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深圳市千目通讯科技有限公司

Shenzhen Qianmu Communication Technology Co.,Ltd.

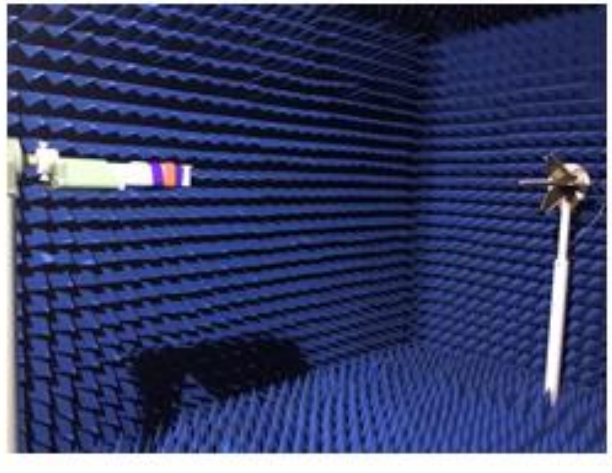
Focus on antenna scheme, design and production

Client ： Linwear
Project: LW76
Date ： 2022.11.30
Version: A1
RFID: liu chu sheng

Content

Test 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 effeciency	1. darkroom： ETS 7x4x3 m (3D) Chamber ETS 5x3x3 m (3D) Chamber



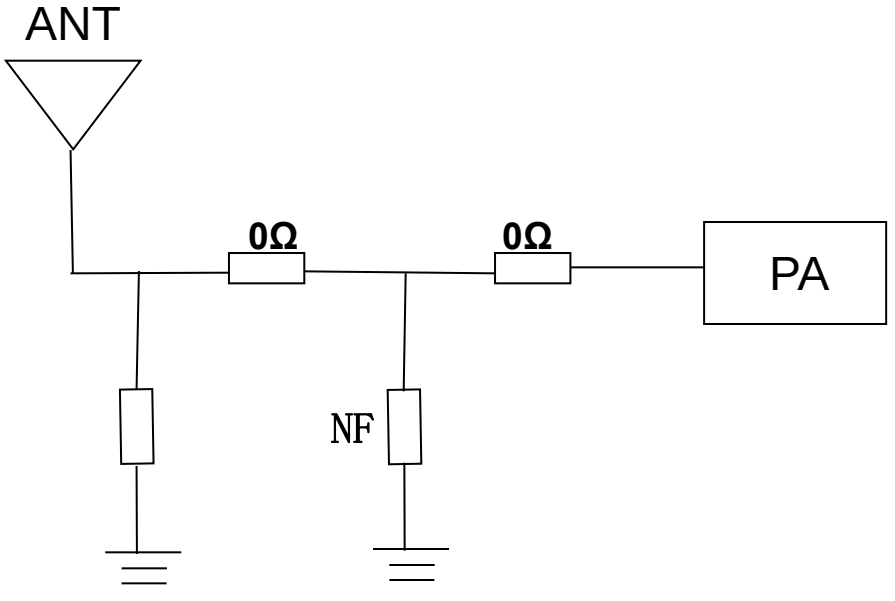
Description of previous debugging records

Date	Version	Debugging Record Description
2021-11-30	A1	Bluetooth cable/Test prototype

