DSSM1B

Dynamic Signal Strength Meter

Firmware Revision 0.54

User Guide

DISCLAIMER: The product described in this user guide is intended to be used as an indicator only. In the event it does not perform as expected, RHDC Services Ltd may not be held liable.

AUDIO LEVELS: Users are advised that listening to audio at high levels is a known cause of permanent hearing damage. Users must use the equipment responsibly and avoid excessive sound levels by adjusting the volume appropriately. In the event users suffer hearing damage after using this equipment, RHDC Services Ltd may not be held liable. We also recommend using closed-back headphones to help attenuate background noise and allow lower listening levels.

ESD WARNING: In order to obtain the highest RF performance, the DSSM1B's RF input has only limited protection and may be damaged by ESD discharge. Please take extra care when connecting to the RF input to avoid static discharge.

1 Scope

This document describes how to use the DSSM1B (Dynamic Signal Strength Meter model 1B).

Figure 1. DSSM1B Dynamic Signal Strength Meter

2 Important Notes

Please read the following important notes before using this product.

1. Observe ESD precautions when connecting to the RF input.
2. Do not apply more than 10dBm to the input.
3. Use Alkaline batteries only such as Energizer E91 or equivalent.
4. Use closed-back headphones such as Sennheiser HD-25 or similar.

3 Introduction

The DSSM1B is a high dynamic range, broadband-response RF signal analyser capable of detecting signals such as Wi-Fi, GSM, Bluetooth, DECT and many others, even if their duration is only a few microseconds.

Since modern RF devices often transmit very short duration pulses, their signal can easily be missed by a spectrum analyser or analogue signal strength meter. Whereas, the fast response of the DSSM1B allows it to detect almost any RF signal from 3MHz to 6GHz irrespective of its nature. As well as the DSSM1B's ability to detect short RF pulses, its scrolling time-domain display reveals superimposed signals that might otherwise be invisible to a spectrum analyser or analogue signal strength meter. The equipment also includes an audio output (Variable Tone or AM Demodulation with Squelch function and adjustable volume), digital sensitivity adjustment and illuminated display for improved usability.

To summarise, the DSSM1B is a versatile handheld instrument that can both detect and discriminate between almost any type of radio signal.

4 Controls

The image below shows the four controls of the DSSM1B.

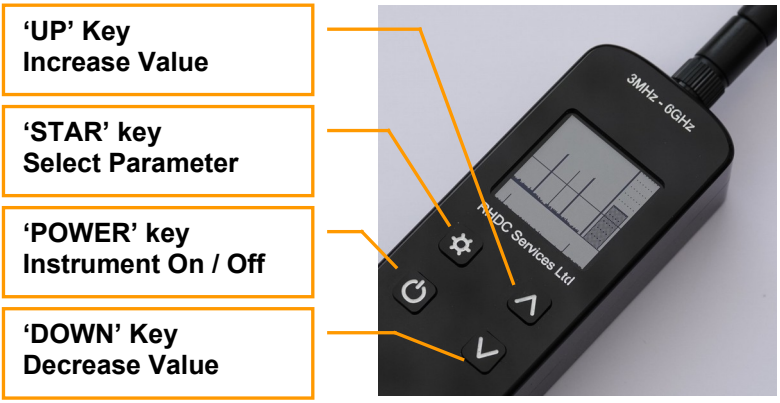

Figure 2. DSSM1B Controls.

5 Getting Started

1. Insert two AA Alkaline batteries.
2. Taking care to avoid ESD discharge, connect the supplied antenna.

Press and hold the power button for 2 seconds. The display will show the model number and firmware version.

Release the power button and the instrument will start. Assuming the device is being used near to a wireless device, activity should be observed on the display, similar to the example shown below.

6 Instrument Display

The instrument display is split into three sections as shown below.

