QRDc .com

Sound Solutions that Resonate

INSTRUCTION SHEET FOR NOISE MEASUREMENT

Carefully read all instructions and warnings before recording noise data.
Call QRDC at 952-556-5205 between 9:00 am and 5:00 pm CST if further clarification is needed.

Customer Information

Name: _____ Phone: _____

Address: _____ Email: _____

City: _____ State: ___ Zip: _____

PACKAGE CONTENT

Note: Inspect the package as soon as it is received. If you find any damage, notify the delivering carrier immediately and contact QRDC. Carriers have the right to refuse claims for damage if it's not promptly identified.

1. Noise Measurement Unit
2. Instruction Sheet (this document)
3. Data Logging Form
4. Packaging Material
5. Return Label
6. Cover Letter

This packet contains instructions for using the QRDC Noise Monitoring Kit. When you ordered the kit, you selected specific services that are offered with the unit. For each service ordered, utilize the corresponding instruction sheet included here.

Also included in this package are data logging forms. All information that you record should be on these forms. Please fill out a separate form for each noise issue that you have, and write legibly. Additional forms have been included so that you can re-write a logging form if necessary.

Please see the attached example forms to get a clear understanding of what is expected of you, the customer, in order for your data to be properly analyzed.

WARNING AN INHERENT DANGER EXISTS WITH HIGH SOUND LEVEL and may require hearing protective aid. If any such conditions exist that may jeopardize the safety of yourself or others or if you are unsure about proper equipment use, DO NOT USE THE EQUIPMENT and call QRDC at 952-556-5205. FAILURE TO COMPLY WITH THESE SAFETY INSTRUCTIONS OR THOSE OF OSHA AND YOUR FEDERAL, STATE OR LOCAL GOVERNMENTS, MAY RESULT IN HEARING LOSS. QRDC accepts no liability for failure to comply.

DISCLAIMER: QRDC, Inc. assumes no liability, either expressed or implied, through recommended actions. All events subsequent to recommendations are the responsibility of the client, and not QRDC, Inc.

The results obtained by use of QRDC's Noise Monitoring Kit are subject to the quality of collected data. Due to uncontrolled environmental conditions, QRDC offers no guarantee that conclusive results will be achieved. QRDC will provide the customer with analysis of the collected data and corresponding conclusions and results based on the collected data and requested services. In the event that the analysis does not yield conclusive results, the customer will NOT be refunded any payments for services.

Basic Services

□ **Loudness Measurement (Service Code 101)**

Loudness is a classification of the overall average noise at a specific location. With this type of measurement, you will be able to say something like, "The noise level at my kitchen sink yesterday afternoon was as high as 85 dBA!"

For each location that you would like to collect data from, please follow the below procedure:

1. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
2. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
3. Record the date, time, and location on the log sheet.
4. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".

Basic Services

□ **Noise Source Characterization (Service Code 102)**
With this type of service, you may collect specific data about the noise that is propagating to a certain location. For example, you could find out details about the source of annoying buzzing you hear while the air conditioning is running. Knowing the roots or the source of noise may aid in diagnosing the problem, or identifying how you can shield yourself from the noise.

For this service, follow the below procedure:
1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. Repeat steps 5-6 two times for three measurements in total.
8. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".
9. Shut down the sound recorder (left) by holding down the "PWR" button until the screen turns off.

Basic Services

□ **Noise Source Identification (Service Code 103)**

Similar to the Noise Source Characterization service, this service goes one step further and helps you to better identify the cause of excess noise. For instance, you may hear a loud noise coming from your basement, but you just can't identify what the source could be. By following the procedures and collecting the data listed in these instructions, it may be possible to identify the source.

For this service, follow the below procedure:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know where the source of the sound is, aim the recording device (metal mesh) at the source. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, location, and measurement direction on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. Rotate the data collector 90º clockwise.
8. Repeat steps 4-7 three (3) times for a total of four (4) measurements at the same location (but at different rotational positions).
9. Identify the location at which you hear the second loudest noise (second noisiest room). If you know where the source of the sound is, aim the recording device (metal mesh) at the source.
10. Repeat steps 3-8 for a total of four (4) measurements at this second location.
11. Identify the location at which you hear the third loudest noise (third noisiest room). If you know where the source of the sound is, aim the recording device (metal mesh) at the source.
12. Repeat steps 3-8 for a total of four (4) measurements at this third location.
13. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".
14. Shut down the sound recorder (left) by holding down the "PWR" button until the screen turns off.

