

# Approval Sheet

## Yc-stg-001 pro Antenna

Customer	Zhaofeng Micro	Model Type	Yc-stg-001
YC P/N	<b>014-039-01</b>	Band	2.4g
Color	White	Version	REV:A
Designed and tested by	ANDY	Checked by	JACK
Date		Date	2024-01-03
Confirmed by:			

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# Index

<b>1. Summary.....</b>	<b>3</b>
<b>2. Specificaiton.....</b>	<b>3</b>
<b>2.1 Electrical Specification.....</b>	<b>3</b>
<b>2.2 Matching Circuit Description.....</b>	<b>4</b>
<b>2.3 Structure specification.....</b>	<b>4</b>
<b>2.3.1 Structure.....</b>	<b>5</b>
<b>2.3.2 Test requirement .....</b>	<b>5</b>
<b>3. Measurement Data .....</b>	<b>5</b>
<b>3.1 Passive test result .....</b>	<b>5</b>
<b>3.1.1 Test Set-up .....</b>	<b>5</b>
<b>3.1.2 VSWR.....</b>	<b>5</b>
<b>3.1.3 Gain &amp; Radiation Patterns .....</b>	<b>6</b>
<b>3.1.4 Efficiency.....</b>	<b>6</b>

## 1、 Summary

This report summarizes the electrical performance results of the proposed Internal antenna to support Yc-stg-001pro program. The antenna is 2.4G band PIFA . (see Figure1).



Figure 1: Proposed Antenna

## 2、 Specification

### 2.1 Electrical Specification

The specification is based on the design result. The following table indicates the electrical performance of yc-stg-001 gram.

Product testing parameters			
(Name)	Copper tube antenna	(Model Type)	YC-stg-001
(Electrical Specifications)			
(Frenquency Range)	2400-2500MHZ	(Polarization)	vertical
(Impedance)	50 $\Omega$	Radiation direction	Omni directional
(VSWR)	1.5	(Power)	50W
(Gain)	3.18DB	(Bandwidth	136/980MHz

## 2.2 Matching Circuit Description

A matching circuit is designed to provide the required impedance match across the bands. The matching circuit of yc-stg-001 pro is supplied by our client.

## 2.3 Structure specification

### 2.3.1 Structure

The antenna of yc-stg-001 pro program is composed by a plastic support.

### 2.3.2 Test requirement

The structure and environmental testing is used to confirm that if the antenna performance is destroyed or affected after testing.

ITEM	Test Requirement	Acceptable criterion
1. Low Temperature	Temperature: $-20^{\circ}\text{C}$ Time: 24 hours	1.No visible damage 2.The electrical performance can reach the electrical specification
2. High Temperature	Temperature: $80^{\circ}\text{C}$ Time: 24 hours	1.No visible damage 2.The electrical performance can reach the electrical specification
3.Salt fog testing	$5\pm 0.1\%$ nad salt fog PH value: 6.5-7.0 Temperature; $35\pm 1\%$ Time: 24 hours	1. No obvious color change 2. No rust on the metal 3. The appearance of the antenna doesn't flake off