Machine debugging Description

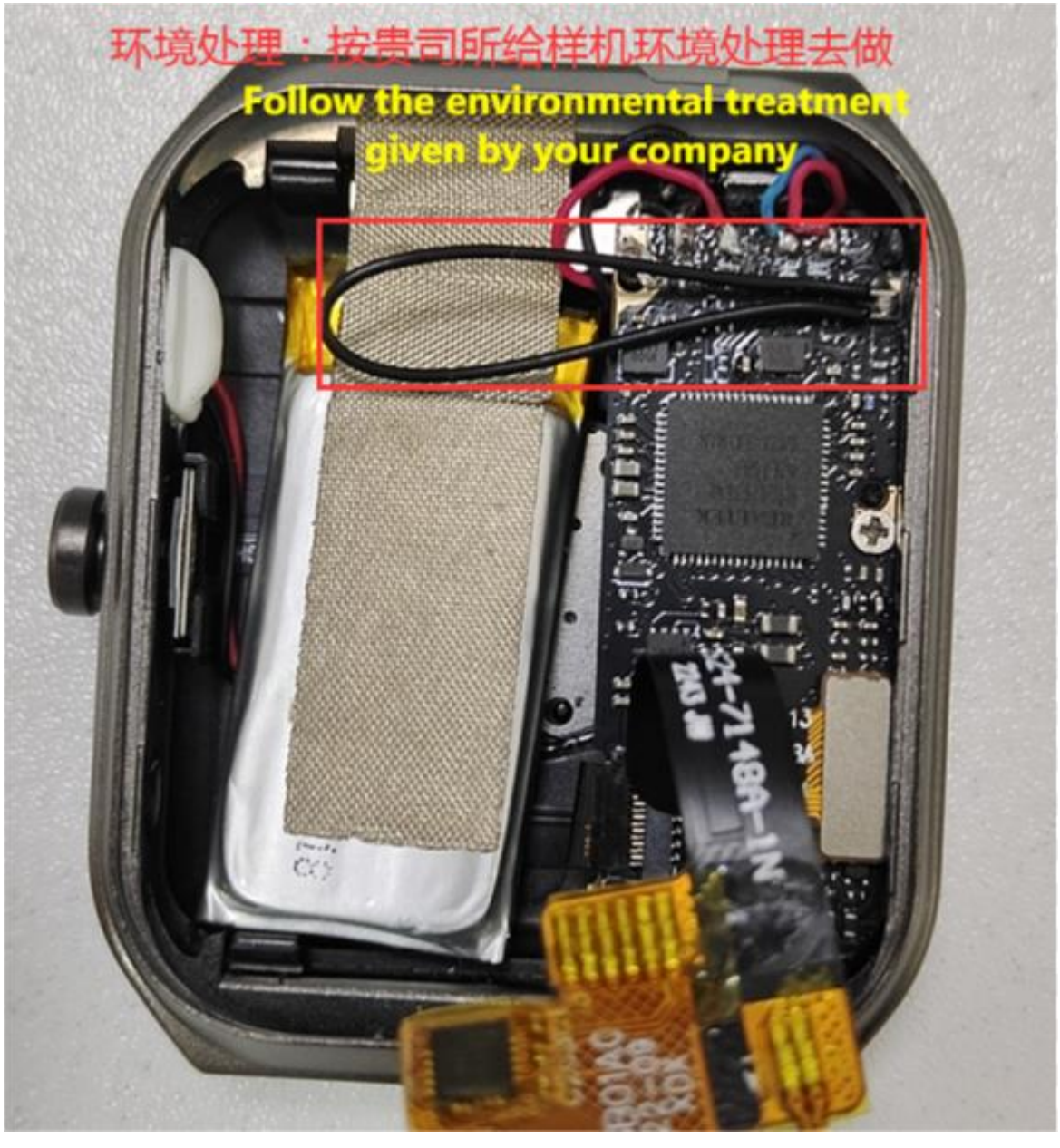
machine type	Bluetooth watch						
Type	mainboard						
Antenna profile		State of the antenna		Antenna state	Antenna form	Design area	Match change
	state of the nation	BT	2.4GHz~2.5GHz	bluetooth cable D:0.6mm L:55mm	Monopole	holder	none
State of the prototype	Debugging machine			environmental manipulation	multiple		

Matching circuit -BT antenna



The original matching circuit has not made any changes

BT antenna environment processing：



Measurement of BT antenna：

1. Connect an Android phone to a wristband and play music

(indoor) frontal test with straight line distance of 30 meters without obstacles.

Test with back to face, straight line distance of 20 meters without obstacle.。

2. Connect your Android phone to a wristband and play music

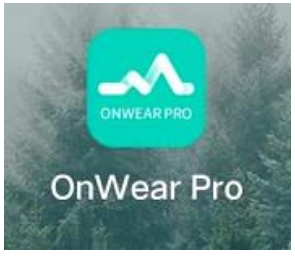
(outdoor) frontal test 16 meters in straight line distance without obstacles.

Back to test straight line distance 9 m without obstacle.

3. Connect your Android phone to your wristband and find your watch by APP

(indoor) frontal test with straight line distance of 35 meters without obstacles.