Basic Services

☐ **Noise Source Location (Service Code 104)**

Consider that you have an offensive noise no matter where you seem to go within your home, building, or outdoor environment. If you have a difficult time identifying where it is coming from, use the Noise Source Location procedure. After we receive and analyze the collected data, we may be able to help you determine where that problem sound comes from.

For multiple locations around the area that you can hear the noise, follow the instructions below:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (the place where you hear the loudest noise). Place the data collector on a flat and stable surface.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, location, and measurement direction on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. Rotate the data collector 90º clockwise.
8. Repeat steps 4-7 three (3) times for a total of four (4) measurements at the same location (but at different rotational positions).
9. Choose a few (2-4) other locations (i.e. different rooms or areas) at significant distances away from one another. Repeat steps 2-8 for each location.
10. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".
11. Shut down the sound recorder (left)by holding down the "PWR" button until the screen turns off.

Basic Services

□ **Potential Solutions (Service Code 105)**

*With data collected using the "***Noise Source Location"*** service and procedure, you may be looking for help identifying possible solutions that will lower the noises that you are hearing. QRDC offers recommendations to reduce noise based on three techniques: treating the source; treating the path; and treating the receiver. Utilize our years of experience to get some suggestions on what you can do.*

Basic Services

□ **Ordinance Violation (Service Code 106)**

Are you utilizing the noise measurement kit because you believe the noise level in your residence exceeds the local ordinance? If so, you may want some assistance in identifying whether the data you collected indicates a violation. We have the capabilities of looking up the ordinances where you live, and identifying whether data you recorded indicates a violation is occurring or not. This service must be accommodated with one or more of the other basic services, such as loudness and noise characterization.

Basic Services

□ **Follow-Up Recommendations (Service Code 107)**
Data may be used to confirm that you can justify investing more resources into investigating your acoustic environment, possibly making a case that something needs to change. We can provide recommendations for further investigation, based on our analyses. This must be accommodated by at least one of the basic services, such as loudness and noise characterization.

Advanced Services

□ Sound Pressure Level (SPL) (Service Code 200)

Sound Pressure: The Sound Pressure is the force (N) of sound on a surface area (m2) perpendicular to the direction of the sound. The SI-units for the Sound Pressure are N/m2 or Pa.
Sound is usually measured with microphones responding proportionally to the sound pressure - p. The power in a sound wave goes as the square of the pressure.

The Sound Pressure Level: The lowest sound pressure possible to hear is approximately $2x10^{-5}$ Pa (20 micro Pascal, 0.02 mPa), 2 ten billionths of an atmosphere.
It therefore convenient to express the sound pressure as a logarithmic decibel scale related to this lowest human hearable sound – $2x10^{-5}$ Pa, 0 dB.

The Sound Pressure Level can be expressed as:

$$L_p = 10\log\left(\frac{p^2}{p_{ref}^2}\right) = 20\log\left(\frac{p}{p_{ref}}\right)$$

where:
L_p = sound pressure level (dB)
p = sound pressure (Pa)
p_{ref} = $2x10^{-5}$ - reference sound pressure (Pa)

If the pressure is doubled, the sound pressure level is increased by 6 dB (=20 log (2)).

For each location that you would like to collect data, please follow the below procedure:
1. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
2. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
3. Record the date, time, and location on the log sheet.
4. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".

Advanced Services

□ **Octave and Fractional Octave SPL (Service Code 201)**

Scales of octave bands and one-third octave bands have been developed for engineering applications. Each band covers a specific range of frequencies and excludes all others. The word "octave" is borrowed from musical nomenclature where it refers to a span of eight notes, i.e. "do" to "do". The ratio of the frequency of the highest note to the lowest note in an octave is 2:1.

If f_n is the lower cutoff frequency and f_{n+1} is the upper cutoff frequency, then the ratio of band limits is given by:

$$\frac{f_{n+1}}{f_n} = 2^k$$

where k = 1 for full octave bands and k = 1/3 for one-third octave bands.

An octave has a center frequency that is √2 times the lower cutoff frequency and has an upper cutoff frequency that is twice the lower cutoff frequency. Therefore,

$$f_1 = \frac{f_o}{\sqrt{2}} \quad f_2 = \sqrt{2}\, f_o \quad f_2 = 2\, f_1 \quad bw = f_2 - f_1$$

where
f_1 = lower cutoff frequency
f_2 = upper cutoff frequency
f_0 = center frequency
bw = band width

For this service, please follow the below procedure:
1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. Repeat steps 4-6 two times for three measurements in total
8. Shut down the sound level display by holding down the "SPL" button until the screen reads "OFF".
9. Shut down the sound recorder (left) by holding down the "PWR" button until the screen turns off.

