

Antenna gain measurement by standard antenna method

◇Introducing the antenna gain measurement method by the standard antenna method using the radio anechoic box and spectrum analyzer.

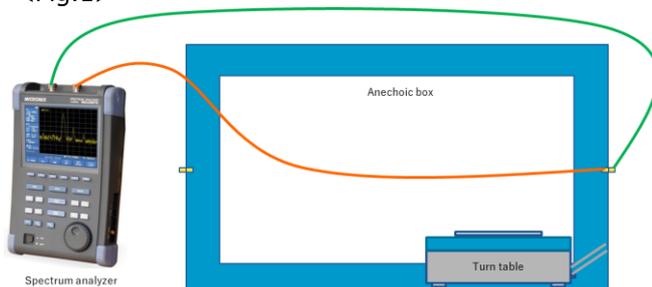
[~*Application*~]

Evaluating antenna gain usually requires a calibrated standard antenna or anechoic chamber, but it can be simply evaluated using a spectrum analyzer with a tracking generator and a radio anechoic box.

- Obtain the EUT gain by comparing it with the reference antenna (antenna with a known gain).
- As for the measurement environment, the measurement is performed in the anechoic chamber (anechoic box) as in the case of radiation pattern measurement.
- Mainly, dipoles and log periodic antennas are used in the MHz band, and horn antennas are used in the GHz band.

[~*Solution*~]

<Fig.1>



<Measurement procedure>

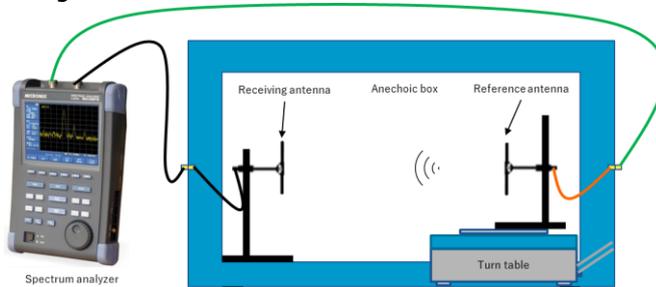
- 1) Set the spectrum analyzer center frequency and span according to the band you want to measure.
- 2) The tracking generator output is measured at the reference antenna end. [Fig.1] The result is "A (dBm)"
- 3) Prepare a receiving antenna and a reference antenna (Tx), and install them in the anechoic box at a certain distance.
- 4) Close the door of the anechoic box and perform the measurement. [Fig.2] The result is "X (dBm)".
- 5) Take out the reference antenna (Tx) and install the EUT in the same position.
- 6) Close the door of the anechoic box and perform the measurement. [Fig.3]
- 7) If you do not know the maximum radiation direction of the EUT, rotate the turn table and look for the peak gain. The result is "Y (dBm)".
- 8) Calculate EIRP EUT (dBm) from the following formula.

$$\text{EIRP}_{\text{Tx}}(\text{dBm}) = A(\text{dBm}) + \text{Gain}_{\text{Tx}}(\text{dBi})$$

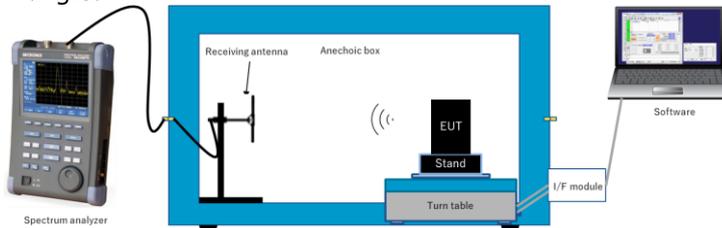
$$\text{EIRP}_{\text{EUT}}(\text{dBm}) = Y(\text{dBm}) - X(\text{dBm}) + \text{EIRP}_{\text{Tx}}(\text{dBm})$$
- 9) Obtain the EUT gain from the following formula.

$$\text{Gain}_{\text{EUT}}(\text{dBi}) = \text{EIRP}_{\text{EUT}}(\text{dBm}) - \text{EUT transmit power}(\text{dBm})$$

<Fig.2>



<Fig.3>



- ※ EIRP : Equivalent Isotropically Radiated Power
- ※ If the EUT transmission power and gain cannot be separated, such as when the EUT antenna is integrated, EIRP will be the final result.

[~*System constitution & Price*~]

- Anechoic box (With manual or electric turntable)
- Antenna (standard and reception)
- Spectrum analyzer (With tracking generator)
- Others, cable stands and various options

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The configuration changes depending on the frequency, EUT size, etc. Please feel free to contact our sales staff for product details.