



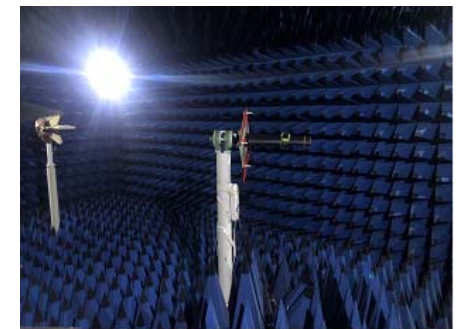
深圳市昱晟通讯设备有限公司  
Yusheng Communications-equipment Co.,LTD

# M80 antenna optimization report

RF: Jiang Mingfei

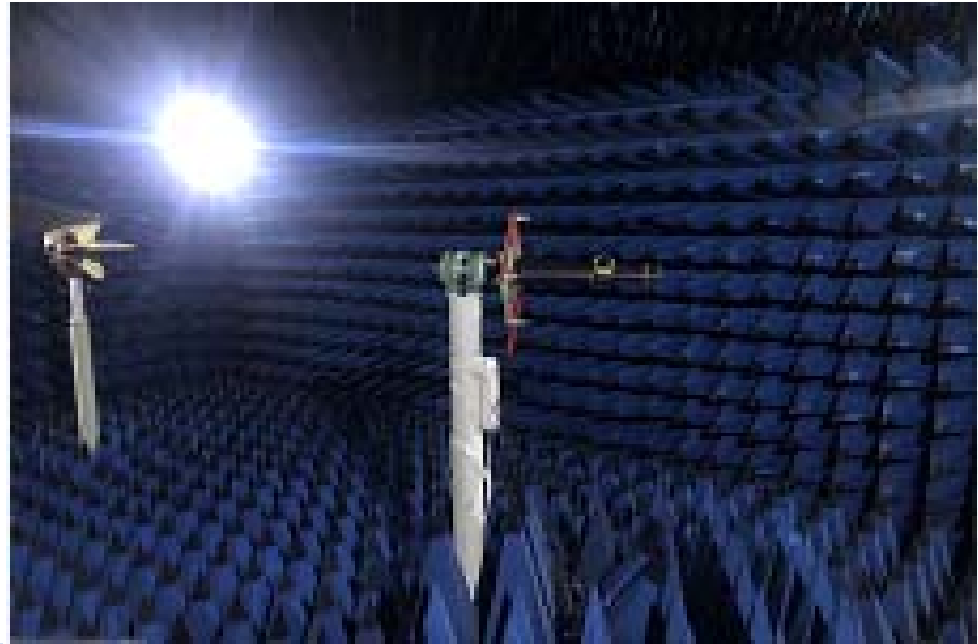
Date: 2024-3-4

Contact information:  
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## Project development environment

We are moving from the Internet era to the intelligent era, and the country is building a digital society and a smart city. In the next 5-10 years, there is a huge development potential in both the consumer electronics market and the Internet of Things market. The field of wireless communication is very diversified. In the future, relying on the customer platform advantages of the main antenna industry, Yusheng will strive to provide customers with professional product solutions with market competitiveness.



Yu Sheng communication products cover almost all wireless terminal equipment antenna applications, including car antenna, high precision surveying antenna, drone ground and satellite data navigation, high precision positioning antenna, medical equipment wireless transmission, consumer antenna (mobile phone antenna, PAD, laptop antenna), base station / indoor distribution antenna, smart wear antenna (smart watches, TWS headphones), security household antenna and a variety of wireless data transmission and wireless control of intelligent equipment antenna, etc.

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Project commissioning brief

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Outline of the report version

