Sercomm Internal Antenna
Preliminary Product Datasheet

For Model TG-1682

SERRCON P/N：617210BM

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Revision History

REV.	Date	Description	Mark
REV 1.1	2013/07/10	Initial Release	

Contents

Disclaimers

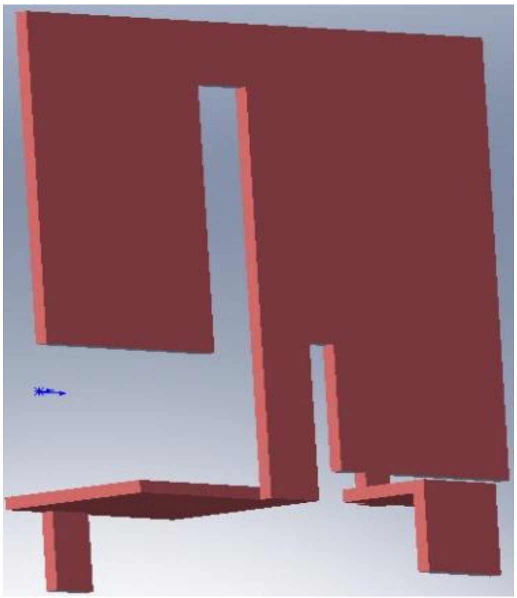
1. For Model TG-1682 internal Antenna

Based on Sercomm's antenna technology, the Model TG-1682 Internal Antenna provides a high efficiency antenna solution for ISM band applications, such as WLAN products. The internal antenna provides the flexibility of an embedded antenna with top performance which can be easily integrated into an ID package design.

2. Feature

For Model TG-1682 Internal Antenna is defined by the following features:

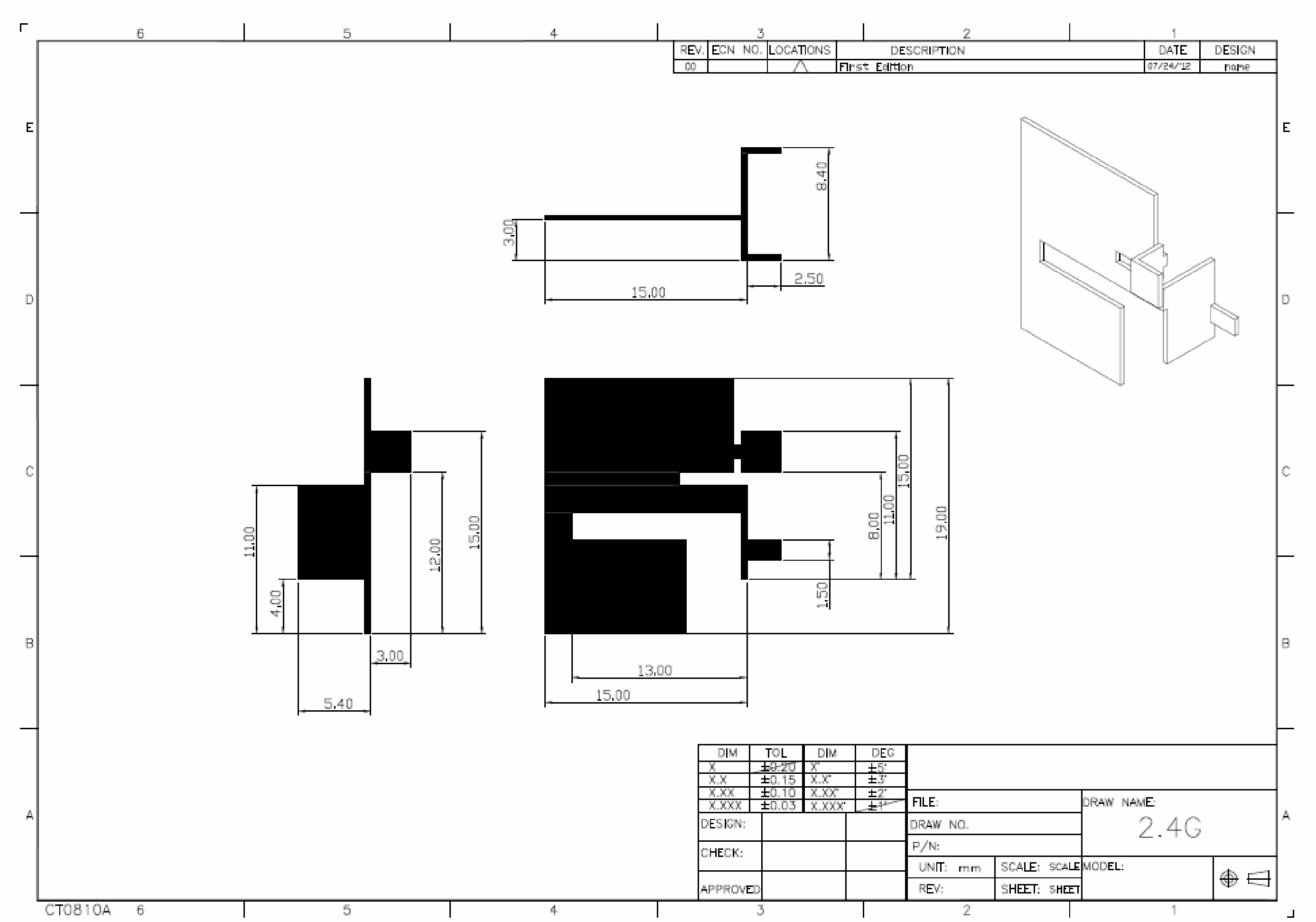
- WLAN applications
- Case mount
- 3.2dBi peak gain @2.4~2.5GHz
- High efficiency
- Quick integration



