USB Microphones Inadequate Shielding Functional Test

麦克风屏蔽不良功能测试

REV: 001

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12/18/07

1.0 Objective 目的

The purpose of this document is to describe and setup a functional test for the USB microphones. The ideal reason for the test is to make sure that the functional test catches inadequate microphone shielding.

本文件描述的是如何建立一个 USB 麦克风的功能测试平台，以检测麦克风是否有屏蔽不良的问题。

1.1 Inadequate shielding description 屏蔽不良的问题

Some USB microphones have shown a 50 to 60 Hz Ground noise coupling to the center conductor of the microphone cable. This noise is amplified on the input gain stage of the Micronas Codec and becomes audible. If the microphone cable is shielded then the noise coupling is reduced below audible range.

一些麦克风的电缆芯线上有从地线藕合进来的 50 到 60Hz 的噪音，这个噪音经输入级放大而形成可听见的噪音。如果麦克风电缆屏蔽完好将会将此噪音减小到听不到的程度。

2.0 Test Setup Description 测试平台的描述

2.1.0 Required Tools 所需工具

Tools needed:

1. PC with PE (Protective Earth) disconnected and all PC peripherals should be isolated from the PE 将 PC 的 PE(保护地)断开，PC 所有的外围设备也需要和 PE 隔离开。

2. VIRTINS Multi-Instrument Software --- Audio based Scope and Spectrum analyzer
   VIRTINS Multi-Instrument 软件---音频示波器和频谱分析仪。
   http://www.virtins.com/

3. Audio Repeater Software – Virtual Audio Cable Version. 4.0
   音频转发器软件-实物电线 4.0. http://www.ntonyx.com/vac.htm

4. USB Microphone --- Logitech USB microphone

USB 麦克风-罗技 USB 麦克风。

5. Microphone test fixture -- Hardware fixture for the microphone
   麦克风测试固定设备-麦克风测试的硬件设备。
6. Power strip to connect all the devices in one power with PE disconnected.
   不连 PE 的电源连接板以连接所有设备。