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Antenna passive parameter

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Antenna pull distance test

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Antenna matching changes



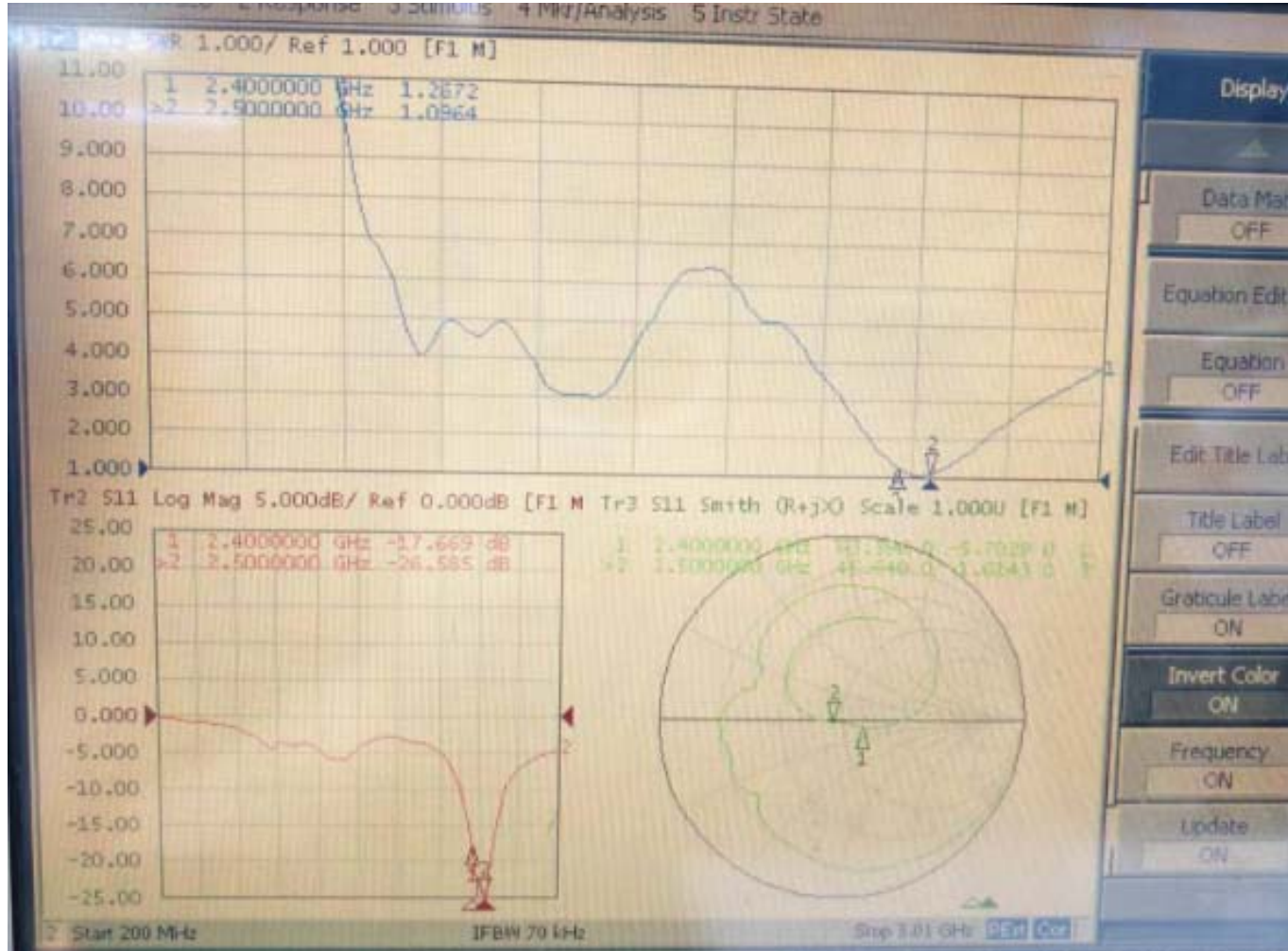
Project  
commissioning brief

|                                        |                                          |                 |              |                             |
|----------------------------------------|------------------------------------------|-----------------|--------------|-----------------------------|
| type                                   | watch                                    |                 |              |                             |
| Frequency band and<br>antenna material | antenna                                  | frequency range |              | material<br>quality         |
|                                        |                                          | BT              | 2400-2500MHZ | Metal medium<br>frame + FPC |
| performance<br>requirement             | According to the customer's requirements |                 |              |                             |



| Report version | Report time | The problem solved by the antenna development |
|----------------|-------------|-----------------------------------------------|
| V0.1           | 2023-12-12  | Antenna preliminary commissioning report      |
| V0.2           | 2023-12-26  | Antenna optimization report                   |
| V0.3           | 2024-3-2    | Increase antenna gain                         |
| V0.4           | 2024-3-4    | Add to the antenna orientation diagram        |