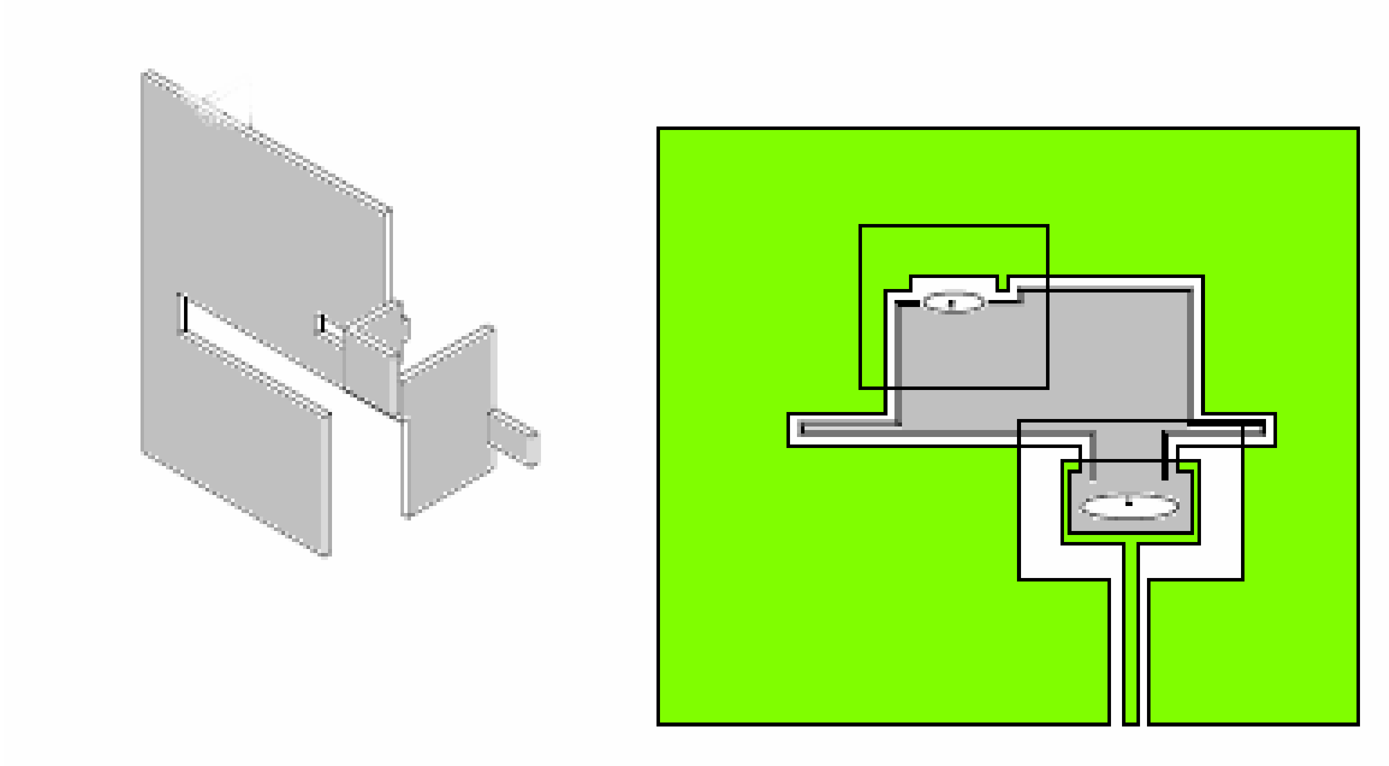
3. Antenna Specifications

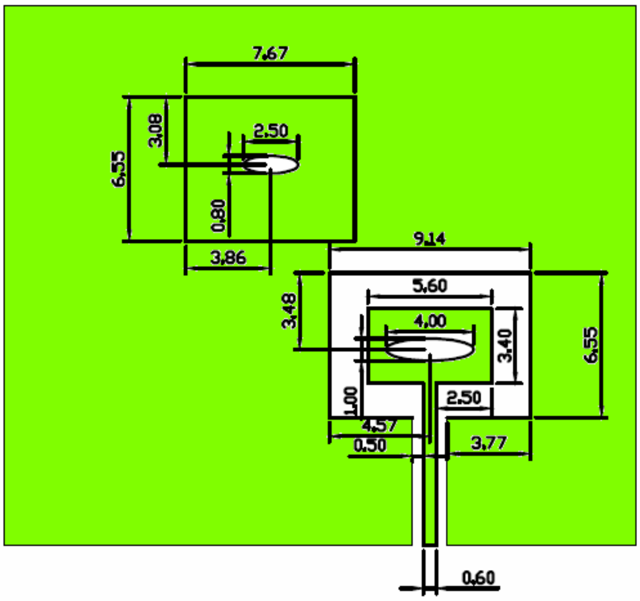
Standard	WLAN 802.11 b/g/n
Frequency Range	2.4 to2.5GHz ,
Peak Gain	3.2dBi @ 2.4GHz,
VSWR	2.0:1
Feed Impedance	50 Ohms
Power Handling	30 dBm
Interface	50 ohm, 1.13mm diameter, micro coax cable (available with optional U.FL compatible cable connector and/or cable mounted EMI ferrites)