## 3. Measurement Data

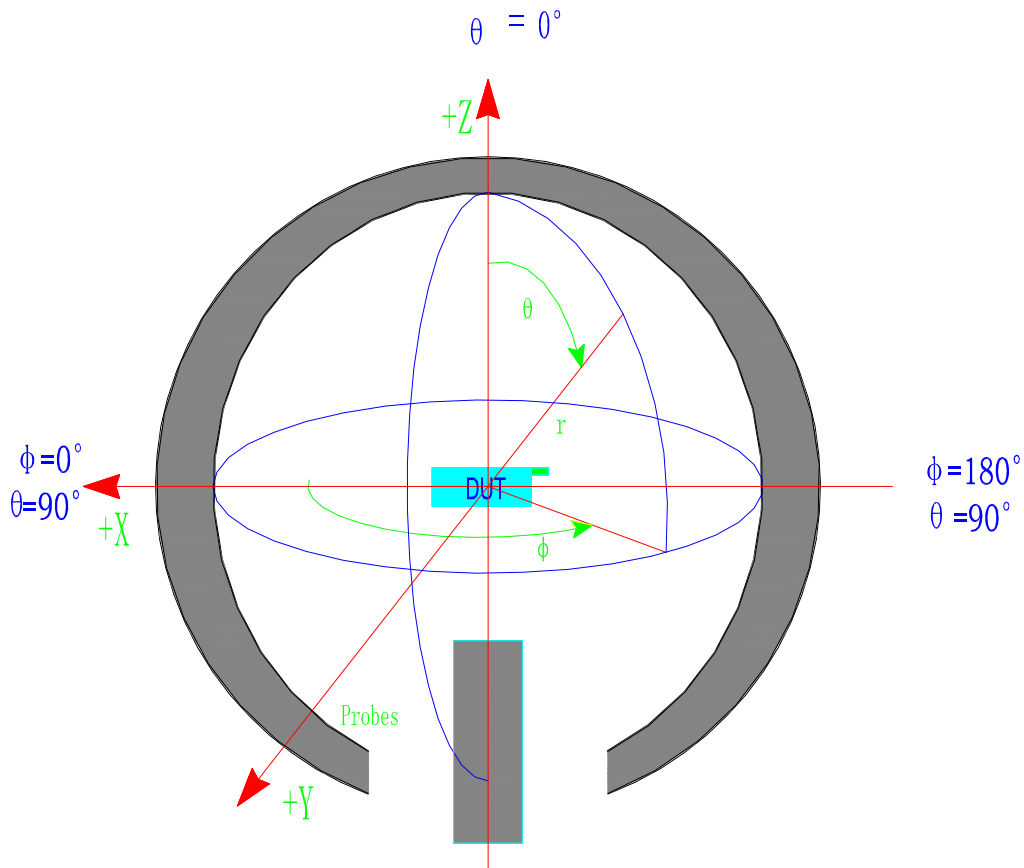
### 3.1 VSWR

VSWR measurements ( $S_{11}$ ) are performed using Agilent 5071B Network Analyzer and the previously described test fixture. A ferrite-loaded coaxial cable is used to mitigate surface currents on the outside of the cabling. The testing was performed in free space. The following chart shows the VSWR of the antenna of Yc-stg-001 pro program.



### 3.1.3 Gain & Radiation Patterns

The gain and efficiency of the antenna are measured in the Welletronics' anechoic chamber. The chamber provides less than  $-40$  dB reflectivity from 800 MHz through 6 GHz and a 40cm diameter spherical quiet zone. The measurement results are calibrated using both dipole and leaky wave horn standards.

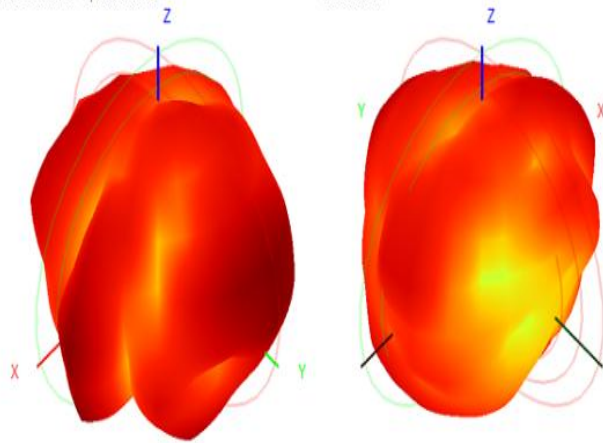


Structure of CTIA approved Satimo SG24 system

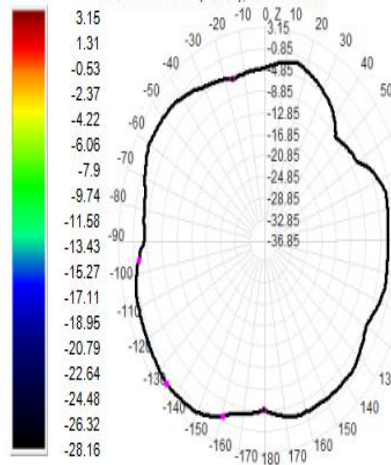
Gain indicates the passive performance of the antenna. The following chart shows the peak gain and average gain of the Yc-stg-001 pro antenna.

