

Category A. Received Signal Strength Estimation

Goal

To estimate the received signal strength under the following conditions

Specifications

- Participants will be asked to estimate the received signal strength at the estimated target points based on the information on the environment, transmission position, transmitter, and received power at the reference point that will be distributed in advance.
- The following information will be distributed in advance to those who wish to participate.
 - General materials of walls, etc. in the measurement environment.
 - Position and height of each point (transmitter, reference points, estimated target points)
 - Received signal strength at the reference points (results measured in advance by the secretariat)
- Participants should build an estimation model based on the distributed information and include it in the manuscript. The following can be included.
 - Multiple patterns of estimation results or estimation models according to the environmental conditions
 - Adjustment parameters according to the environmental conditions (for example, attenuation terms according to the number of people)
- The received power at the estimated target points will be measured in front of the participants on the day of the contest. The arrangement of fixtures and the congestion of people at the time of measurement on the day of the contest may differ from the environmental conditions distributed in advance. Please observe the measurement situation and determine the final estimated values based on the estimation models described in the manuscript.
- The estimated errors between the estimated values submitted on the day of the contest and the actual measured values will be evaluated, and the participant with the smallest error will be declared the winner.
- The key to estimating received signal strength with high accuracy is to build an adjustable estimation model using information distributed in advance (or prepare multiple patterns of estimation results/estimation models depending on the situation), and to adjust the model based on the conditions at the time of measurement on the day of the contest.
- The map of the measurement environment is shown in Fig.1, and the photo is shown in Fig.2. Please refer to it for the estimation of the environment. The transmitter and receiver are as shown in Table I. Other information above will be distributed separately.

Instruction for final submission

The following information is required to submit the final submission.

- Estimation models or estimation results for the received signal power
- Details of the estimation method

Instruction for online competition

- In the competition, the finalists must have oral presentation.
- All presentations have been allocated a XX-minute time slot including questions and discussion.
- The presentation contents are expected to include following items:
 - Explanation of the estimation models or estimation results
 - Explanation of estimation methods and its unique points
 - Point that you worked out the most

Evaluation

- The following items will be evaluated comprehensively based on the submitted documents and presentations.
 - Root mean squared error (RMSE) between estimated and measured values at all estimated target points
 - Originality and validity of the estimation method
- The team with the highest score based on the above evaluations will be awarded the prize.

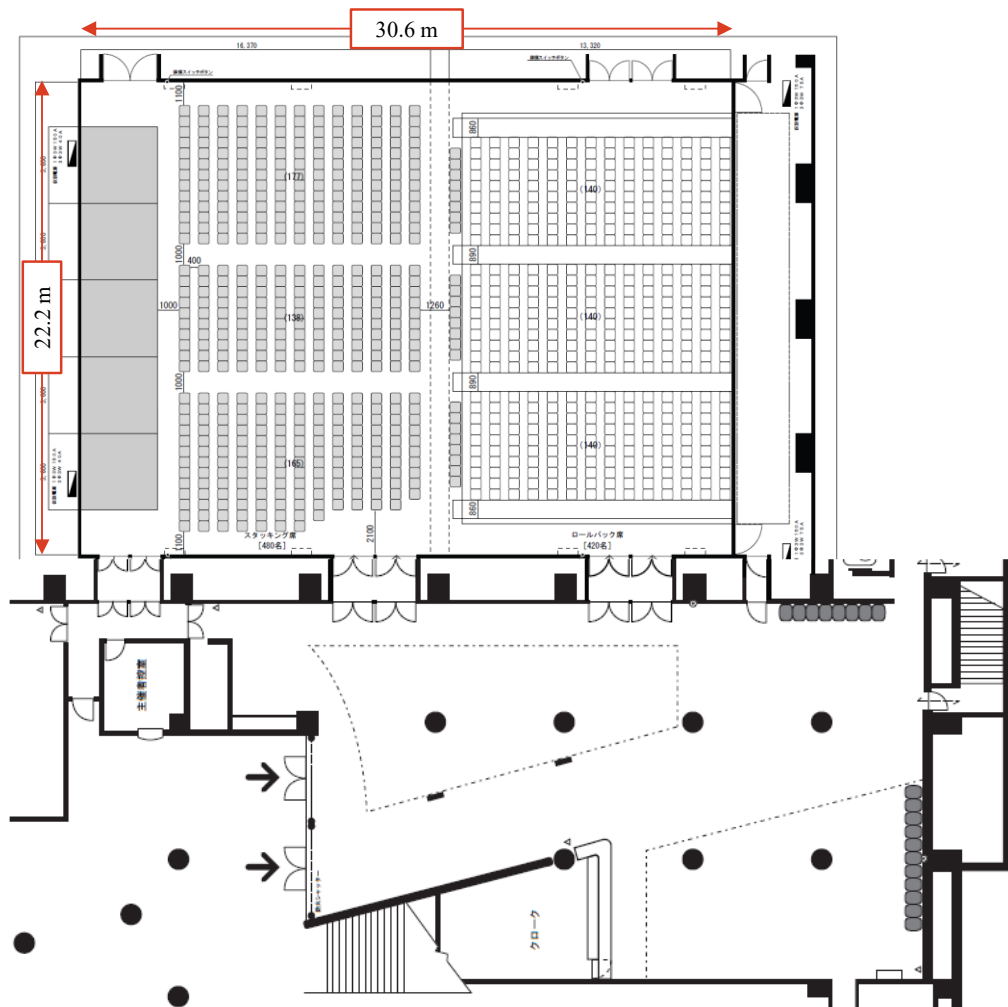


Fig.1 Floor map for measurements.

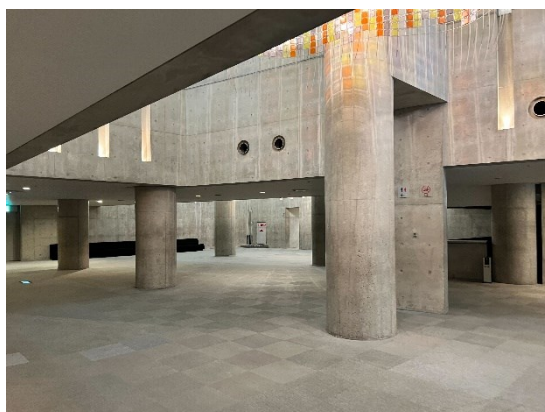


Fig.2 Photo of the floor

TABLE I. The transmitter and receiver

Transmitter	
Wireless interface	IEEE802.11ac
Frequency	5.2 GHz (W52)
Bandwidth	20 MHz
Transmit power	18 dBm
Antenna gain	4 dBi
Antenna directivity	Omni-directional
Receiver	
Product name	iPhone SE (3rd generation)