Antenna Dimensions	19.0 x 8.9 x 17.5 (mm)
Weight	1.3g
Temperature Range	Operating : -40° C to +75° C (-40° F to +167° F) Storage: -40° C to +85° C (-40° F to +185° F)
Humidity Range	0% to 95% non-condensing

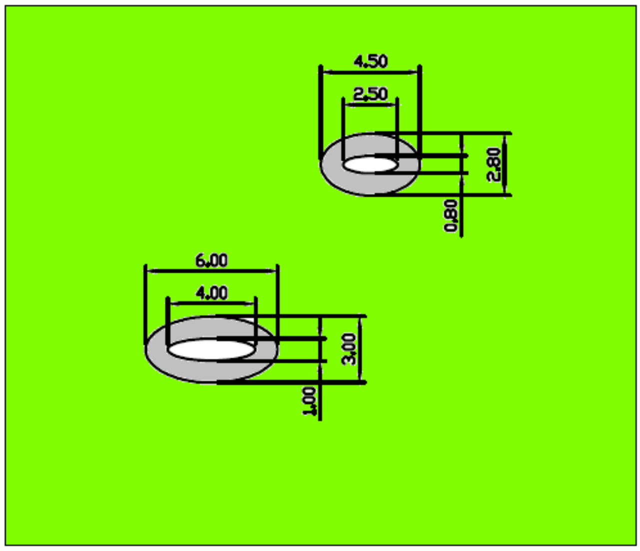
4. Product Drawing



5. Layout Guide & Footprint







(TOP)

(BOTTOM)