### Antenna passive parameter





Antenna passive  
parameter

No FPC antenna is added

| Test           | free state |       |       |       |       |       |       |       |       |
|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Test Point ID  | 1          | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| Freq.(MHz)     | 2400       | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  |
| Efficiency (%) | 8.5        | 8.7   | 9.1   | 10.7  | 11.4  | 12.7  | 9.8   | 8.7   | 8.3   |
| gain (dBi)     | -3.76      | -3.82 | -3.56 | -3.53 | -3.44 | -3.27 | -3.88 | -4.15 | -4.27 |

| Test           | Arm state |       |       |       |       |       |       |       |       |
|----------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Test Point ID  | 1         | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| Freq.(MHz)     | 2400      | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  |
| Efficiency (%) | 4.1       | 4.3   | 5.1   | 6.7   | 6.5   | 7.3   | 5.1   | 4.5   | 4.2   |
| gain (dBi)     | -7.52     | -6.86 | -6.73 | -6.75 | -7.22 | -6.23 | -6.70 | -6.78 | -6.66 |



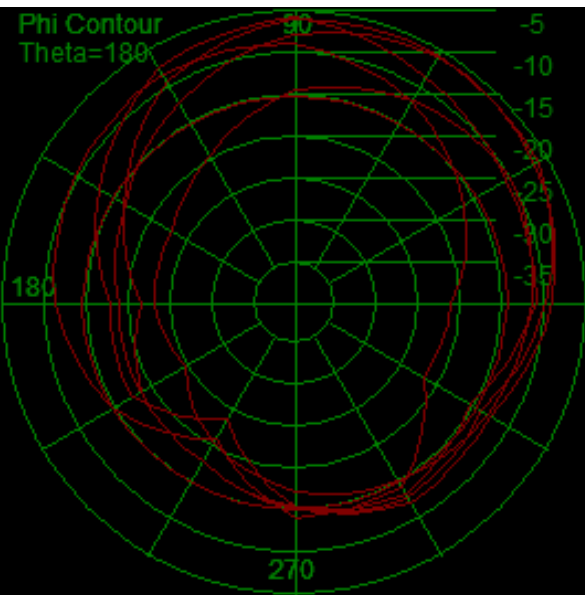
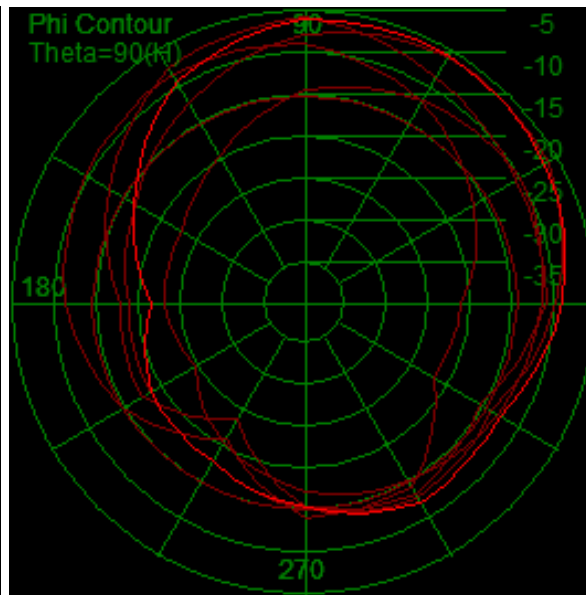
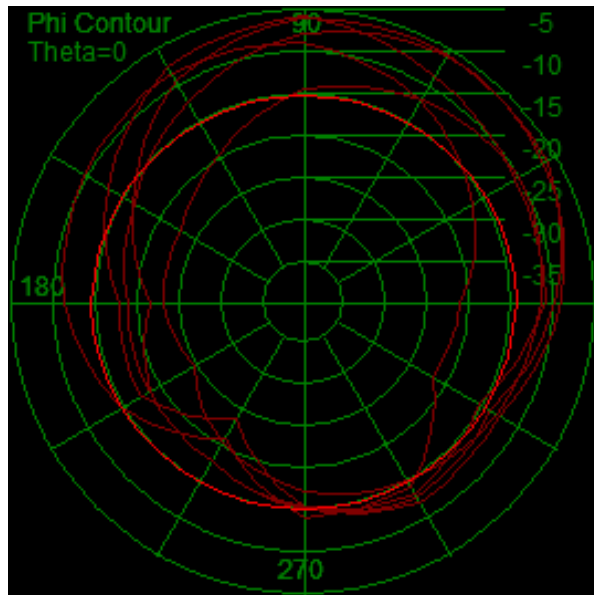
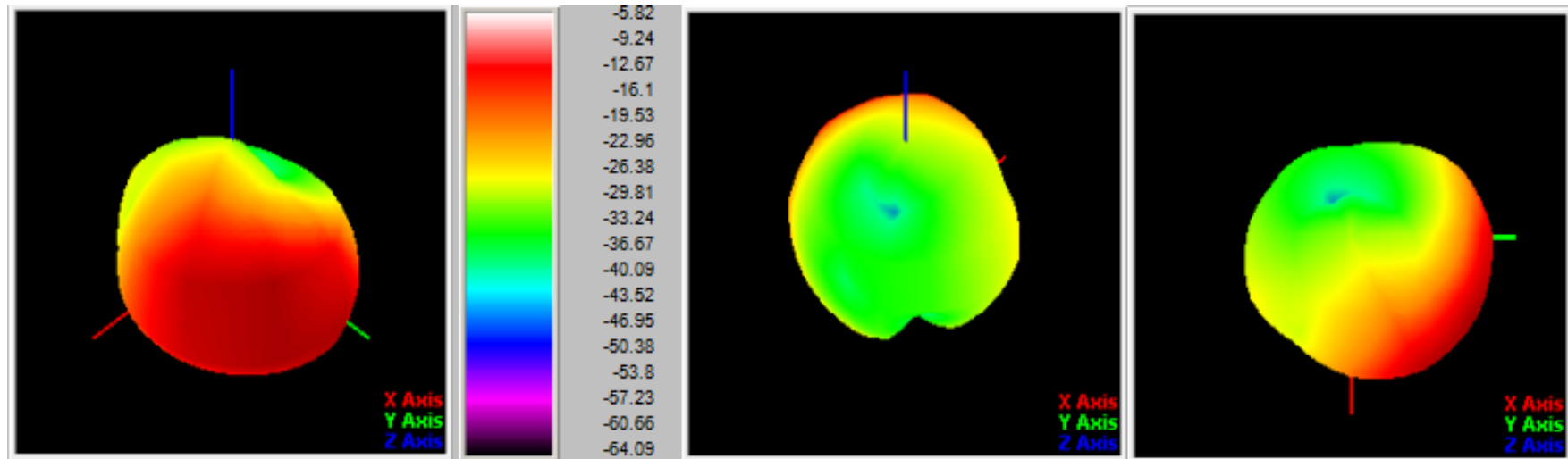
Antenna passive  
parameter

