

Result of distance measurements at multiple intervals (0.5m, 1m, 1.5m)

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1m (-59dBm 기준)

RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -59 dBm → Estimated Distance: 1.00 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -61 dBm → Estimated Distance: 1.26 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -53 dBm → Estimated Distance: 0.50 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -58 dBm → Estimated Distance: 0.89 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -56 dBm → Estimated Distance: 0.71 meters
RSSI: -67 dBm → Estimated Distance: 2.51 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -59 dBm → Estimated Distance: 1.00 meters
RSSI: -57 dBm → Estimated Distance: 0.79 meters
RSSI: -58 dBm → Estimated Distance: 0.89 meters

0.5m (-57dBm 기준)

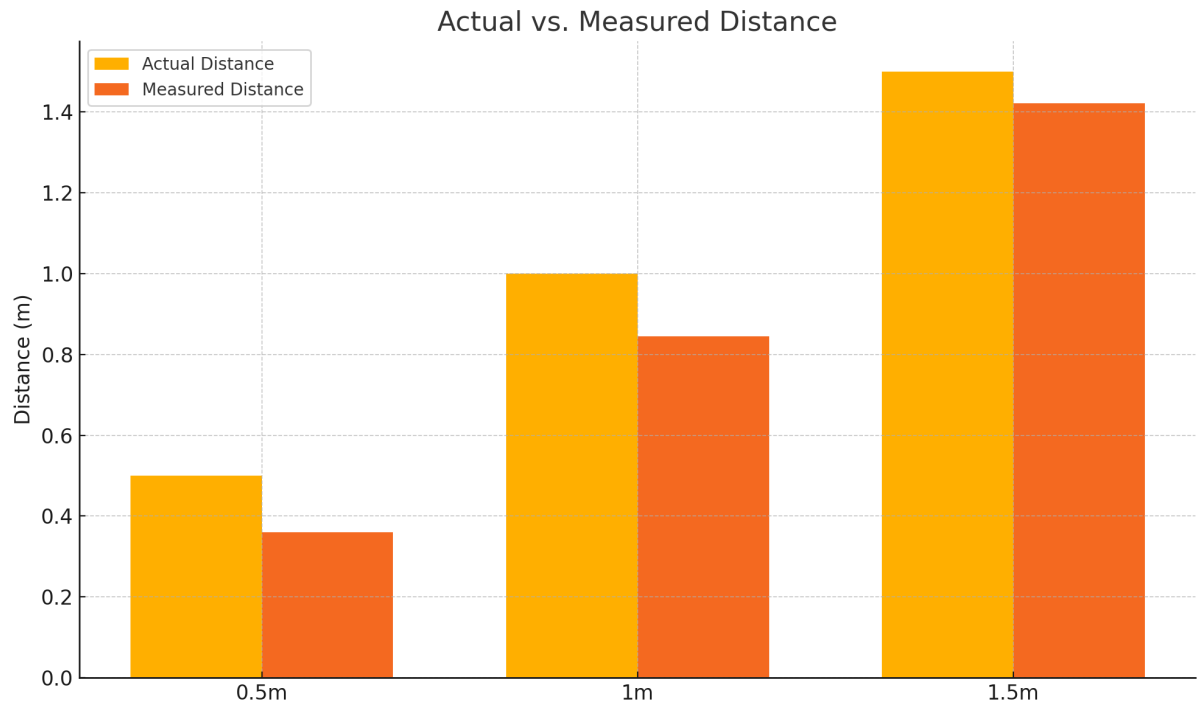
RSSI: -48 dBm → Estimated Distance: 0.35 meters
RSSI: -49 dBm → Estimated Distance: 0.40 meters
RSSI: -48 dBm → Estimated Distance: 0.35 meters
RSSI: -48 dBm → Estimated Distance: 0.35 meters
RSSI: -48 dBm → Estimated Distance: 0.35 meters

1.5m (57dBm 기준)

RSSI: -60 dBm → Estimated Distance: 1.41 meters
RSSI: -60 dBm → Estimated Distance: 1.41 meters
RSSI: -59 dBm → Estimated Distance: 1.26 meters
RSSI: -58 dBm → Estimated Distance: 1.12 meters
RSSI: -60 dBm → Estimated Distance: 1.41 meters
RSSI: -57 dBm → Estimated Distance: 1.00 meters
RSSI: -60 dBm → Estimated Distance: 1.41 meters
RSSI: -63 dBm → Estimated Distance: 2.00 meters
RSSI: -62 dBm → Estimated Distance: 1.78 meters
RSSI: -60 dBm → Estimated Distance: 1.41 meters

Summary

Actual Disatance(m)	Measured Distance(m) Mean value	Error(m)
0.5	0.36	0.14
1.0	0.84	0.15
1.5	1.42	0.079



After observing significant fluctuations in the experimental results, various measurement methods were applied. It was found that the orientation of the ESP32 board—whether laid flat or positioned vertically—and the presence or absence of obstacles in the testing environment were major factors affecting the outcome. Apart from the presented data for 1m and 1.5m, the measurements at 0.5m showed considerable error. This is likely due to the nature of RSSI, which changes more drastically at shorter distances than at longer ones. A small difference in distance can lead to a large perceived error, which may explain the substantial variation observed in the short-range measurements.