

Experiment 2: Underwater Acoustic Modem Communication Range test

Model: UAM-08160H

Version: —

Document Type: Performance Test

Experiment Location

Sea area of Weihai City, Shandong Province, China

Experimental Data Record

From 12:00 to 17:00 on November 23, 2025, the communication performance was tested in the ranges of 6 km to 8 km

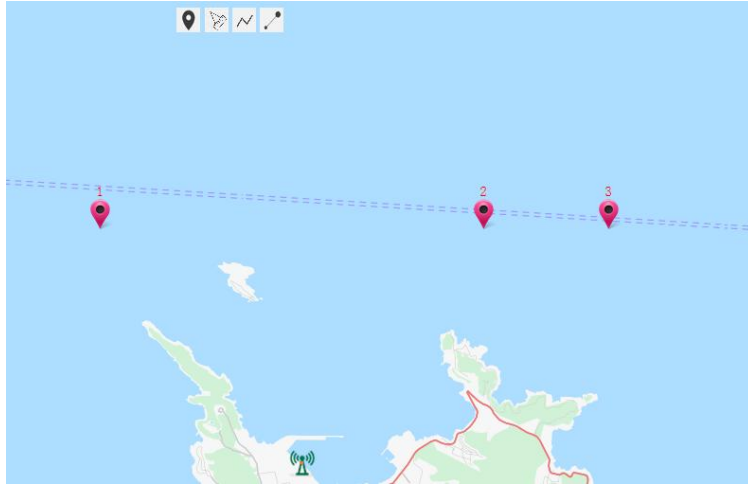


Figure 1 Test Site Image

Name	latitude	Longitude
UUV1-P1	37.57879	122.0542
UUV3-P1(6km)	37.57879	122.1237
UUV3-P2(8km)	37.57879	122.1463

Test Process

At 12:20, arrived at the designated sea area with a node spacing of 6 km. Used CTD to measure hydrological information

At 12:40, two-way communication was successful at a distance of 7 km.

At 12:46, two-way communication was successful at a distance of 7.5 km.

At 12:50, two-way communication failed completely, and the hydrophone could not capture any acoustic signal. It is suspected that the vessel's drift caused the acoustic propagation path to be blocked by Island.

From 13:07 to 15:30, positions were continuously adjusted and tests were conducted within the range of 6.5 – 8.2 km, with communication being generally normal.

At 15:50, at a distance of 9.2 km, the topside computer demodulated correctly.

At 16:09, at a distance of 9.7 km, during ship-to-ship communication, the topside computer demodulated correctly. The received signal was clear in the frequency domain but not obvious in the time domain.

At 16:15, at a distance of 10.2 km, during ship-to-ship communication, the topside computer demodulated correctly.

At 16:18 and 16:24, at a distance of 10.4 km, the submersible was navigating at a fixed depth of 5 m. At the receiving end, the topside computer demodulated correctly. The signal-to-noise ratio (SNR) was 21 dB, the frequency response was uneven, and frequency-selective fading was observed (at 10 kHz, 13 – 14 kHz).

Test Result:

Dynamic stable communication at 8 km, two-way stable communication at 9.7 km, and one-way stable communication at 10.4 km.