

MAGIC-WAND Antenna Performance Report

Designer: caiqin
Date : 2022-08-25
Versions : 2.0



1. Antenna condition

please refer to the internal photo

- 1, The antenna is located at the bottom to avoid the influence of hand holding
- 2, The middle part is a battery, and the hand holding part has no antenna space
- 3, There are LED lights, buttons, motors and sensor on the top of PCB, without antenna space.



2. Pattern size & matching circuit

please refer to operation description.



3. Test sample photo

please refer to the external photo and setup photo



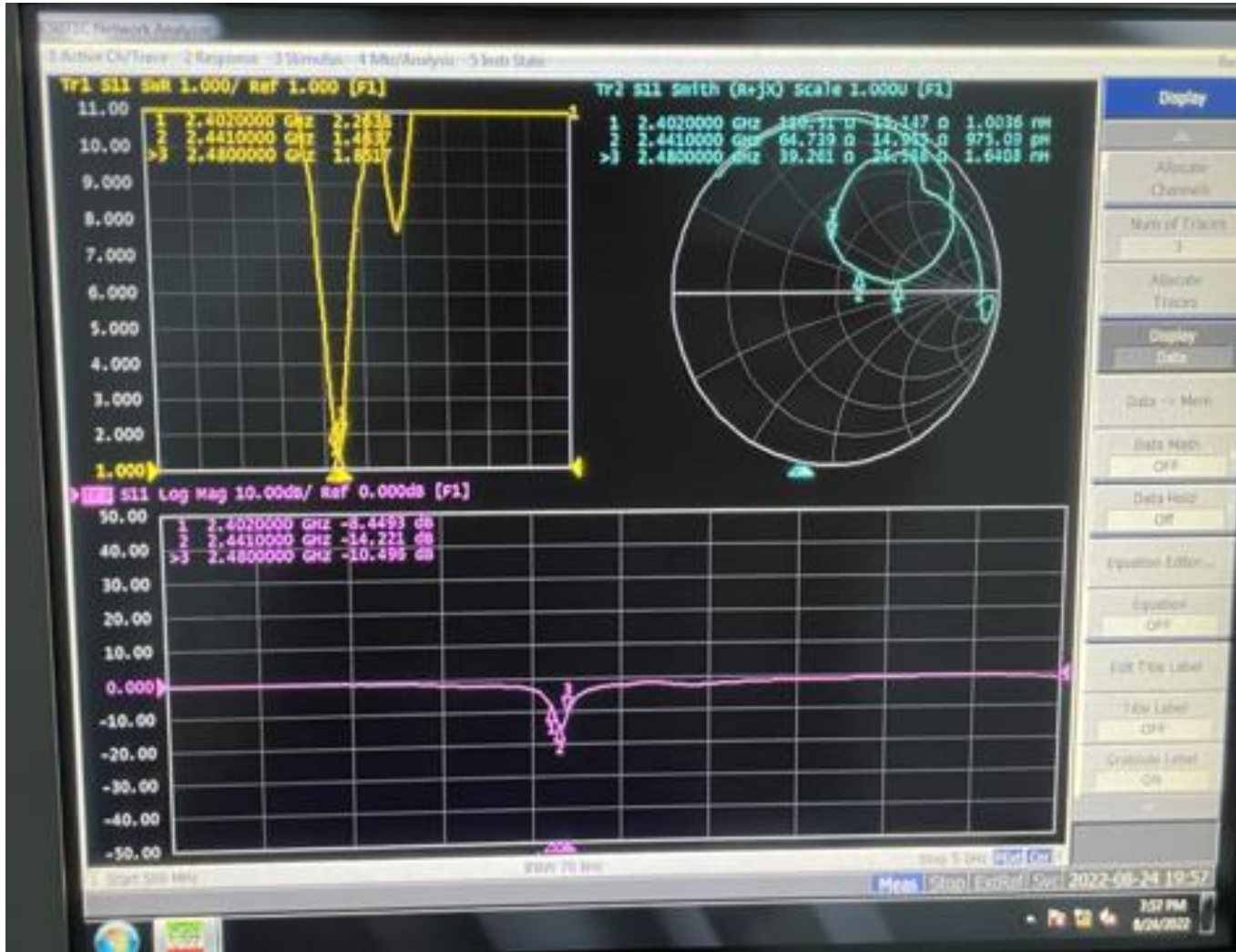
4. Test device and steps

| | |
|---------------|--|
| Test device | Network analyzer |
| Manufacturers | Agilent |
| Model | E5071C |
| Serial NO | MY46630767 |
| Last Cal | 2022.4.28 |
| test lab | Tonly OTA lab |
| Lab address | Huizhou City, Guangdong Province Tonly company |

| Name | Parameter | Method | Standard no. |
|------------------------------|----------------------|--|------------------------|
| Mobile communication antenna | VSWR | Generic specification for antennas used in the mobile communications | GB/T 9410-2008 |
| | Antenna gain | | |
| | Radiation pattern | | |
| Antenna performance | Radiation efficiency | IEEE Standard Test Procedures for Antennas | ANSI/IEEE Std 149-1979 |



