



Shenzhen Qianmu Communication Technology Co., Ltd.

Focus on antenna scheme, design and production

Client : Linwear

Project: LA23 (version changed)

Date : 2021-12-17

Version: A1

RFID: ZHENG LI GUO



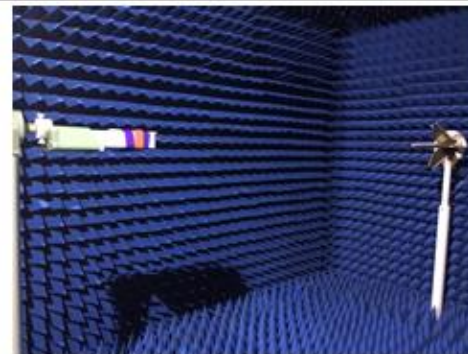
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testing environment

	Test project	Equipment
1. S-parameter	1. Return Loss 2. voltage standing wave ratio (VSWR)	Network analyzer: Agilent E5071B HP 8753D
2. Active test	1. transmitted power (TRP) 2. receive sensitivity (TIS) 3. Frequency Error 4. screen off, screen on	1. Darkroom: ETS 7x4x3 m (3D) Chamber ETS 5x3x3 m (3D) Chamber 2. General-purpose tester: Agilent 8960 E5515B × 2 StarPoint SP6011
3. Passive test	1. Antenna Gain 2. Antenna efficiency	1. darkroom: ETS 7x4x3 m (3D) Chamber ETS 5x3x3 m (3D) Chamber 2. network analyzer: Agilent E5071B HP 8753D





Description of previous debugging records

Date	Version	Debugging Record Description
2021-12-17	A1	Test prototype

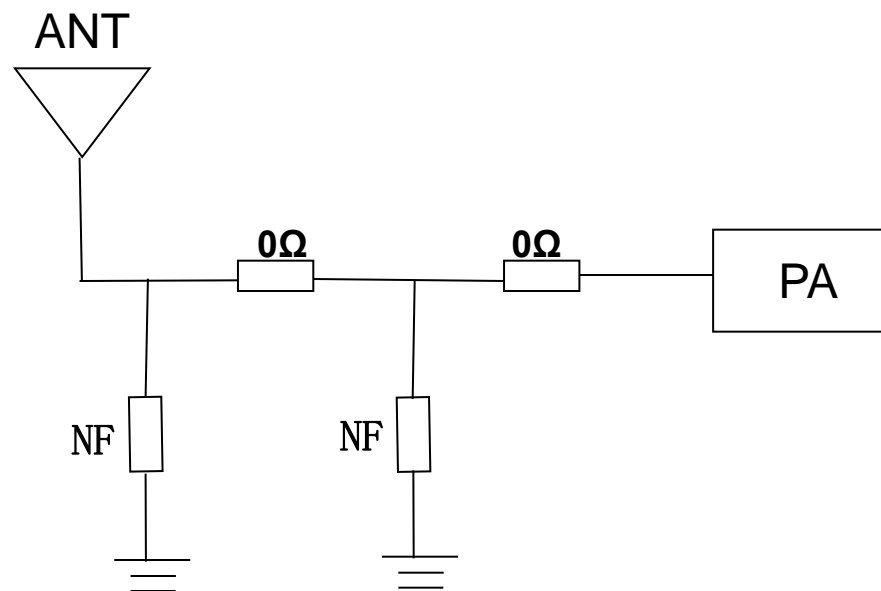


Machine debugging Description

machine type	Bluetooth watch					
Type	mainboard					
Antenna profile	State of the antenna		Antenna state	Antenna form	Design area	Match change
	state of the nation	BT	2.4GHz~2.5GHz	BPP L=25mm D=0.6mm	Monopole holder	none
State of the prototype	Debugging machine		environmental manipulation			