Add to the FPC antenna

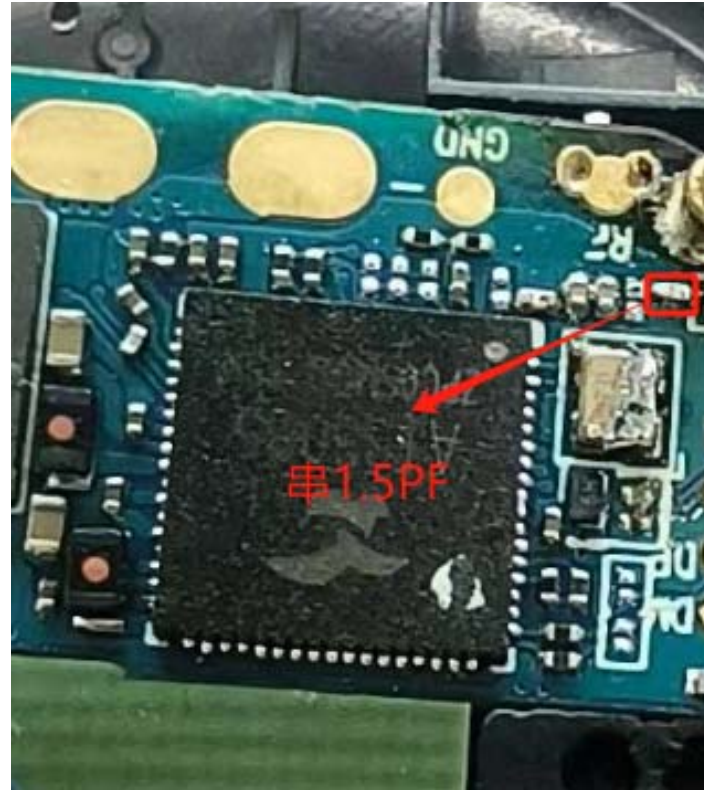
| Test           | free state |       |       |       |       |       |       |       |       |
|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Test Point ID  | 1          | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| Freq.(MHz)     | 2400       | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  |
| Efficiency (%) | 15.4       | 15.2  | 14.7  | 13.9  | 13.7  | 12.5  | 11.7  | 12.1  | 12.4  |
| gain (dBi)     | -2.98      | -3.10 | -3.24 | -3.23 | -3.47 | -3.54 | -3.66 | -3.61 | -3.78 |