3. S11 result



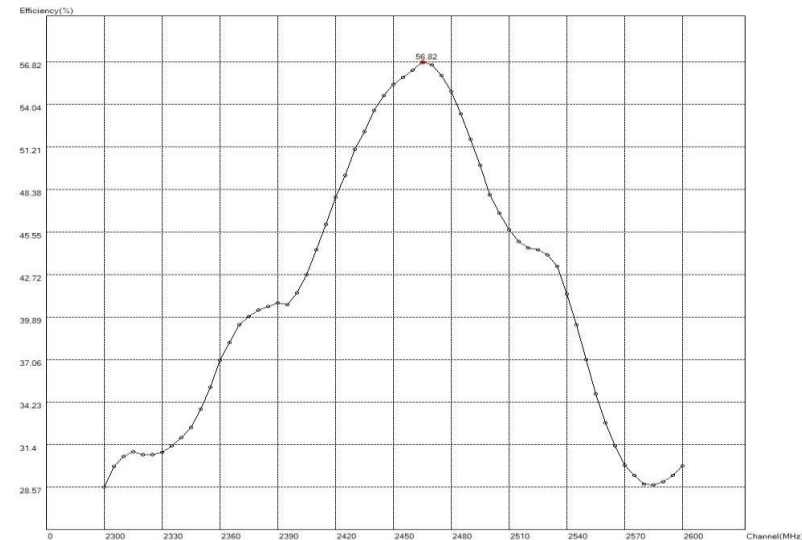
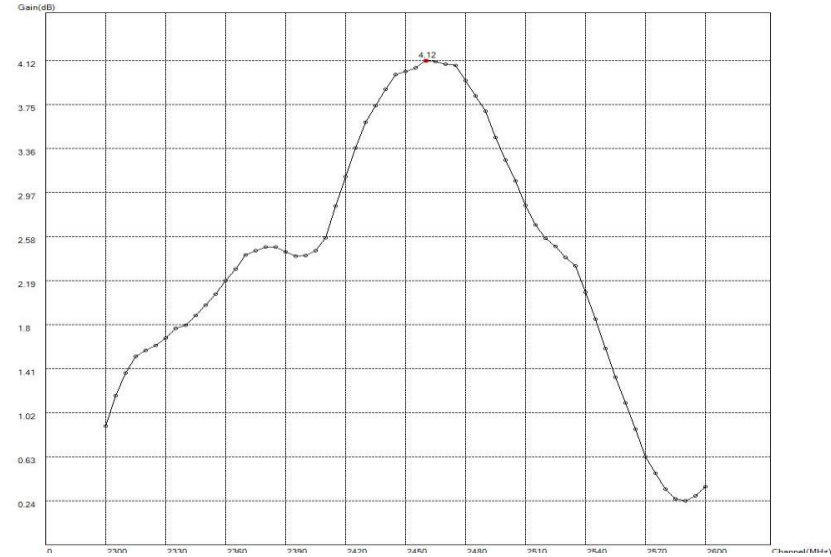
| fre | 2402MHz | 2441MHz | 2480MHz |
|------|---------|---------|---------|
| VSWR | 2.26 | 1.48 | 1.85 |

S11 is ok!