Matching circuit -BT antenna



The original matching circuit has not made any changes



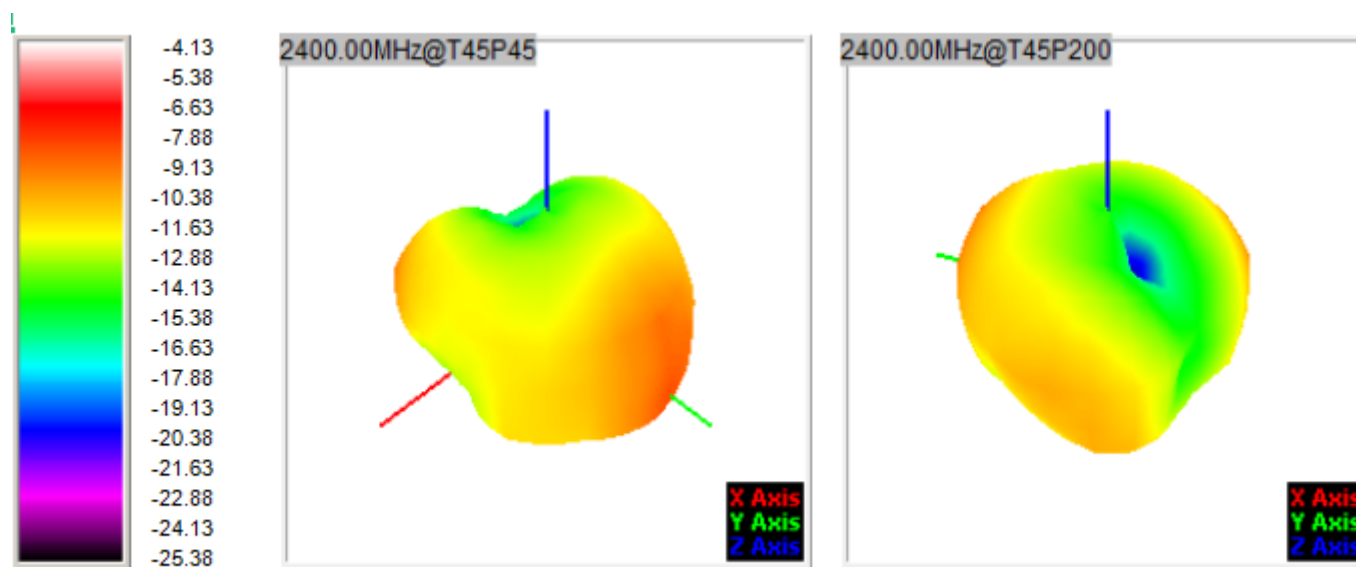
Antenna passive efficiency gain data

FETUKEJI											
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Point Values											
Ant. Port Input Pwr. (dBm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot. Rad. Pwr. (dBm)	-8.42	-8.19	-7.98	-7.54	-7.38	-7.09	-7.04	-7.41	-7.39	-7.36	-7.47
Peak EIRP (dBm)	-4.13	-4.02	-3.91	-3.52	-3.34	-3.04	-3.02	-3.27	-3.09	-2.97	-3.06
Directivity (dBi)	4.29	4.17	4.06	4.02	4.04	4.05	4.01	4.14	4.30	4.39	4.41
Efficiency (dB)	-8.42	-8.19	-7.98	-7.54	-7.38	-7.09	-7.04	-7.41	-7.39	-7.36	-7.47
Efficiency (%)	14.40	15.20	15.90	17.60	18.30	19.60	19.80	18.20	18.20	18.30	17.90
Gain (dBi)	-4.13	-4.02	-3.91	-3.52	-3.34	-3.04	-3.02	-3.27	-3.09	-2.97	-3.06
NHPRP \pm Pi/4 (dBm)	-9.16	-8.92	-8.70	-8.25	-8.09	-7.80	-7.75	-8.11	-8.09	-8.05	-8.17
NHPRP \pm Pi/6 (dBm)	-10.32	-10.09	-9.88	-9.44	-9.28	-9.00	-8.96	-9.32	-9.28	-9.24	-9.34
NHPRP \pm Pi/8 (dBm)	-11.24	-11.03	-10.84	-10.41	-10.27	-9.99	-9.95	-10.31	-10.26	-10.20	-10.28
Upper Hem. PRP (dBm)	-11.05	-10.84	-10.65	-10.24	-10.12	-9.88	-9.93	-10.40	-10.44	-10.42	-10.53
Lower Hem. PRP (dBm)	-11.85	-11.59	-11.34	-10.87	-10.68	-10.32	-10.17	-10.44	-10.37	-10.33	-10.43
Upper Hem. PRP (%)	7.85	8.24	8.60	9.46	9.72	10.27	10.17	9.11	9.04	9.07	8.86
Lower Hem. PRP (%)	6.54	6.94	7.34	8.18	8.55	9.29	9.62	9.04	9.19	9.28	9.05

◆ Efficiency (%)