6. Performance Test Report

6.1 Return Loss

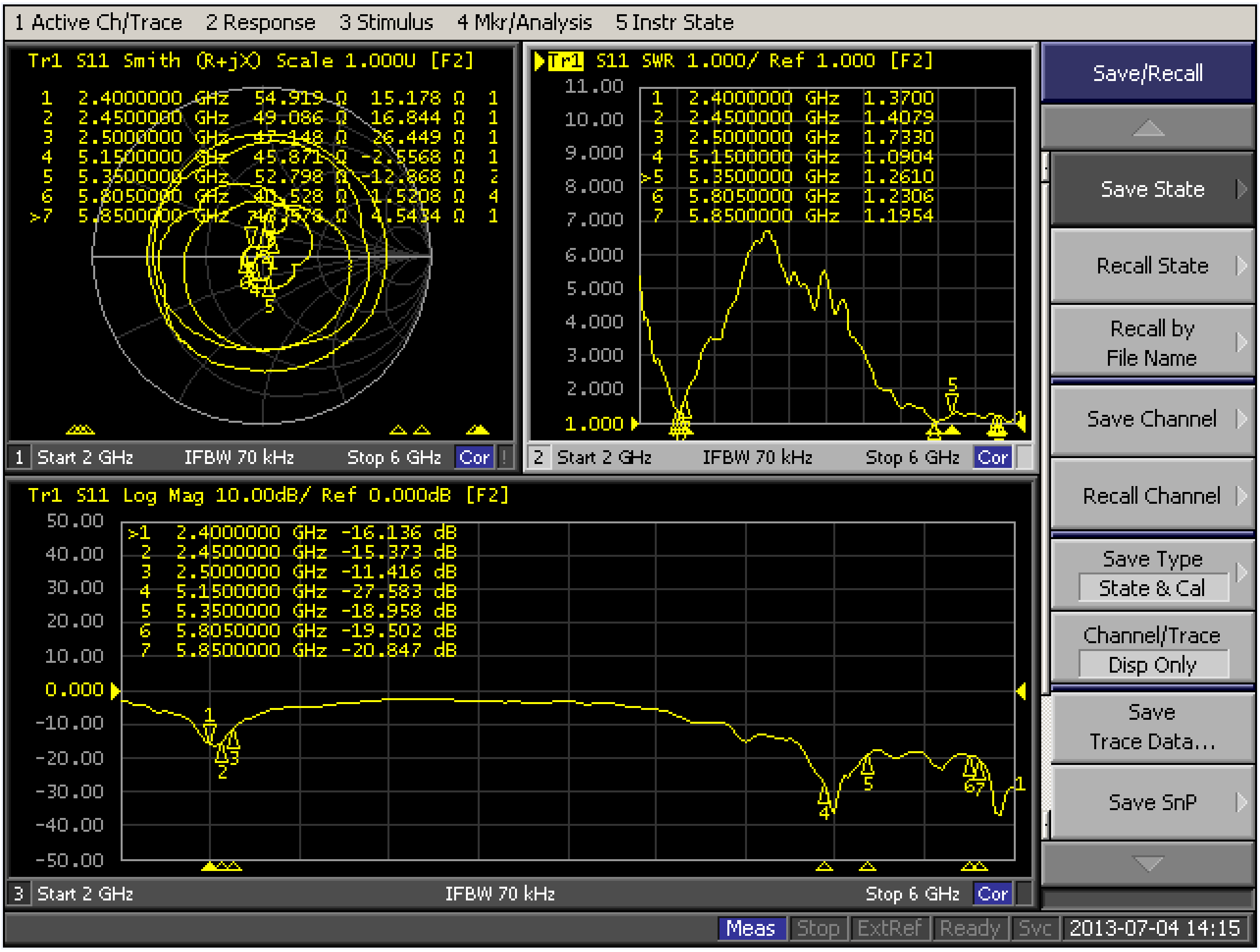
In tel)ommunications, **return loss** or **reflection loss** is the loss of signal power resulting from the reflection caused at a discontinuity in a transmission line. This discontinuity can be a mismatch with the terminating load or with a device inserted in the line. It is usually expressed as a ratio in decibels (dB);

$$RL(\mathrm{dB}) = 10\log_{10}\frac{P_\mathrm{i}}{P_\mathrm{r}}$$

where $\boldsymbol{RL}$**(dB)** is the return loss in **dB**, $\boldsymbol{P}_\mathrm{i}$ is the incident power and $\boldsymbol{P}_\mathrm{r}$ is the reflected power.

