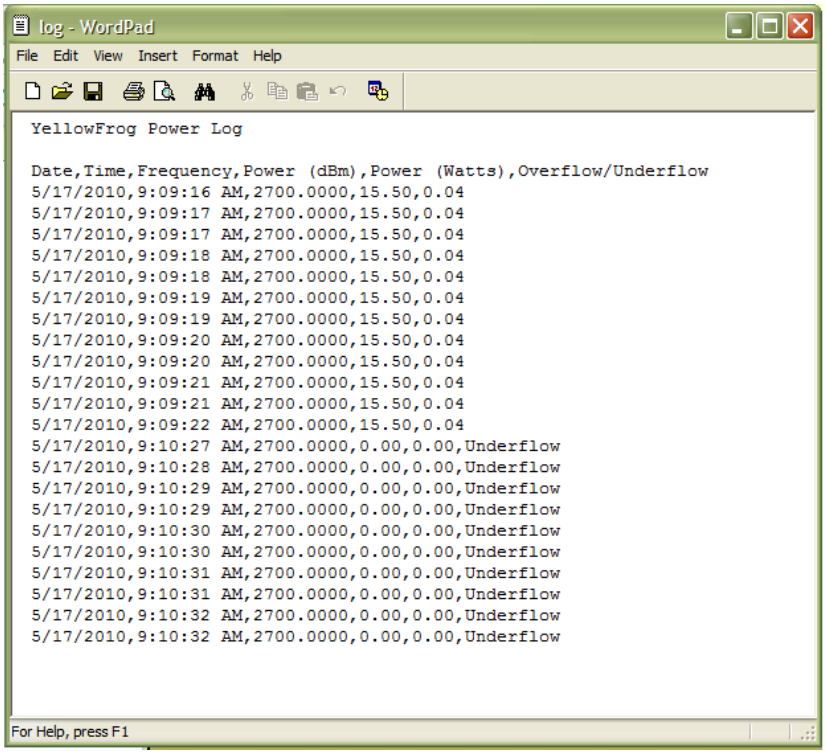


Figure 2. A Sample of the Output File(ASCII)

The first line shows the data column headings in the following order:

Date

Time

Frequency

Power (dBm)

Power (Watts)

Overflow/Underflow

When the power level is below 20dBm, the word "Underflow" will be recorded in the last column. When the power level is above 50 dBm, the word "Overflow" will be recorded in the last column. The output file has the default name "*log.yfrg*". This is an ASCII file and can be opened and edited as a text file.

6. Specifications

Measurement Resolution: 0.1dB
Measurement Accuracy: 0.5dB
Power Range Measurable: 15dBm - 50dBm
Frequency Range: 150 MHz to 2700 MHz
Maximum VSWR (with 50 Ohm termination): 1.20

Stability: Temperature compensated in the 0 to 65 degree Celsius range
Electrical Interfaces:
RF: Type N
Computer: USB
Battery Charge: DC Jack

Controls: Power Switch
Indicators:
Display: LCD
Battery Status: LED
(dBm) Reading Indicator: LED
(Watt) Reading Indicator: LED
Power Source: internal Lithium Ion Polymer or Computer USB port
Battery Run Time: 8 hours
Weight: 2 lbs.
Dimensions: 3”H x 3”W x 5”L
User Interface Software and USB Driver Support: Windows 7, Vista, XP & 2000 (32 bit)

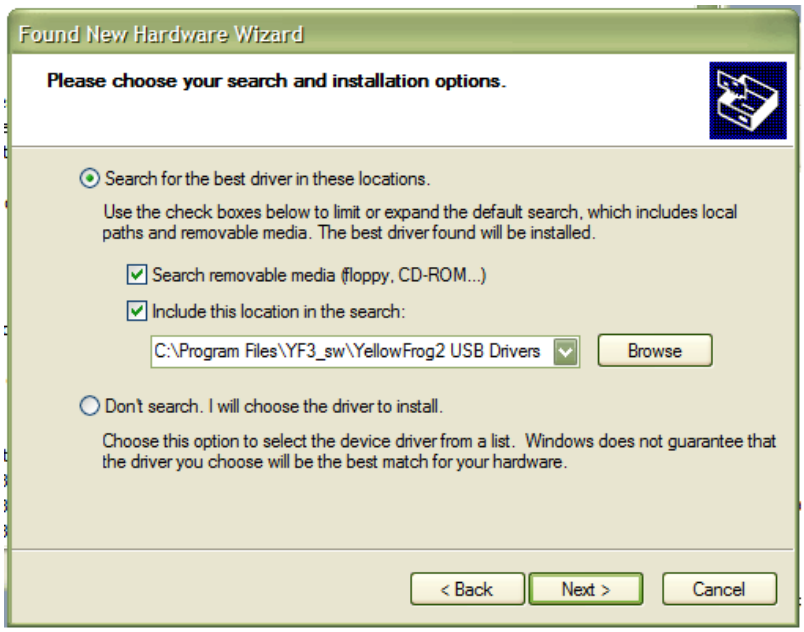
7. Appendix 1: USB Port Driver Installation

After the USB driver folder "YellowFrog2USBDrivers" is copied to the C:\Program Files\YF2\ directory, proceed as follows:

a) Connect the YF2 USB port to the PC USB port with the USB cable; the YF2 unit should be detected by the PC and the "Found New Hardware Wizard" displayed as follows:

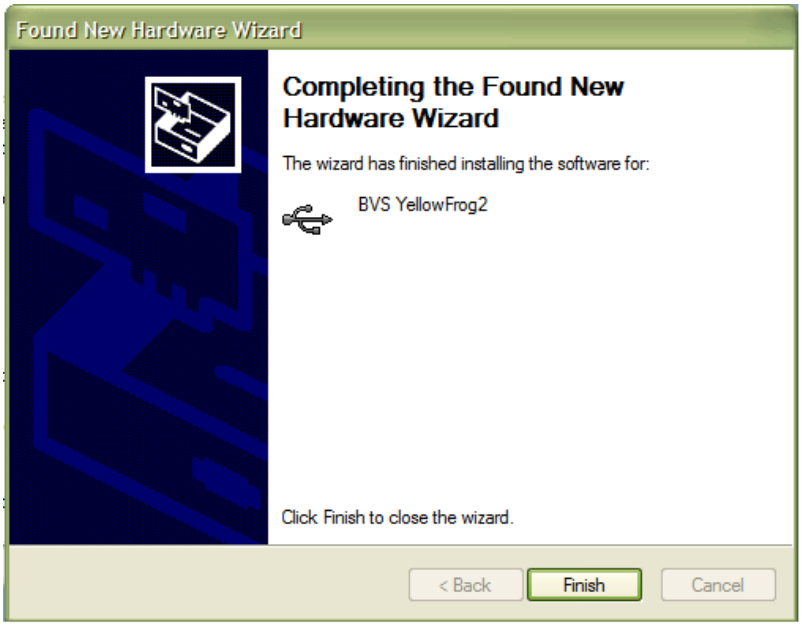
b) Select "Install from a list or specific location (Advanced)" as see below and click "Next":

c) In the next window (see below) select "Search for the best driver in these locations" and check the box "Include this location in the search" and click "Browse" to point to the folder where the drivers are located and click on "Next":



d) The next window will first display the "Please wait while the wizard installs the software …" message, followed by the "Hardware Installation" message as seen below:

e) Press "Continue Anyway", which will result in the following window:



f) Press “Finish” to complete the USB driver installation