Advanced Services

□ **Narrowband Spectrum (Service Code 202)**

The term "narrowband" is used to describe a measurement where a frequency analysis of the sound is made and thereafter only the frequency bands containing the characteristic frequencies are used in the evaluation. For acoustic measurements, sound pressure, sound intensity, and sound power levels can all be deduced for narrowband spectrums.

Narrowband analysis may be necessary in situations where the environment has numerous noise sources, and only information about specific frequencies are desired.

For each location that you would like to collect data, please follow the below procedure:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. Repeat steps 4-6 two times for three measurements in total
8. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".
9. Shut down the sound recorder (left) by holding down the "PWR" button until the screen turns off.

Advanced Services

☐ **L$_{eq}$** (L$_{ave}$) **(Service Code 203)**
Equivalent Sound Level quantifies the noise environment as a single value of sound level for any desired duration. This descriptor correlates well with the effects of noise on people. L$_{eq}$ is also sometimes known as **Average Sound Level (L$_{AT}$).**

Equivalent Sound Level can be expressed as:

$$L_{eq} = 10\log\left[\frac{1}{T} \cdot \frac{\int p_A^2 dt}{p_{ref}^2}\right]$$

where
L$_{eq}$ = equivalent sound level (dB)
T = time period (s)
p$_A$ = sound pressure (Pa,N/m^2)
p$_{ref}$ = reference sound pressure (20x10^{-6} Pa, N/m^2)

For each location that you would like to collect data, please follow the below procedure:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges), allow data collector to record for
    _____ minutes _____ hours.
7. When the above time has elapsed, press the "STOP" button.
8. Rotate the data collector 90º clockwise.
9. Repeat steps 4-8 three (3) times for a total of four (4) measurements.
10. Shut down the sound level display (right) by holding down the "SPL" button until the screen reads "OFF".
11. Shut down the sound recorder (left) by holding down the "PWR" button until the screen turns off.
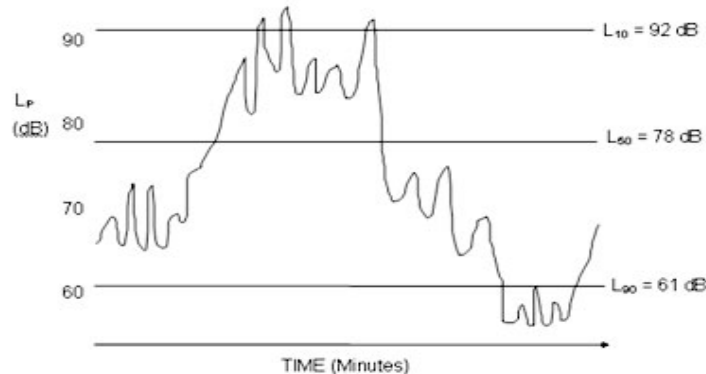
Advanced Services

□ **L_{10}, L_{50}, L_{90}, L_{95} (Service Code 204)**

L_n, where n may be anything from 1 to 99, is that noise level exceeded for n% of the measurement time.

An example of how L_n values look in a graphical format:

L_{10} is the noise level exceeded for 10% of the time of the measurement duration. This is often used to give an indication of the upper limit of fluctuating noise, such as that from road traffic.

L_{50} is the noise level exceeded for 50% of the measurement duration. It is the middle point and has been incorporated in some American Community Noise Assessments.

L_{90} is taken to be the ambient or background noise level as used.

For each location that you would like to collect data, please follow the below procedure:
1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button and write down the name of the current record file on the log sheet.
6. Press the "REC" button once more, allow data collector to record for _____ minutes   hours.
7. When the above time has elapsed, press the "STOP" button.
8. Rotate the data collector 90º clockwise.
9. Repeat steps 4-8 three (3) times for a total of four (4) measurements.
10. To shut down the sound level display (right), hold down the "SPL" button until the screen reads "OFF". To shut down the sound recorder (left), hold down the "PWR" button until the screen turns off.

Advanced Services

□ **L_{dn}, L_{den} (Service Code 205)**

Day-Night Sound Level (L_{dn}) is the A-weighted equivalent sound level for a 24 hour period with an additional 10 dB imposed on the equivalent sound levels for night time hours of 10 p.m. to 7 a.m.

