

### GY-511 Acceptance Test Data

1. Sensor Type: ST Microelectronics Magnetometer/Accelerometer
  - a. LSM303DLHC: <https://www.st.com/resource/en/datasheet/lsm303dlhc.pdf>
2. Note: The linear acceleration sensitivities for the LSM303DLHC are printed in the LSM303D datasheet!
  - a. LSM303D: <https://www.st.com/resource/en/datasheet/lsm303dlhc.pdf>
3. For LSM303DLHC FS = 00 the gravitational field sensitivity Gsens = 0.061 mg/LSB
4. Earth's gravitational field strength Gfield = 1g or 1000 mg
5. Earth's gravitational field sensor value Gvalue = Gfield / Gsens = 16393
6. For LSM303DLHC GN = 001 the magnetic field sensitivities are:
  - a. MsensXY = 1100 gauss/LSB (X and Y axis); and
  - b. MsensZ = 980 gauss/LSB (Z axis)
7. Earth's magnetic field strength at the test location can be obtained from here: <https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#igrfwmm>
8. Earth's magnetic field strength Mfield = 6.00358E-05T = 0.60 gauss
9. Earth's magnetic field sensor values are:
  - a. MvalueXY = Mfield x MsensXY = 660
  - b. MvalueZ = Mfield x MsensZ = 588

### GY-511 Acceptance Test Procedure

1. Read the sensor every 50ms
2. Rotate the sensor in a non-magnetic gimbal through the 12 cardinal points
3. Accumulate the maximum and minimum values for each axis
4. Calculate the range for each sensor axis: Range = maximum - minimum
5. Calculate the offset for each sensor axis: Offset = (maximum + minimum) / 2
6. Verify that the sensor range meets the pass criteria
7. Verify that the sensor offset meets the pass criteria

### GY-511 Acceptance Test Pass Criteria

1. The sensor range must be at least ninety percent of the specified range
  - a. PassRange = 90% = 0.9
  - b. Accelerometer range min value Grange = 2 x Gvalue x PassRange = 29507
  - c. Magnetometer range min value MrangeXY = 2 x MvalueXY x PassRange = 1188
  - d. Magnetometer range min value MrangeZ = 2 x MvalueZ x PassRange = 1058
2. The sensor offset must be less than one third of the specified range
  - a. PassOffset = 1/3 = 0.333333
  - b. Accelerometer offset max value Goffset = Grange x PassRatio = ±5464
  - c. Magnetometer offset max value MoffsetXY = MvalueXY x PassRatio = ±220
  - d. Magnetometer offset max value MoffsetZ = MvalueZ x PassRatio = ±196