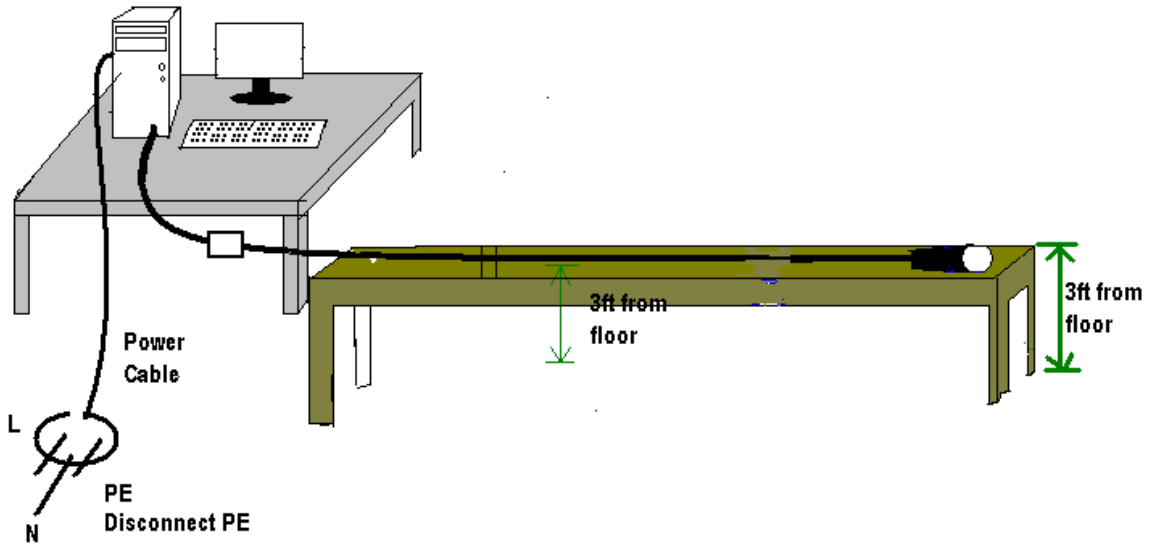
Definition 定义

*PE – Protective Earth, or earth ground. 保护地。

2.1.1 Hardware Test Setup 硬件测试设备

Please make sure the test setup is a stable repeatable setup. All the measurements are relative to the test setup consistent environment. If the setup is changed the measurements will not be consistent. Please use a power strip to connect all the PC peripherals in one AC outlet with PE disconnected.

请确保所有的测试设备是稳定并可以重复的，所有的测量要采用一致的测试设备及测试环境。如果设备不一致将造成测量结果不可比。请使用该电源连接板来连接 PC 所有的外围设备。

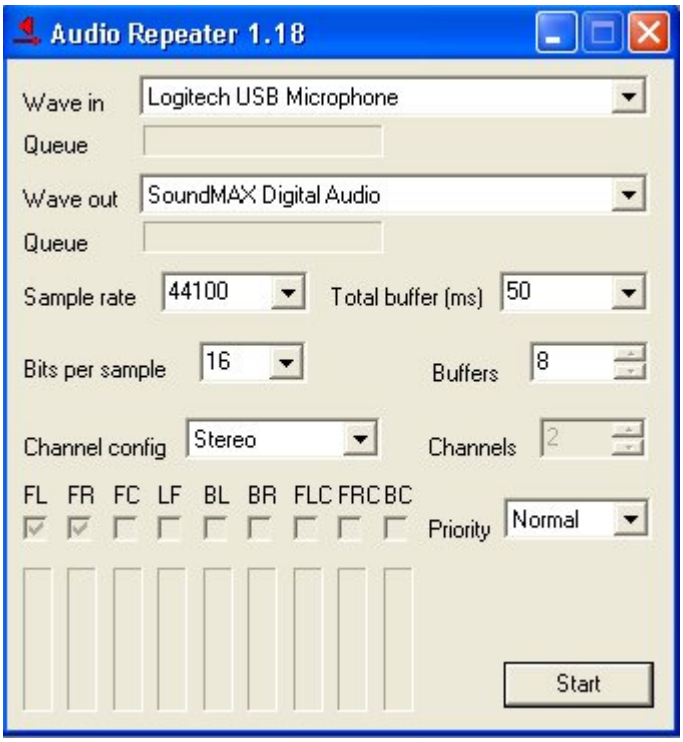


2.2.0 Software Setup 软件设备

2.2.1 Audio Repeater Software 音频转发软件

Virtual Audio Cable is a Windows WDM multimedia driver allowing you to transfer audio (wave) streams from one application to another. It creates a set of "Virtual Cables" each of them consists of a pair of the waveform input/output devices.

Virtual Audio Cable（虚拟音频电缆）软件是 Windows WDM 多媒体驱动程序，支持将音频流从一个应用程序转移到另一个应用程序上。它创建立了一条“虚拟电缆”，该电缆包括一个音频流输出和输入设备。



A. Choose Logitech USB Microphone from the pull down Menu labeled Wave in.
从 Wave In 下拉菜单中选择罗技 USB 麦克风。

B. Choose the output usually PC Speaker drivers from the pull down menu labeled Wave out.

从 Wave Out 下拉菜单中选择的所用的 PC 喇叭驱动程序.