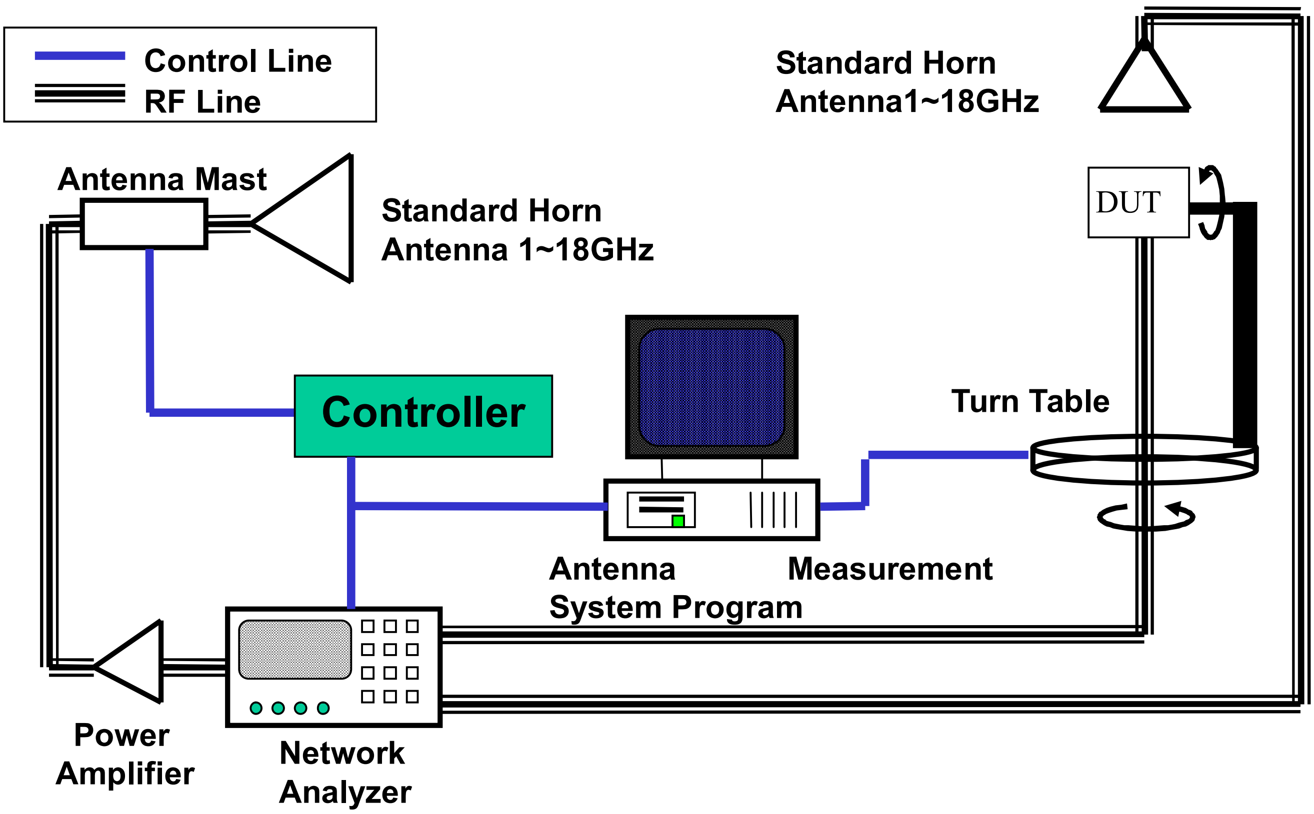
Two lines or devices are well matched if the return loss is high. A high return loss is therefore desirable as it results in a lower insertion loss. Return loss may be given a minus sign.

The smaller of antenna RL is, it means the more of antenna power radiated.