2400.0MHz H+V, Eff: 60.7%

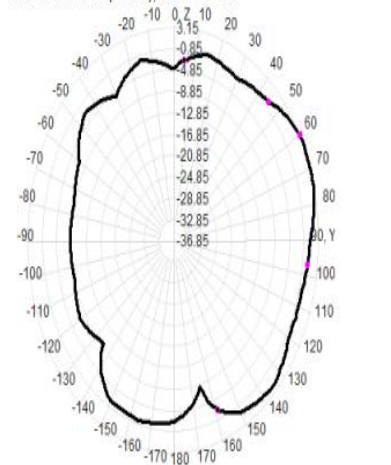
Back View



2400.0MHz Total(E1-XZ), Max= 0.91dBi

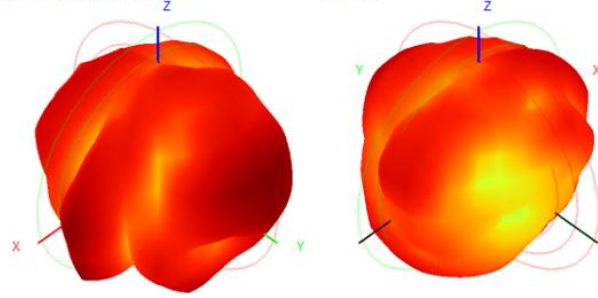


2400.0MHz Total(E2-YZ), Max= 3.15dBi

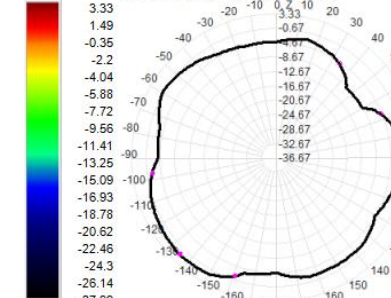


2415.0MHz H+V, Eff: 60.9%

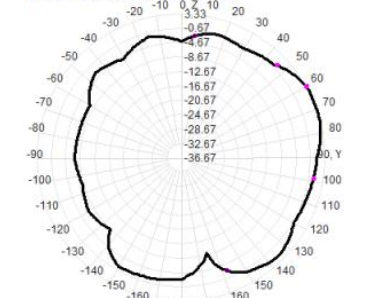
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2415.0MHz Total(E1-XZ), Max= 0.97dBi