C. Set **Sample Rate** 44100 设置采样率为 44100

D. Set **Total buffer** (ms) 50 设置总缓冲器（ms）50

E. Set **Buffers** 8 设置系统缓冲区数为 8

F. Channel Configuration, Channels, and Priority are set by default as shown on screen capture

Channel Configuration（通道配置）, Channels（通道）, Priority（优先级）按默认值选择，如图。

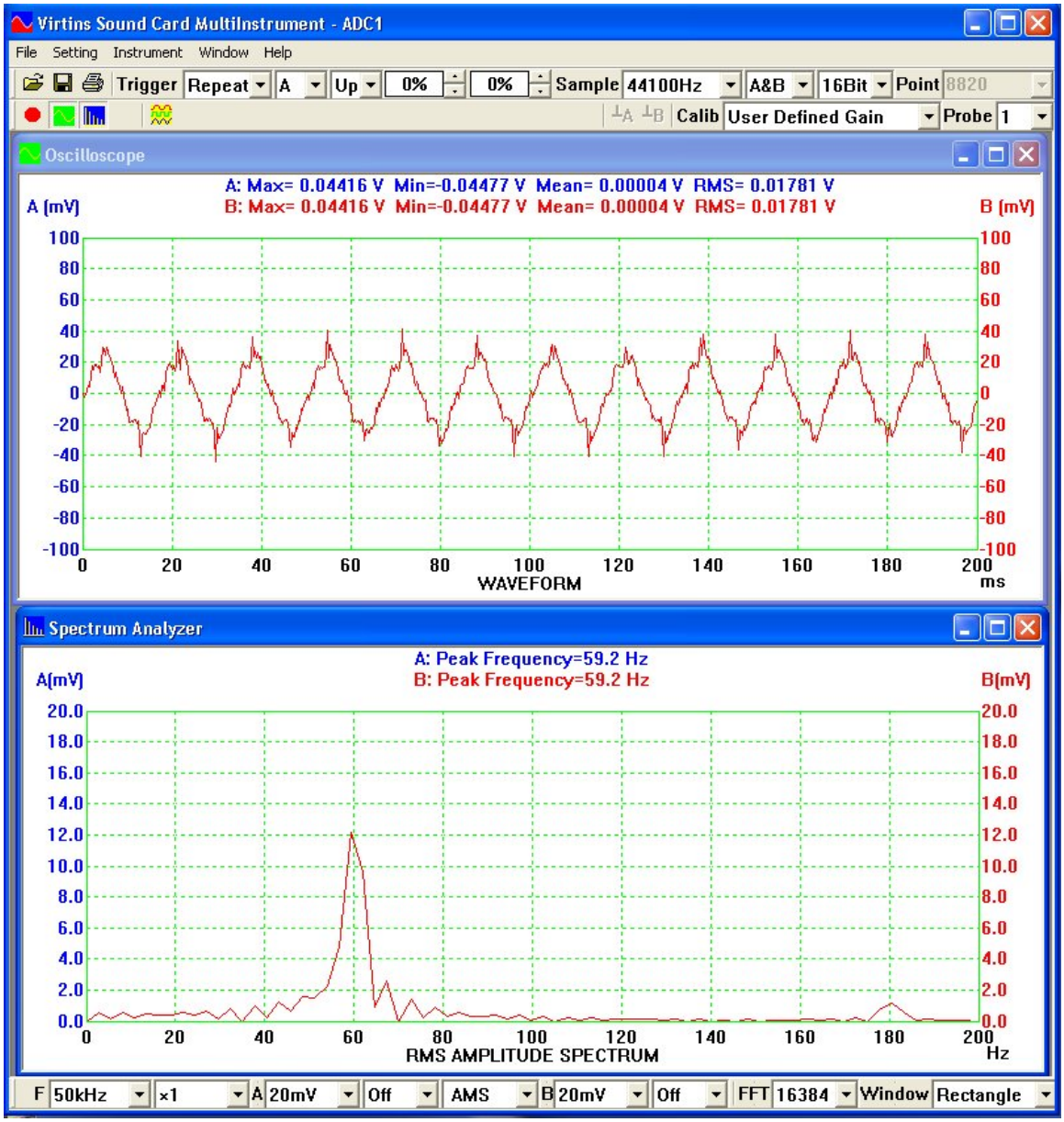
G. Press Start 按启动

H. At this point Microphone sound must be present on the output speakers
此时麦克风采集到的声音应从喇叭输出。

2.2.2 VIRTINS Multi-Instrument VIRTINS Multi - Instrument 软件

This software is locked and will only work if a USB key or an activation code is purchased for this software, after the 21-day fully functional trial period. Please insert the key in a USB port and then open the software.