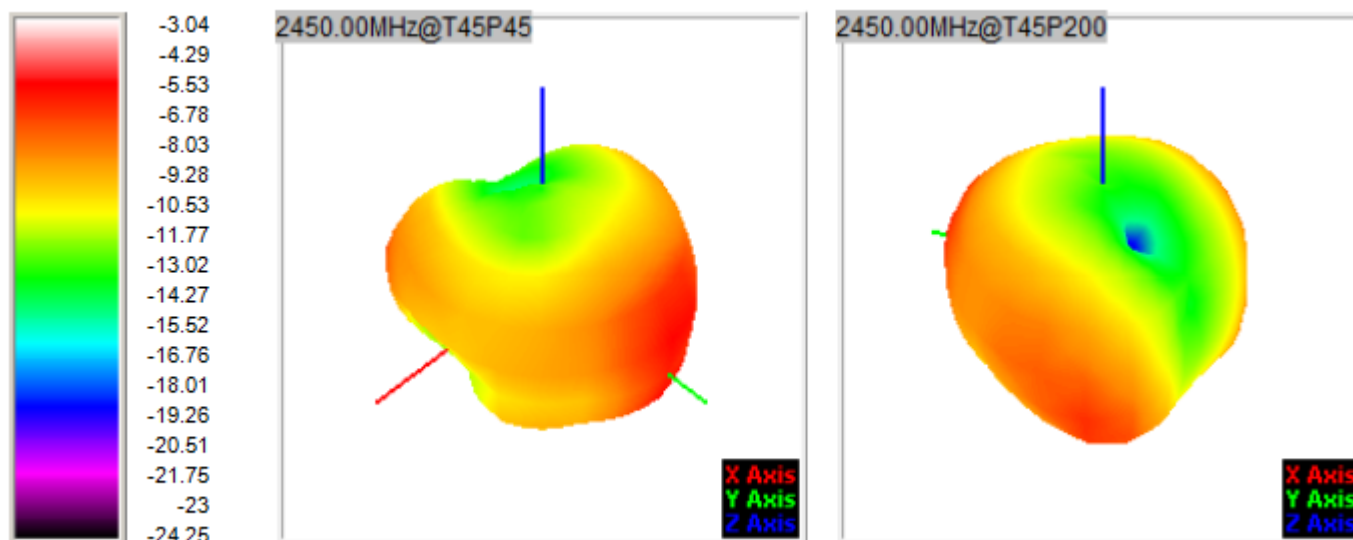


Antenna direction diagram and apple diagram



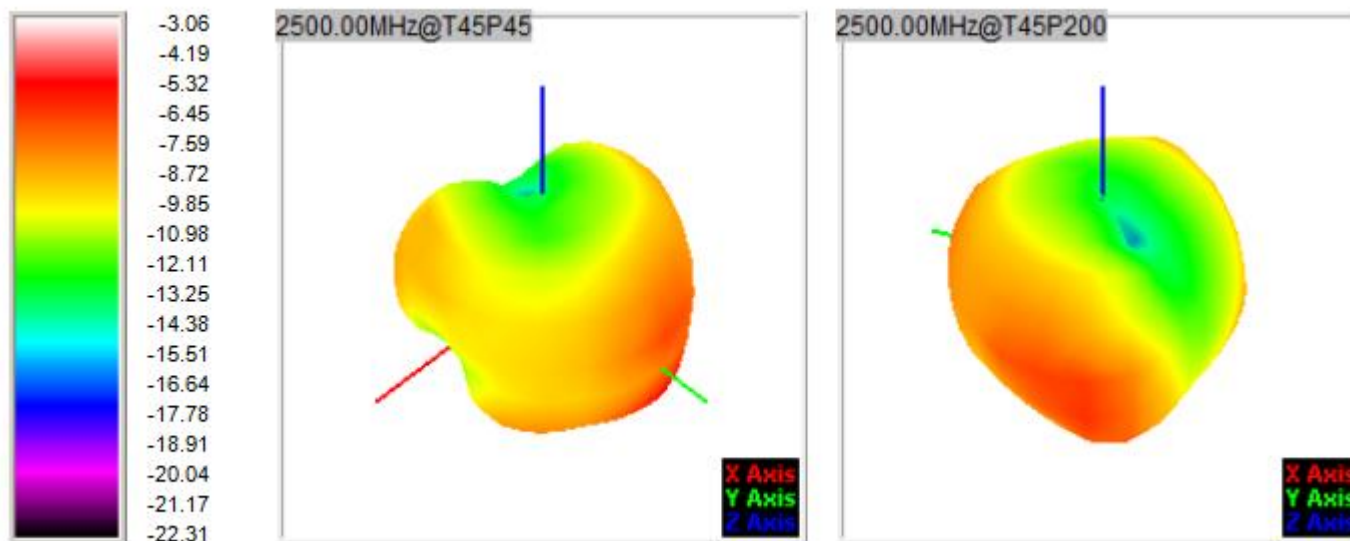


Antenna direction diagram and apple diagram





Antenna pattern and apple chart





BT antenna environment processing:



Bluetooth antenna position



Measurement of BT antenna:



Test mode



Measurement of BT antenna:

testing software



1.
APP Bluetooth test, Android phone connected to the bracelet, bracelet search mobile phone (indoor) test if the straight line distance without obstacles about 30 meters.

APP Bluetooth test, Android system mobile phone connection bracelet, bracelet search mobile phone (outdoor) test linear distance is about 15 meters without obstacles



BT antenna measurement: call test

1. Bluetooth measurement of phone calls, phone calls through the mobile phone, bracelet (**indoor**) test phone calls smoothly without any obstacles straight-line distance about **13 meters**.





Instructions

Tips:

- I. This data only refers to the data generated by the prototype provided by the customer, and does not represent the final mass production status of the customer;
2. Please carefully confirm the description of matching circuit modification and environmental treatment in our report;
- lii. Before the mass production, please provide the trial production prototype to our company for second verification; Please inform us in advance of material replacement, software update and environmental treatment.
- Iv. If the customer needs the third party to retest or send the sample to the customer for testing, please come to our company for verification before sending the sample; To prevent the difference between the machine and the test machine;
- V: Our company does not accept the machine data other than our debugging and other darkroom test data, but you can refer to it, except the certification darkroom. If there is any difference in the data, all the reasons shall be based on the commissioning machine.



Thanks!

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