Day-Night Sound Level can be expressed as:

$$L_{dn} = 10\log\left(\frac{15 \cdot 10^{Ld/10} + 9 \cdot 10^{(Ln+10)/10}}{24}\right)$$

where
L_{dn} = day-night sound level (dB)
L_d = daytime equivalent sound level (dB)
L_n = nighttime equivalent sound level (dB)

For each location that you would like to collect data, please follow the below procedure:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for 24 hours, and then press the "STOP" button.
7. When the above time has elapsed, press the "STOP" button.
8. To shut down the sound level display (right), hold down the "SPL" button until the screen reads "OFF". To shut down the sound recorder (left), hold down the "PWR" button until the screen turns off.

Advanced Services

□ **NC, NR (Service Code 206)**

Noise in buildings is more stable (over time) than outside community noise. The Noise Rating (NR) curves are developed by the International Organization for Standardization (ISO), and specify the maximum acceptable noise level for indoor environments. In the United States, a similar rating, the Noise Criterion (NC), is used.

For both NC and NR, values are determined from the measurements of the octave-band sound levels in an occupied room when the mechanical systems are on. The measured values are then compared to standard NC (or NR) curves.

For each location that you would like to collect data, please follow the below procedure:

1. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
2. Identify the location of interest (likely the place where you hear the loudest noise). Place the data collector on a flat and stable surface. If you know what the source of the sound is, aim the recording device (metal mesh) at the source, about 1 meter away. If you are in a room and don't know where or which direction the noise comes from, place the data collector at the center of the room.
3. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
4. Record the date, time, and location on the log sheet.
5. Press the "REC" button once (you will see the button flash on the edges). The unit is in standby right now. Write down the name of the current record file on the log sheet (e.g. DR000005.wav). You can read information from the LCD display.
6. Press the "REC" button once more (you will see the button glow solid red on the edges). The unit is now recording. Allow the data collector to record for about one (1) minute, and then press the "STOP" button.
7. To shut down the sound level display (right), hold down the "SPL" button until the screen reads "OFF". To shut down the sound recorder (left), hold down the "PWR" button until the screen turns off.

Advanced Services

□ RT60 (Service Code 207)

The Sound Reverberation Time (RT60) of a room is the time it takes for sound to decay by 60 dB once the source of sound has stopped. Reverberation time is inversely related to sound absorption and is a way to measure the amount of absorption in a room.

Long RT60 times tend to make it more difficult to understand speech in a room, but may be pleasing for some forms of music. Additionally, in most rooms RT60 times will be longer at the lower frequencies.

Because RT60 is a measurement of the sound as it decays, it is essential to have sufficient signal to noise. Especially in the 120Hz Octave band, it is common to have excessive levels of noise from the HVAC system. Accordingly, HVAC should be turned off whenever feasible while making the measurements. The quieter it is in the room, the easier it will be to measure the decay, and to get good data.

For each location that you would like to collect data, please follow the below procedure:

1. Locate and inflate the three (3) balloons provided in the noise measurement kit.
2. Locate the pin provided in the noise measurement kit.
3. Locate the ear plugs provided in the noise measurement kit.
4. Insert the ear plugs as directed on the packaging.
5. Turn on the recording device by pressing and holding the "PWR" button on the side of the data collector for 3-5 seconds. The display should light up orange.
6. Place the data collector at the center of the room, on a flat, stable surface.
7. Press the SPL button and record the reading on the log sheet. Note that this reading may vary somewhat … just record what you observe to be an average value. Note also that there is a "MAX" feature on the unit, which (if enabled) you should disable by pressing the button once to toggle it off.
8. Record the date, time, and location on the log sheet.
9. Press the "REC" button once and write the name of the current record file on the log sheet.
10. Press the "REC" button once more and allow the data collector to record for about one (1) minute, and then press the "STOP" button.
11. Record the date, time, and location on the log sheet.
12. Press the "REC" button twice again, and write down the record file name on the log sheet.
13. Locate yourself in the room to be tested as far as possible from the recording device.
14. Facing the recording device, hold the balloon at arm's length in front of you, and pop the balloon with the pin. (Feel free to close your eyes.)
15. Continue to record for one (1) minute after pop.
16. Press the "STOP" button.
17. Repeat steps 10-16 two (2) times for a total of three (3) measurements.
18. To shut down the sound level display (right), hold down the "SPL" button until the screen reads "OFF". To shut down the sound recorder (left), hold down the "PWR" button until the screen turns off.
19. Dispose of popped balloons and pin.