| Test           | Arm state |       |       |       |       |       |       |       |       |
|----------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Test Point ID  | 1         | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| Freq.(MHz)     | 2400      | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  |
| Efficiency (%) | 9.4       | 10.2  | 9.1   | 8.7   | 8.3   | 7.4   | 6.5   | 6.8   | 7.1   |
| gain (dBi)     | -6.67     | -6.38 | -6.23 | -6.02 | -5.90 | -5.82 | -6.34 | -6.75 | -6.43 |

### antenna pattern



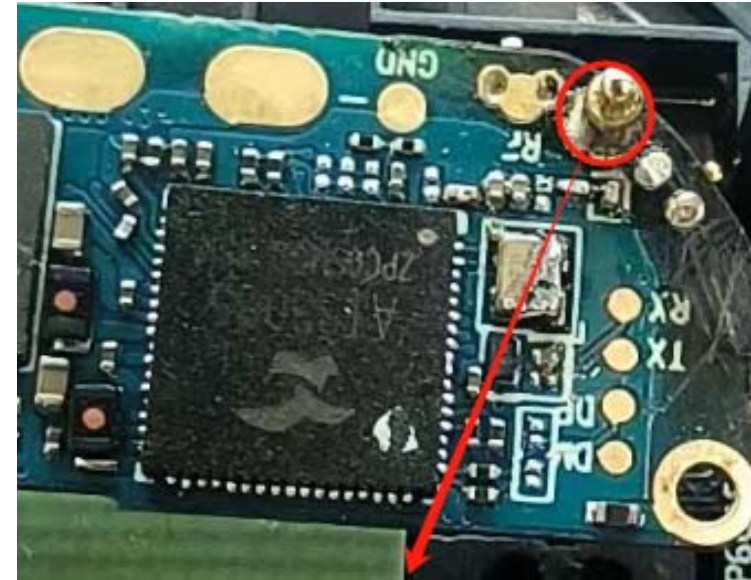
Antenna matching  
changes



## Antenna environment processing



Remove a thimble for a monopolar antenna



Add gold finger thimble to do FPC auxiliary debugging

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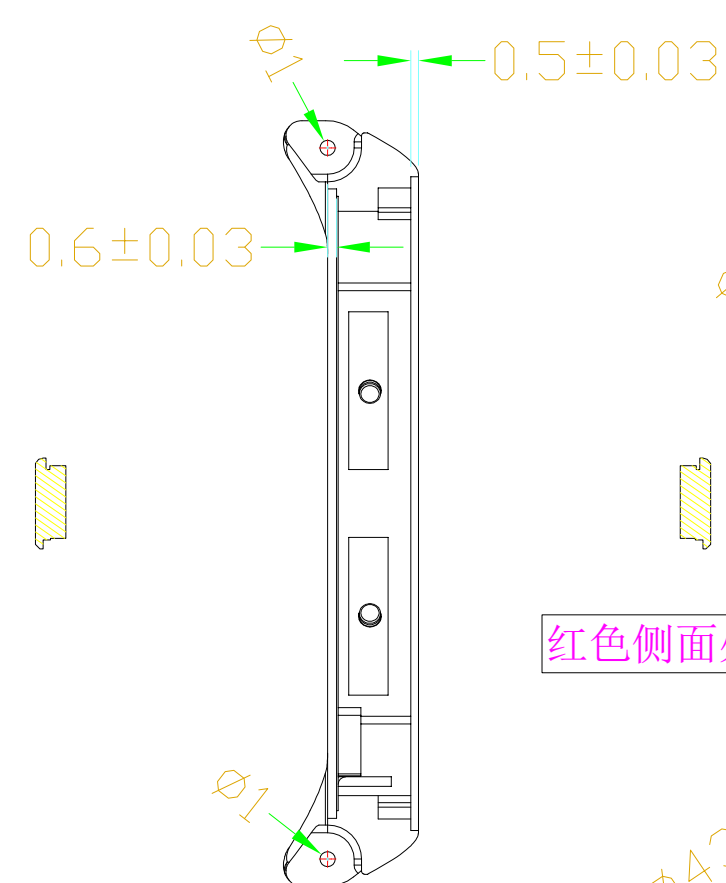
A