此软件是上了锁的，在 21 天的全功能免费试用期过后，只有在购买了这个软件的 USB 加密匙或注册码后，才能正常使用。请将加密匙插入任何一个 USB 口中。



Please click on the red button to activate the software and the red button will turn green.

请点红色按纽启动数据采集，随后红色按纽将变为绿色。

A. Trigger, Sample setting is setup by default as shown on the picture]
触发和采样设置采用默认值，如图所示。

B. Calib and Probe setting is also setup by default as shown on the picture above
Calib 和 Probe（探针）的设置也设置采用默认值，如图所示。

C. Spectrum Analyzer setting is set-up as follows
频谱分析仪设置如下：

D. All the settings located on the bottom of the window will be activated by clicking on the Spectrum analyzer window. The parameters will be set as follows,

f = 200 Hz zoom x1
A = 20mV zoom off
Amplitude mode = AMS
B = 20mV zoom off
FFT = 16384
Window = Rectangle

点击频谱分析仪窗口，电脑屏幕下端将显示频谱分析仪的参数，设置如下：

f = 200 Hz 水平显示放大倍数 x1
A = 20mV 垂直显示放大倍数 无
mode = AMS 幅度谱
B = 20mV 垂直显示放大倍数 无
FFT = 16384
Window = Rectangle 矩形窗

E. If the top Scope window is clicked the menu located in the bottom Window will change as below

Time Base = 200ms zoom set to x1

For trace A
Amplitude = 10mV zoom off or x1

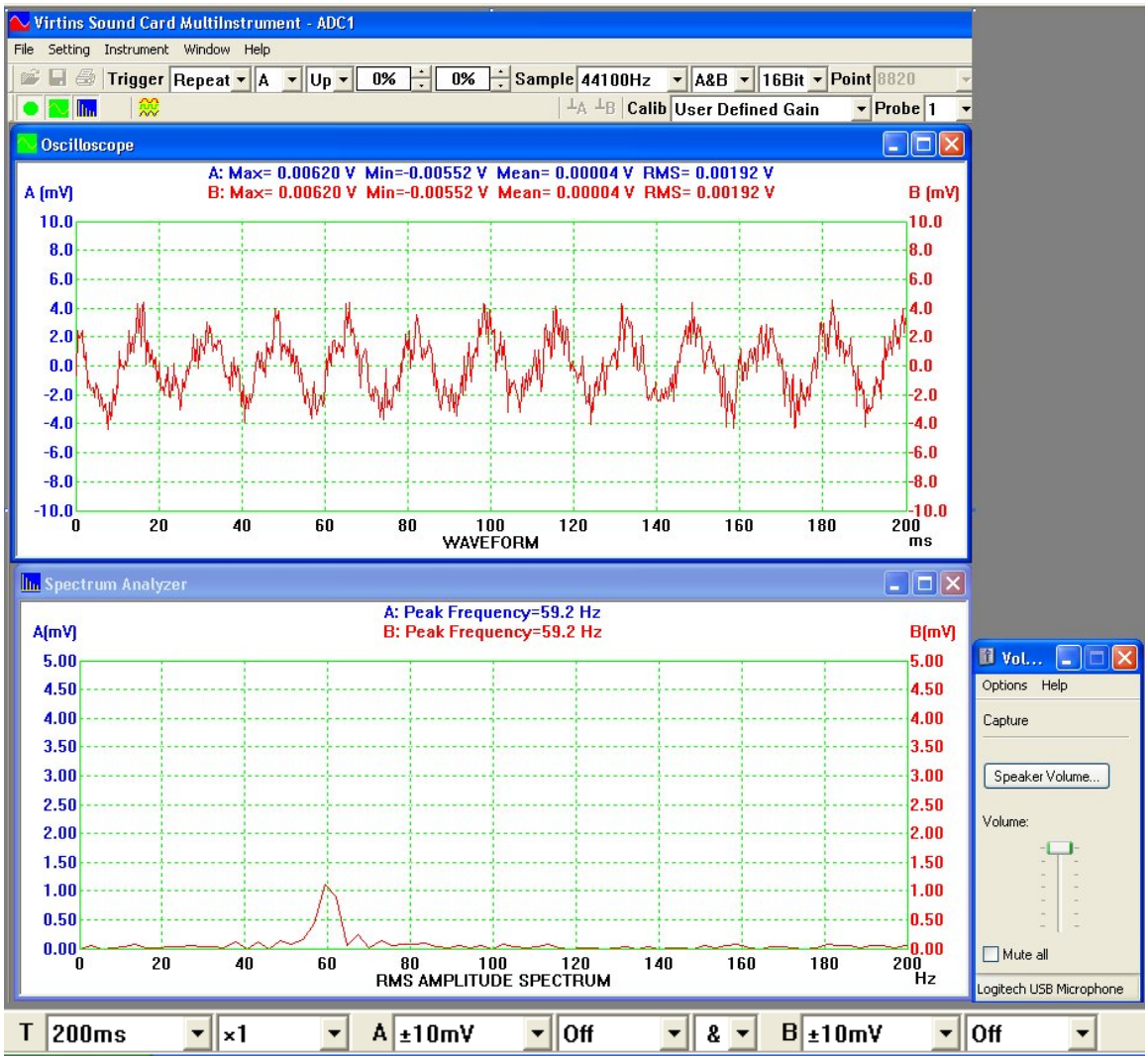
For trace B
Amplitude = 10mV zoom off or x1