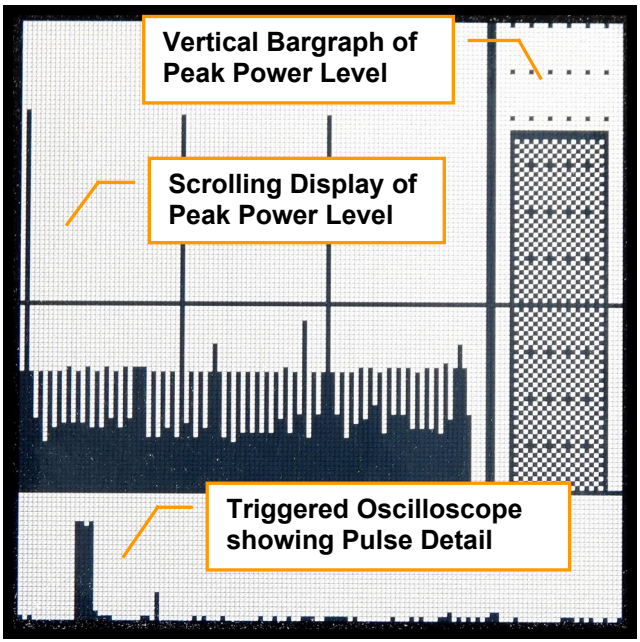

Figure 3. Example Display

6.1 Top right Display Section

This section displays the current signal level as a vertical bargraph with a scale of 5dB/div. The reported level is the peak level not the RMS level. This ensures that low duty-cycle transmissions are not missed.

6.2 Top Left Display Section

This section displays the historical peak signal level from the vertical bargraph as a scrolling chart, also with a scale of 5dB/div.

6.3 Bottom Display Section

This section behaves like a conventional triggered oscilloscope. It is designed to show the pulse duration in more detail than can be accommodated by the upper scrolling display.

7 Frequency Response

The image below shows the typical frequency response of the FFTD1B.

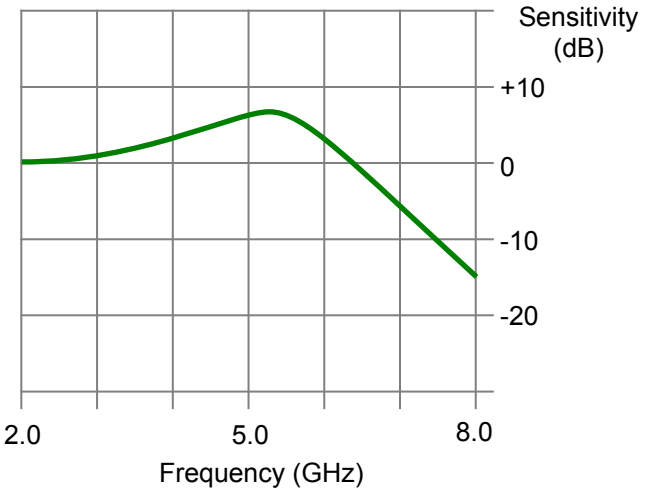

Figure 4. Typical Frequency Response

8 Settings

Pressing the STAR button cycles through a number of user settings which may be adjusted using the UP and DOWN buttons as described below.

8.1 Rate

Sets the speed of the scrolling display (upper left section).
The value can range from x1 through to x16.

8.2 Span

Sets the timebase of the triggered display (lower section).
The value can be either 10ms or 20ms.

8.3 Gain

Sets the instrument sensitivity (except for the triggered display section).
The value can range between -5dB and +5dB allowing signals between approximately -58dBm and 0dBm to be detected (limited by hardware).

8.4 Light

Turns the backlight on or off.

8.5 Sound

Configures the instrument's audio output (3.5mm jack socket) as follows.

1. "off" (audio system is disabled)
2. "demod" (audio is the AM demodulation of the detected signal).
3. "tone" (frequency or pulse rate is proportional to the log signal level).

8.6 Vol

Sets the audio volume in the range of 1 to 40. **See front cover warnings.**

8.7 Squelch

Sets a threshold (indicated by a horizontal line) below which the audio is muted. Can be set between the bottom of the display (off) and 90% FSD.

9 Limitations

This instrument is only intended as an indicator. In order to make precise, calibrated measurements of a dynamic signal, more sophisticated instrumentation may be required. However, for many applications, the advantages of portability and low-cost make the DSSM1B an ideal choice.

10 Absolute Maximum Rating

Parameter	Min	Typ	Max	Units
Maximum Input Signal Level			10	dBm

11 Specifications

Unless Otherwise Stated: Battery = 2 x Energizer E91, Gain=0dB, Backlight & Audio = off, Temp=20ºC, Freq = 1GHz, Level = -10dBm.

Parameter	Min	Typ	Max	Units
Frequency Range	3MHz		6GHz	
Amplitude Range [2]	-55		-5	dBm
Absolute Accuracy 100MHz to 2GHz		3		dB
Measurement Rate		100		kHz
Battery Life	40	TBA		Hours
Battery Life (with BL & audio)	20	TBA		Hours
Dimensions	38W x 24H x 109L			mm

Note. Specifications are subject to change without notice.

WARNING. To protect your hearing, use this equipment at the minimum volume possible. Listening to audio at high levels for extended periods is known to cause permanent hearing damage.

1. Recommended for use with Sennheiser HD25 headphones.

2. Using the Digital Sensitivity Adjustment, a range of approx. -58dBm to 0dBm can be achieved.