B

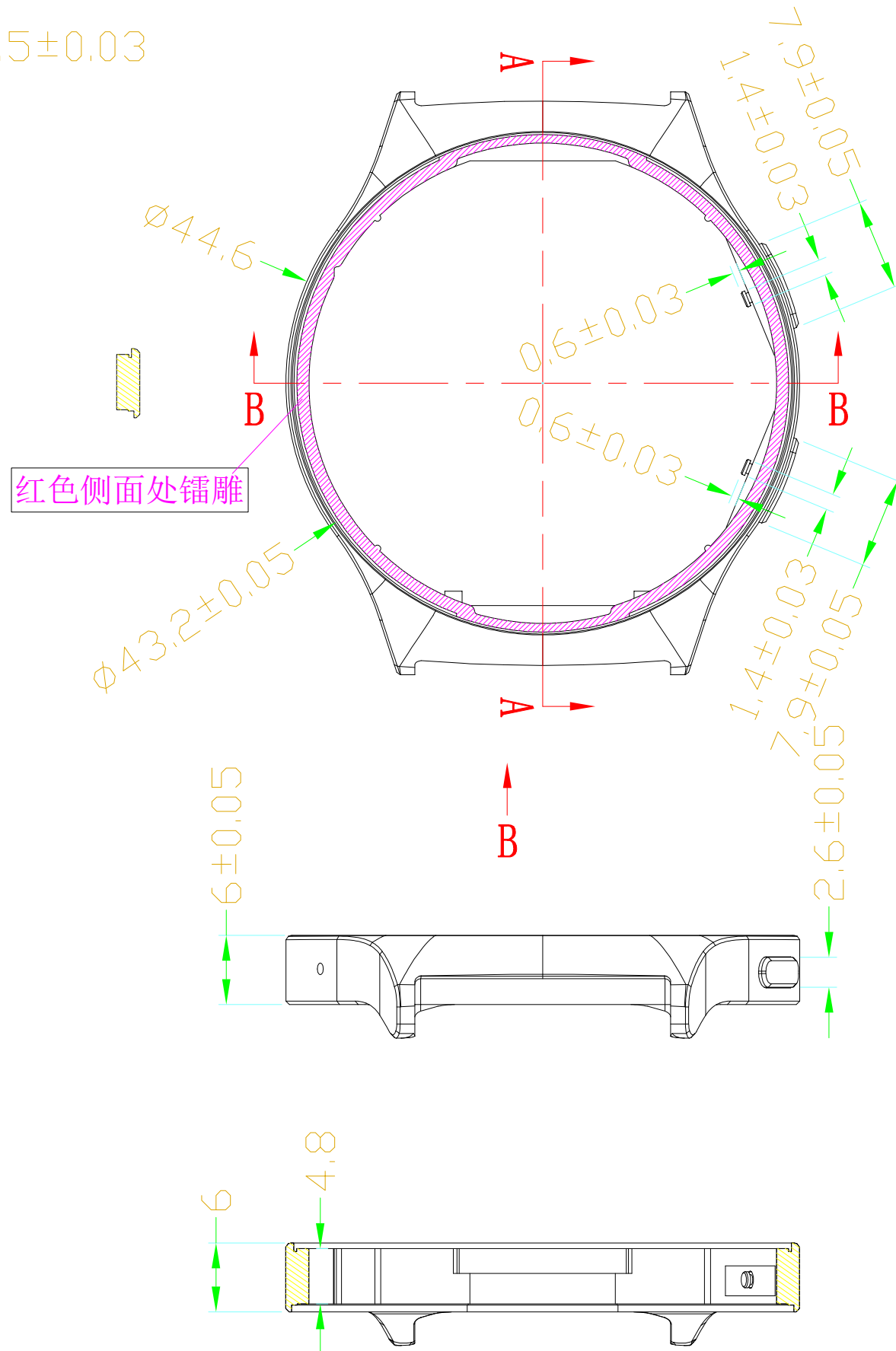
C

B

C

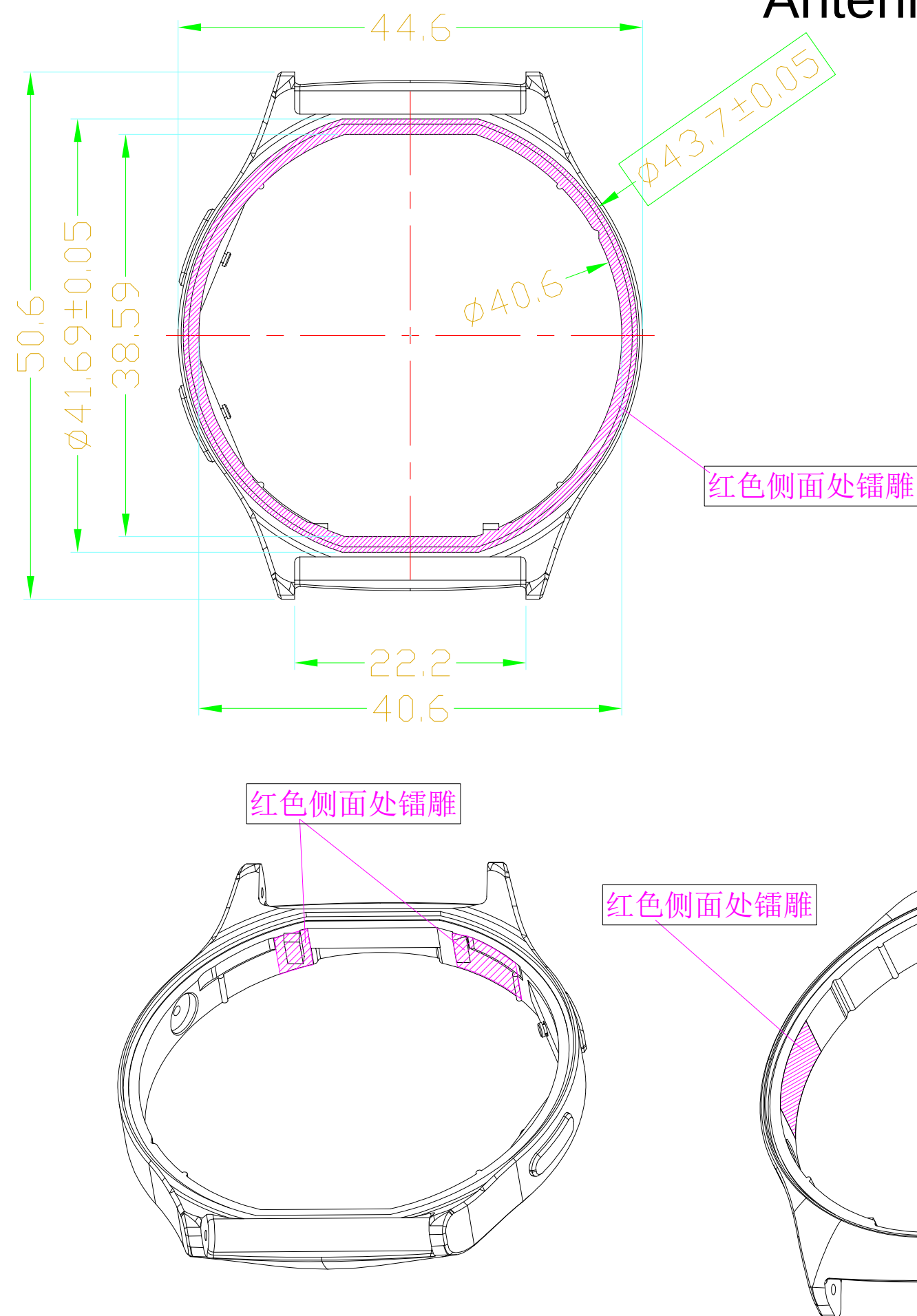


Section A-A



Section B-B

Antenna size diagram





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Arm simulation  
test scenario



# *Thank you!*



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