4. Efficiency & Gain

| Freq(MHz) | Gain(dBi) | Efficiency(dB) | Efficiency(%) |
|-----------|-------------|----------------|---------------|
| 2400 | 2.402072217 | -3.822502386 | 41.47150168 |
| 2405 | 2.447779326 | -3.695168472 | 42.70543528 |
| 2410 | 2.561158575 | -3.53291649 | 44.33108401 |
| 2415 | 2.83799592 | -3.368534177 | 46.04119448 |
| 2420 | 3.101579647 | -3.201366886 | 47.84794733 |
| 2425 | 3.353080159 | -3.072102177 | 49.29351438 |
| 2430 | 3.578628444 | -2.923326933 | 51.0114075 |
| 2435 | 3.725172991 | -2.822835874 | 52.20551839 |
| 2440 | 3.872177842 | -2.707681661 | 53.60827514 |
| 2445 | 4.000687352 | -2.630418179 | 54.5705313 |
| 2450 | 4.029568433 | -2.569439949 | 55.34214719 |
| 2455 | 4.058369528 | -2.532835053 | 55.81057471 |
| 2460 | 4.124392516 | -2.495800389 | 56.28853702 |
| 2465 | 4.110957632 | -2.454736395 | 56.82328807 |
| 2470 | 4.091467853 | -2.468679828 | 56.64114411 |
| 2475 | 4.07898003 | -2.523388721 | 55.93210032 |
| 2480 | 3.947235799 | -2.608242042 | 54.84989441 |

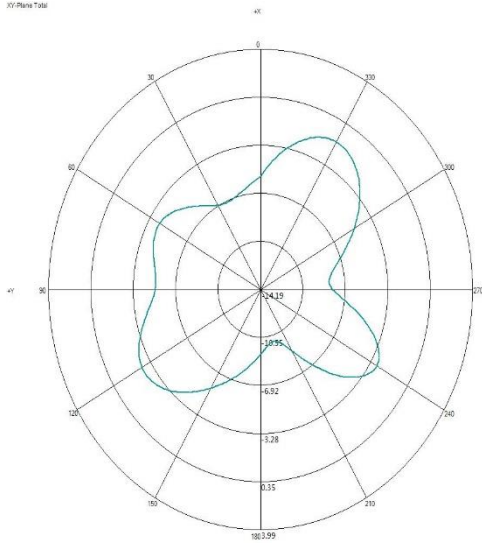


The efficiency is more than 40%

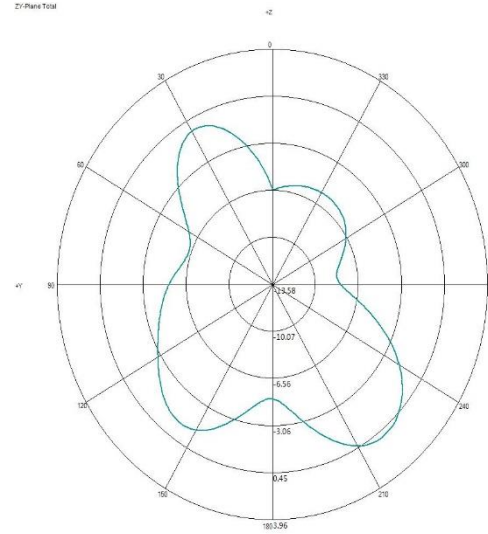


5. Radiation Pattern

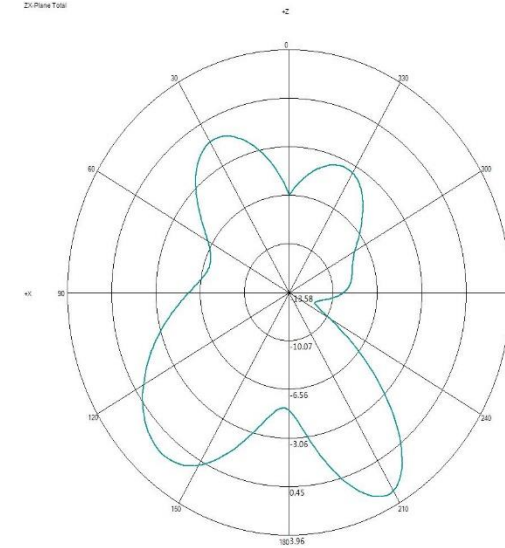
Channel (MHz) 2440
XY-Plane Total



Channel (MHz) 2440
ZY-Plane Total



Channel (MHz) 2440
ZX-Plane Total



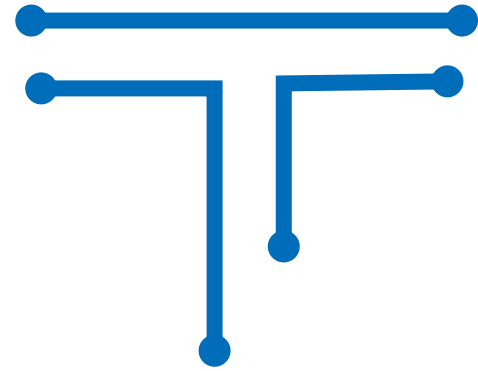
The direction map is relatively uniform without obvious notch, and there is no dead angle during use.



6.Conclusion

- The passive of Antenna is ok





THANKS