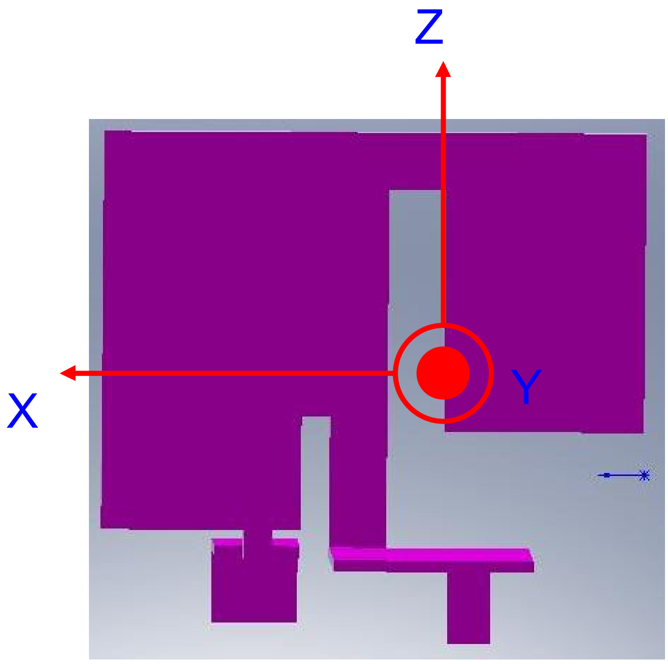


6.2 Antenna Pattern & Efficiency

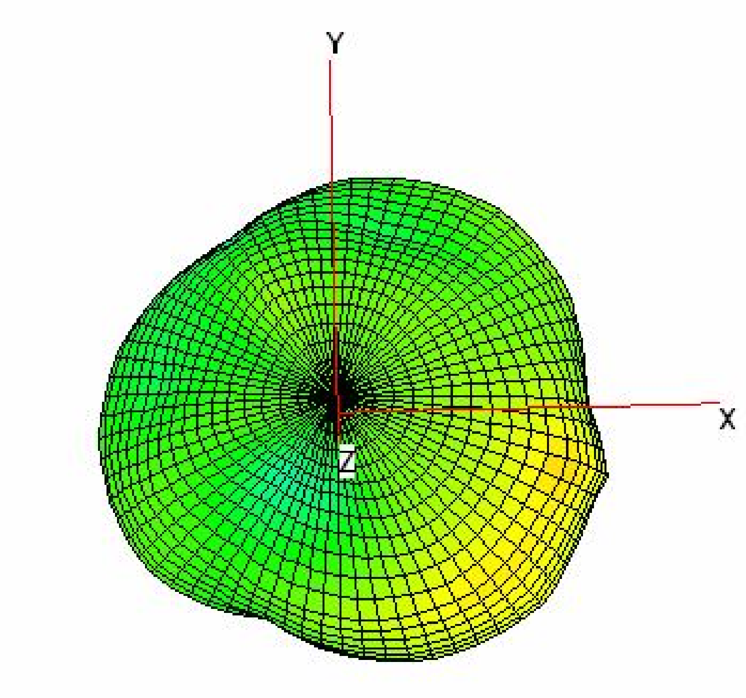
Test Environment: 3D Anechoic Chamber



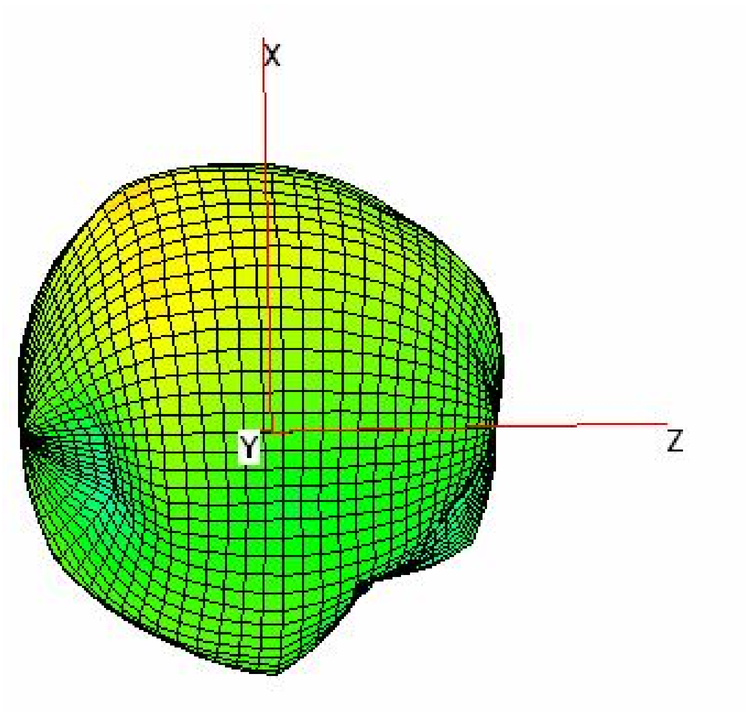
The measurement antenna plane definition and result as below:



