

# **A Study on the Electromagnetic Transmission Performance Evaluation of Antenna Housing Using 6-DOF Robot Manipulator**

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The non-destructive electromagnetic performance evaluation of the radome is important because the radome of an aircraft aims to protect the antenna and transmit electromagnetic waves simultaneously. In addition, many studies have been conducted on the radome structure that passes only a specific frequency domain using a multi-layered structure and a frequency selective surface (FSS) structure in stealth aircraft. Therefore, in the development of stealth radome, a method of evaluating electromagnetic performance for antenna housing is important. However, research on how to measure 3D electromagnetic radiation patterns in all directions of antennas is insufficient. Therefore, this study presents a method of evaluating the electromagnetic performance of the antenna subsystem, including the antenna and antenna housing, using a robot arm. The antenna under test is usually set as a patchy antenna in the C-band frequency band applied to drones, and the measurement setup consists of a standard gain horn antenna, VNA (Vector Network Analyst), an anechoic chamber, and a rotating stage for measuring radiation patterns. In this setup, the measurement accuracy of the 2D electromagnetic radiation pattern of the antenna to be tested is first checked using a rotating stage. When the distance of the antenna to be tested is determined from the TCP (Tool Center Point) of the robot arm, the coordinates in which the robot arm is driven are calculated, and the robot arm moves according to the calculated coordinate value and measures the electromagnetic radiation pattern of the antenna under test. The transmission coefficient of the housing is measured by comparing the transmission loss of an antenna without an antenna housing and an antenna subsystem structure with the antenna housing.