2415.0MHz Total(E2-YZ), Max= 3.33dBi



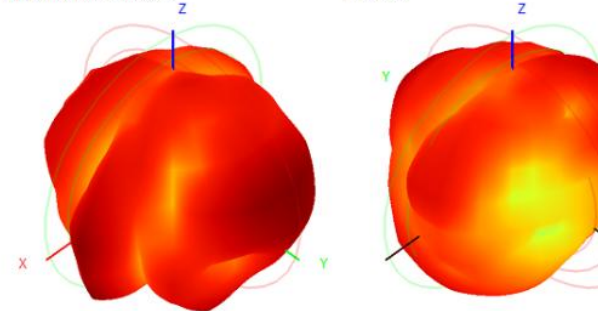
-27.99

-170 180 170

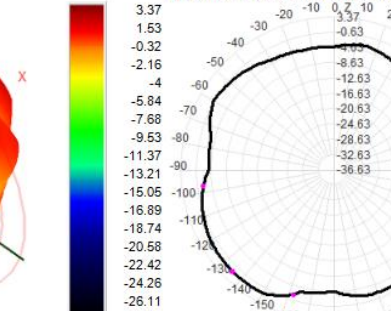
-170 180 170

2420.0MHz H+V, Eff: 60.2%

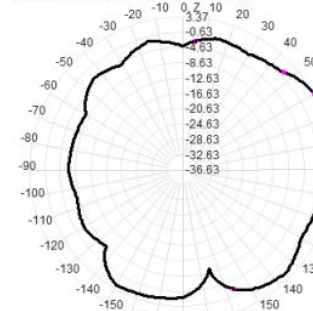
Back View



2420.0MHz Total(E1-XZ), Max= 0.83dBi



2420.0MHz Total(E2-YZ), Max= 3.37dBi



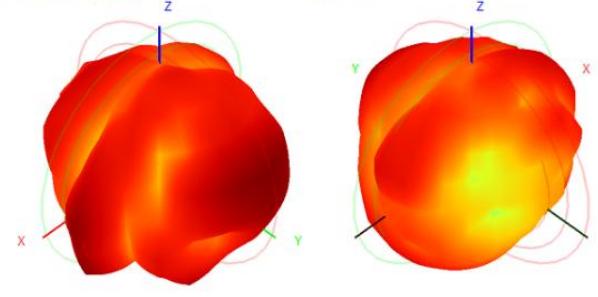
-27.93

-160 -170 180 170

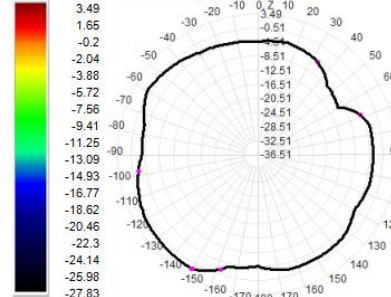
-160 -170 180 170

2430.0MHz H+V, Eff: 60.0%

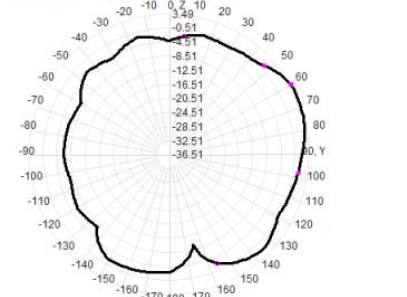
Back View



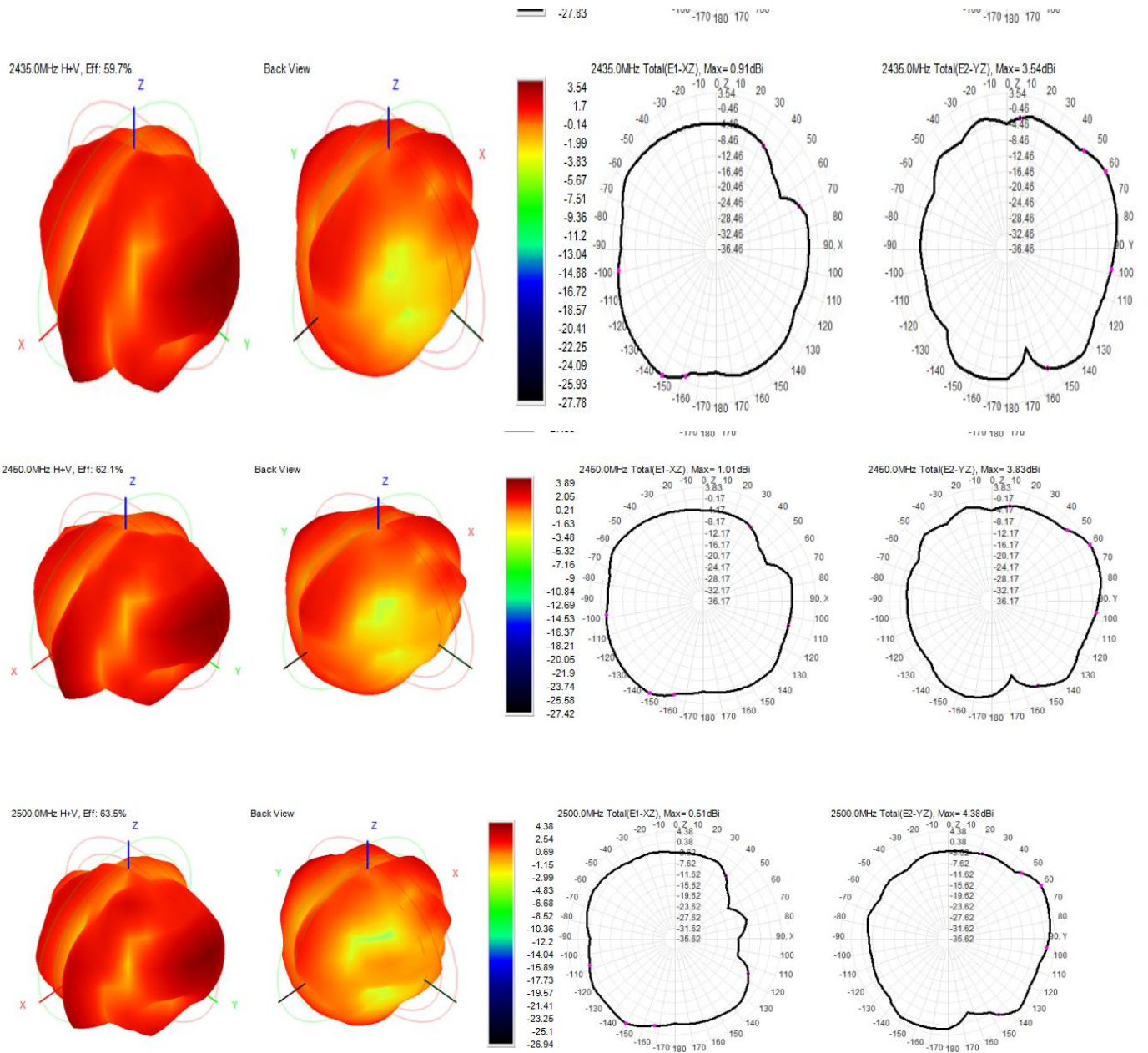
2430.0MHz Total(E1-XZ), Max= 0.85dBi



2430.0MHz Total(E2-YZ), Max= 3.49dBi









### 3.1.4 Efficiency

Efficiency shows the radiation capability of the antenna designed by WELLETRONICS.

The following chart indicates the efficiency Yc-stg-001 pro antenna.

Frequency ID	161	162	163	164	165	166	167	168	169	170	171
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Efficiency (dBi)	-2.24	-2.20	-2.14	-2.18	-2.18	-2.11	-2.10	-2.07	-2.08	-2.06	-2.00
Gain (dBi)	3.15	3.14	3.16	3.18	3.16	3.17	3.15	3.17	3.16	3.17	3.15
Efficiency (%)	59.71	60.32	61.09	60.48	60.52	61.48	61.67	62.14	61.93	62.28	63.10
Directivity (dB)	7.47	7.39	7.34	7.32	7.30	7.28	7.26	7.24	7.20	7.04	6.84
Peak Gain Position (Theta)	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Peak Gain Position (Phi)	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
Efficiency ThetaPol (%)	23.59	23.61	24.02	23.74	23.44	23.55	23.22	23.23	23.05	23.16	23.62
Efficiency PhiPol (%)	36.13	36.70	37.08	36.74	37.07	37.93	38.44	38.92	38.88	39.12	39.49
Upper Hem. Efficiency (%)	29.56	29.83	30.30	30.05	30.03	30.43	30.49	30.78	30.68	30.78	31.08
Lower Hem. Efficiency (%)	30.16	30.49	30.79	30.43	30.49	31.05	31.17	31.36	31.26	31.50	32.02