Test with back to face, straight line distance of 20 meters without obstacle

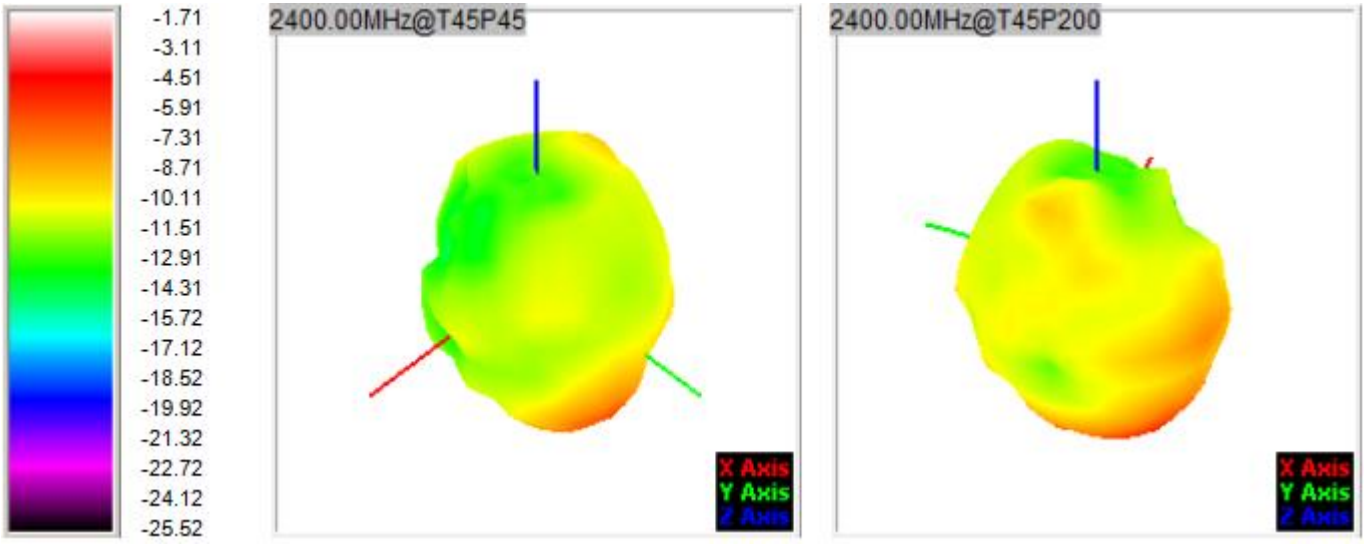


APP for Test

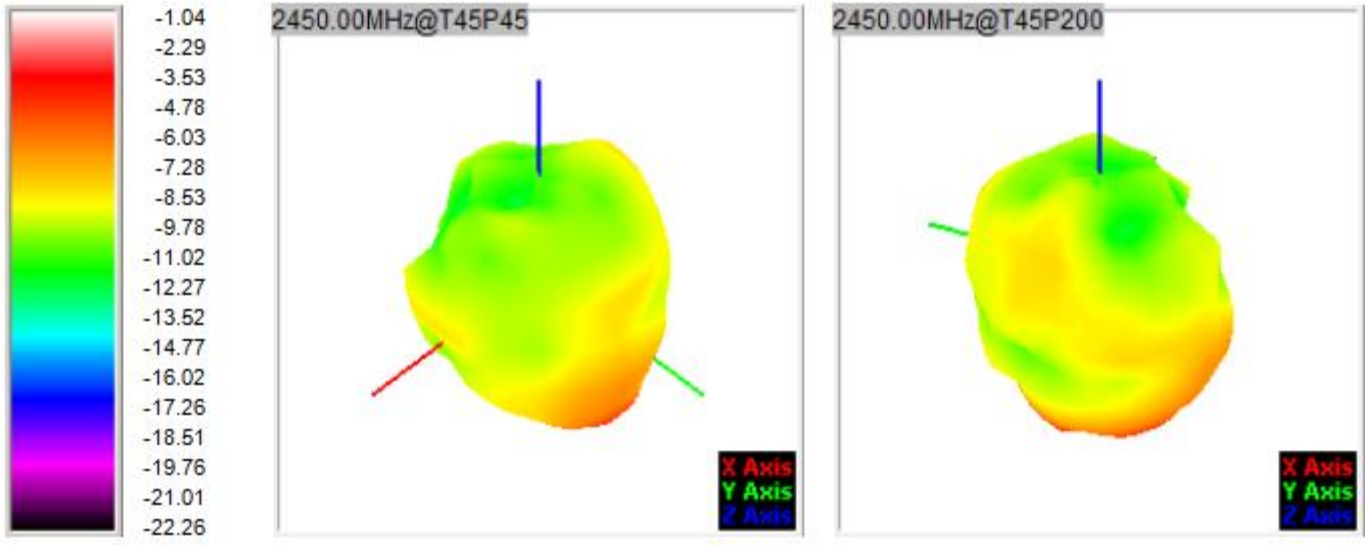
Antenna passive efficiency gain data

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)	-7.93	-8.06	-8.15	-7.98	-8.08	-7.89	-8.17	-8.48	-8.56	-8.46	-8.46
Peak EIRP (dBm)	-1.71	-1.72	-1.61	-1.20	-1.16	-1.04	-1.47	-1.84	-1.96	-2.04	-2.32
Directivity (dBi)	6.22	6.34	6.54	6.78	6.92	6.85	6.71	6.65	6.60	6.42	6.14
Efficiency (dB)	-7.93	-8.06	-8.15	-7.98	-8.08	-7.89	-8.17	-8.48	-8.56	-8.46	-8.46
Efficiency (%)	16.10	15.60	15.30	15.90	15.50	16.30	15.20	14.20	13.90	14.30	14.30
Gain (dBi)	-1.71	-1.72	-1.61	-1.20	-1.16	-1.04	-1.47	-1.84	-1.96	-2.04	-2.32
NHPRP ±Pi/4 (dBm)	-9.69	-9.78	-9.84	-9.65	-9.75	-9.57	-9.87	-10.20	-10.28	-10.20	-10.20
