## Experiments on the Tesla Wireless Transmission Method for Submarine Communication

## **Oliver Nichelson**

## onichelson@post.harvard.edu

When writing about "The True Wireless" in the Electrical Experimenter of May 1919, Tesla noted that the illustration comparing his system with sending and receiving tuning forks "*was not a mere mechanical illustration, but a simple representation of my apparatus for submarine signaling, perfected by me in 1892.*"

That illustration from that article is shown below. The system consisted of a capacitance at the top, a ground plate and a signal generating alternator or a receiving device between the upper and lower elements.



Transmission of Electrical Energy Thru the Earth Electrical Experimenter, May 1919, p. 29

In an effort to replicate Tesla's method of wireless power transmission hardware was setup in the following configuration:



Squares of sheet copper were mounted on the top and the bottom of two sections of pvc (plastic) pipe. The copper squares were connected to input/output conductors. The pipes with plates were put in a plastic container. On the transmitter side, a power source was connected to the top and bottom plates. On the receiver side, the top and

bottom plates were connected to a digital volt meter. Voltage measurements were made on the receiver side with the plastic container using the following media between the transmitter and receiver: air (empty container), potting soil, water and salt water.

The voltage reading on the receiver side was lowest for air (no dense medium between transmitter and receiver). Voltage readings for potting soil, water and salt water were higher than those for air. A typical test would result was .002 volts for transmission through air and .04 volts through water, a 2000% greater voltage response.

Tesla claimed that his wireless method was different from the transmission method used in his time. That method, electromagnetic transmission, still used today, transmits best through air and much less well through earth and water. After 100 years of electronic communication there still is not a method of transmitting signals through water or soil as there is as transmitting through the air. A submerged submarine cannot communicate directly with another submerged submarine or base station in the same manner as a submarine on the surface.

These initial tests consistently showed that the voltage strength at the receiver in the experimental setup was stronger when the transmission was made through soil, water or salt water than it was through air – just the opposite of what would be expected with an electromagnetic transmission.

Though this experimental setup does not completely replicate Tesla's wireless transmission method, it is a test of the physics underlying his system – a system for what Tesla described as "submarine signaling."

Additional details available for commercial research and development.