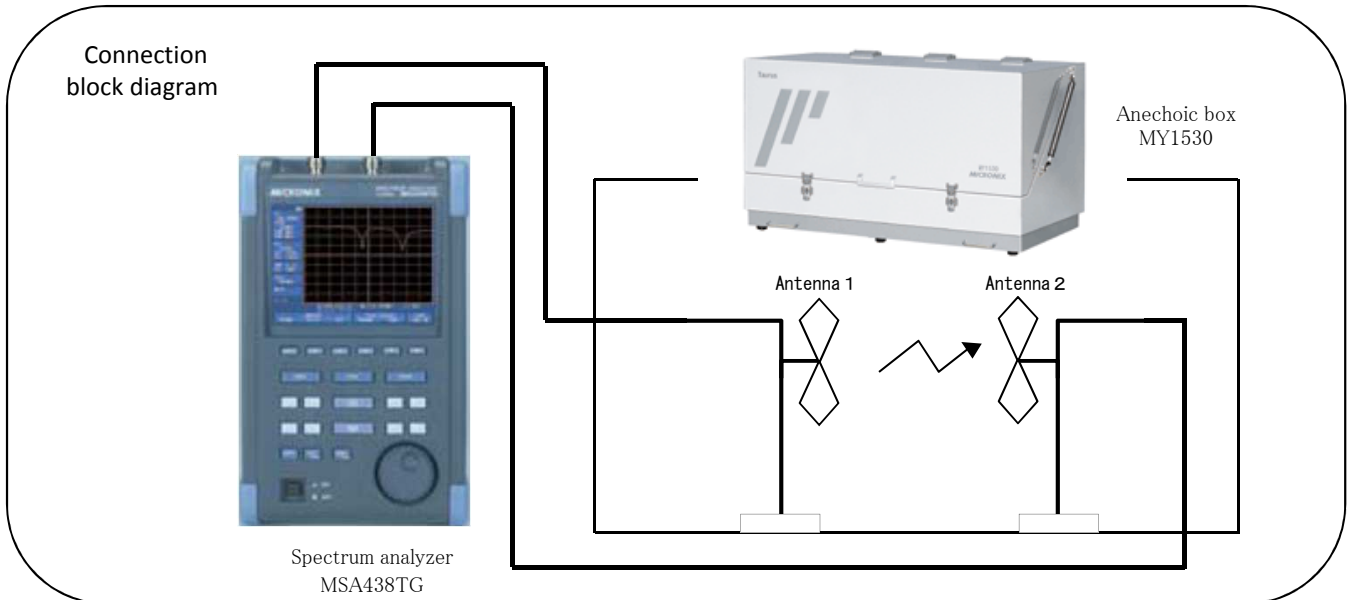


Antenna gain measurement using a tracking generator

◇ Antenna gain characteristic is easily measured using spectrum analyzer with tracking generator.

Application



Solution

■ The anechoic room and calibrated standard antenna are usually required in order to measure the antenna gain. However, it can be easily measured using the anechoic box and MSA438TG. The measurement procedure is as follows.

- 1) Place the two antennas to be tested with a certain distance in the anechoic box.
- 2) Set the center frequency and span of the spectrum analyzer to a band to be observed.
- 3) The output of tracking generator and RF input of the spectrum analyzer are directly connected using a coaxial cable in the anechoic box, and then the frequency characteristics of the system is normalized using the function of spectrum analyzer.
- 4) Connect the output of tracking generator to Antenna 1.
- 5) Connect the RF input of spectrum analyzer to Antenna 2.
- 6) Start the measurement.

■ Antenna gain can be calculated by the following equation.

$$\text{Antenna gain [dB]} = [\text{measured level} + \text{space loss}] / 2$$

■ Space loss can be calculated by the following equation.

$$\text{Space loss [dB]} = 20 \times \text{LOG} [4 \pi D / \lambda]$$

[But, D: distance between antennas (m), λ : wavelength (m)]

•Refer to a technical report "Near field and far field".

•When the antenna interval is 50cm in MY1530, the practical measurement frequency range is from 600 MHz to 3.3 GHz.

System configuration

■ This system is an inexpensive tool by which the antenna characteristics can be easily measured.

Spectrum analyzer [MSA438TG]	×1
MSA438 calibration set	×1
Anechoic box [MY1530]	×1
SMA cable (3m) [MC202]	×2

•With the addition of VSWR bridge MVS300B, the return loss measurement is possible.