NHPRP ±Pi/6 (dBm)	-11.36	-11.42	-11.46	-11.27	-11.40	-11.24	-11.57	-11.93	-12.02	-11.91	-11.88
NHPRP ±Pi/8 (dBm)	-12.60	-12.61	-12.63	-12.45	-12.61	-12.47	-12.81	-13.18	-13.28	-13.13	-13.07
Upper Hem. PRP (dBm)	-12.40	-12.48	-12.55	-12.40	-12.54	-12.38	-12.72	-13.11	-13.21	-13.08	-12.96
Lower Hem. PRP (dBm)	-9.85	-10.01	-10.12	-9.92	-10.01	-9.80	-10.05	-10.32	-10.38	-10.30	-10.36
Upper Hem. PRP (%)	5.75	5.65	5.56	5.75	5.57	5.79	5.34	4.89	4.77	4.92	5.06
Lower Hem. PRP (%)	10.35	9.98	9.74	10.18	9.98	10.48	9.89	9.29	9.17	9.34	9.20

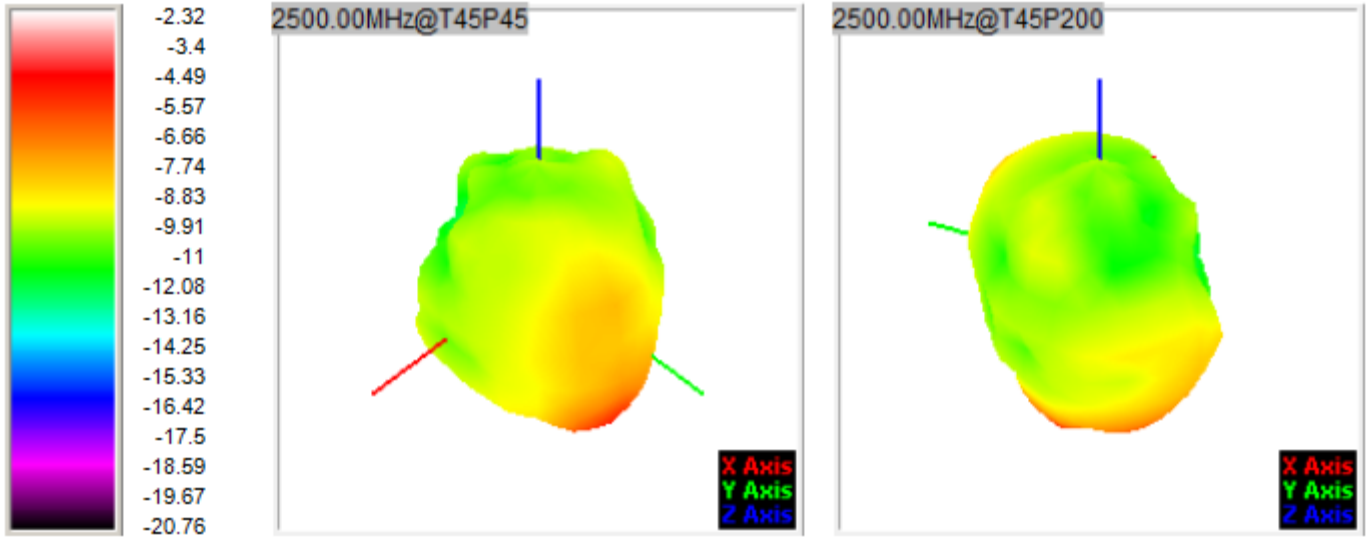
Antenna direction diagram and apple diagram



Antenna direction diagram and apple diagram



Antenna direction diagram and apple diagram



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;

Iii. 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!