点击上部的示波器窗口，电脑屏幕下端将显示如下：

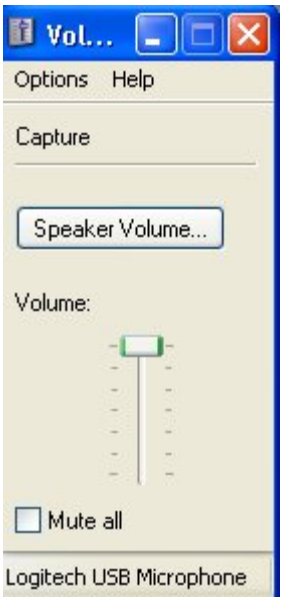
Time Base（时基）= 200ms 水平显示放大倍数 x1

A 通道
Amplitude = 10mV 垂直显示放大倍数 无 或 x1

B 通道
Amplitude = 10mV 垂直显示放大倍数 无 或 x1



2.2.3 Windows Audio Setting Windows 音频设置



-- Adjust the PC Speaker Volume to Max 调整 PC 喇叭音量到最大

3.0.0 Test parameter data analysis 测试参数数据分析

Please take a careful measurement for the different inadequate shielding samples and save it for comparison with the new microphones under test. Please make sure that the DUT Spectrum amplitude is always below or equal to the good shielding sample.

请仔细测量不同的屏蔽不良的样品，并将数据保存下来以和新的待测麦克风对比，请确保被测设备 DUT（即：麦克风）的频谱振幅一直低于或等于良好屏蔽样品的频谱振幅。

Sample Data Spreadsheet 样品数据表

Microphone samples 麦克风样品	N01. 47% Inadequate shielding 屏蔽不良	N03. 56% Inadequate shielding 屏蔽不良	N06. less than or equal 3% good shielding 小于或等于 3%良好屏蔽	DUT less than or equal 3% good shielding 小于或等于 3%良好屏蔽。

Amplitude 振幅 (mV)	12mV	8mV	1 mV	1mV