# Noise Sensor Test – Three-Sensor Comparison (Open, Small Hole, Large Hole)

#### **Preparation Work:**

* **Understand Speaker Orientation:**
  + Confirm the orientation of the Bluetooth speaker to ensure optimal sound reception.
  + Test different angles and distances to verify that the sound reaches all three noise sensors effectively.
  + Perform preliminary sound checks to confirm that the speaker produces consistent sound levels (**20 dB to 90 dB**) at the intended setup.
  + Adjust the speaker position if necessary to optimize sound delivery to all three sensors.

#### **Setup:**

* Use **three noise sensors** for the test (**Open, Small Hole (Microphone Size), Large Hole (1-Inch Diameter)**).

#### **Test Duration:**

* Conduct noise logging for a duration of **2 hours**.

#### **Sound Source:**

* Use a Bluetooth speaker connected to an app to generate sounds ranging from **20 dB to 90 dB** during the test.

#### **Data Collection:**

* Log noise data from all **three sensors** throughout the **2-hour duration**.

#### **Time Offset Compensation:**

* Adjust for any time offsets between the **three** sensors to ensure proper synchronization.

#### **Data Analysis:**

* Use the **previously developed R script** to analyze the data.
* Calculate the following parameters to compare the sensors:
  + **R²**
  + **Slope**
  + **Intercept**
  + **Correlation coefficient**
* Perform **pairwise comparisons** to evaluate consistency between each pair of sensors.

#### **Outcome:**

* Assess whether the **three sensors** provide **comparable** measurements by analyzing the calculated values.