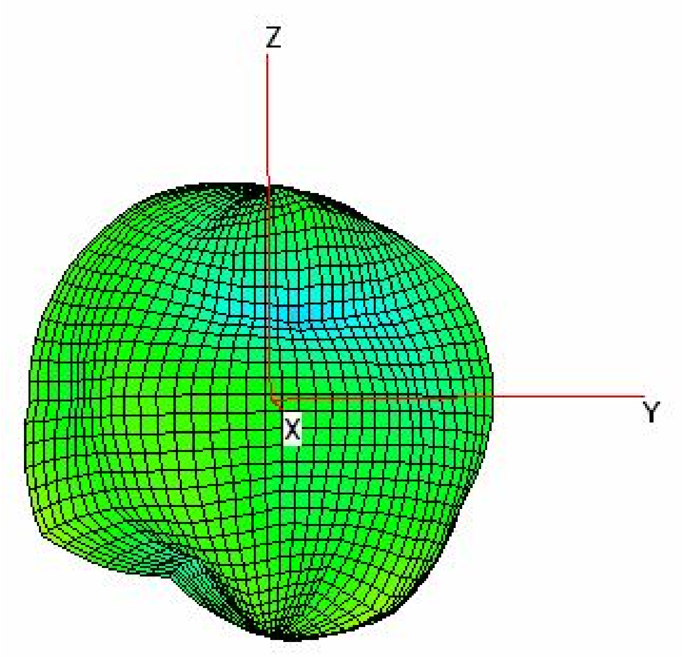
X-Y Pattern



X-Z Pattern



Y-Z Pattern



Antenna efficiency depends on three kinds of loss: coil losses (R_c), ground losses (R_g), and other losses (R_o) including ohmic and capacitive losses. The antenna's total resistance (R_t) is the sum of these losses plus the *radiation resistance* (R_r), which is the effective resistance representing emitted RF power:

$$R_{total} = R_{radiation} + R_{coil} + R_{ground} + R_{other}$$

Antenna efficiency is the ratio between its radiation resistance and its total resistance:

$$E_{radiation} = \frac{R_{radiation}}{R_{total}}$$

Antenna efficiency can also be expressed as the ratio between its input power and its radiated power:

$$E_{radiation} = \frac{P_{radiated}}{P_{input}}$$

...again yielding a value between 0.0 (100% loss) and 1.0 (0% loss).

Antenna Efficiency Result

Frequency	Efficiency
2400MHz	73.8 %
2450MHz	72.5 %
2500MHz	73.6 %

Power gain is a measure that combines an antenna's efficiency $E_{antenna}$ and directivity D:

$$G = E_{antenna} \cdot D$$

When considering the power gain for a particular direction given by an elevation (or "altitude") θ and azimuth Φ, then:

$$G(\theta, \phi) = E_{antenna} \cdot D(\theta, \phi)$$

$D(\theta,\Phi)$ is known as the *directive gain*. The directive gain signifies the ratio of radiated power in a given direction relative to that of an isotropic radiator which is radiating the same total power as the antenna in question but uniformly in all directions. Note that a true isotropic radiator does not exist in practice.

The power gain, on the other hand, signifies the ratio of radiated power in a given direction relative to that of an isotropic radiator which is radiating the total amount of *electrical power* received by the antenna in question. This is in contrast to the directive gain which ignores any reduction in efficiency. If only a certain portion of the electrical power received from the transmitter is actually radiated by the antenna (its efficiency) the directive gain compares the power radiated in a given direction to that reduced power, ignoring the inefficiency. By instead comparing the radiated power in a given direction to the actual power that the antenna receives from the transmitter, the power gain takes into account that poorer efficiency, making it a more useful figure of merit for the ability of a transmitter in sending a radio wave toward a receiver.

The *radiation intensity U* expresses the power radiated per solid angle. In terms of U the power gain in a specified direction can be calculated:

$$G = \frac{U}{P_{elec}/4\pi}$$

where P_{elec} signifies the electrical power received by the antenna from the transmitter.

Published figures for **antenna gain** are almost always expressed in decibels (dB), a logarithmic scale. From the gain factor G, one finds the gain in decibels as:

$$G_{dBi} = 10 \cdot \log_{10}(G)$$

Antenna Gain Result

Frequency	Gain
2400MHz	3.1 dBi
2450MHz	3.0 dBi
2500MHz	3.2 dBi