

Shenzhen Qianmu Communication Technology Co., LTD

Antenna acknowledgement

Applicable model	HP220W		
Client	Shenzhen Hengteng Creative Technology Co., LTD		
Specifications description			
	Product content	specifications	
Specifications description	3G antenna	FPC material/black/Screen-printed characters QM-HP220W-MAIN-V1.1	
	Bluetooth antenna	0.8*25mm/black	
Changing your resume			
Order number	Date	Edition	Change content summary
1	2025-08-01	V1.0	New projects
2			
3			

Supplier sample confirmation					
Research and development	Structure	Examine and verify		Judge	
Yang Zongyu	Wang Bo	Li Zhang		PASS ☒ FAIL ☐	
Customer sample confirmation					
Electron	Structure	Project	Purchase	Character	Examine and verify
Reasons for rejection or other matters needing attention:					

Contact: Wang Zhiqiang

Mobile phone: 13760153961

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1、Electrical performance test report of main antenna

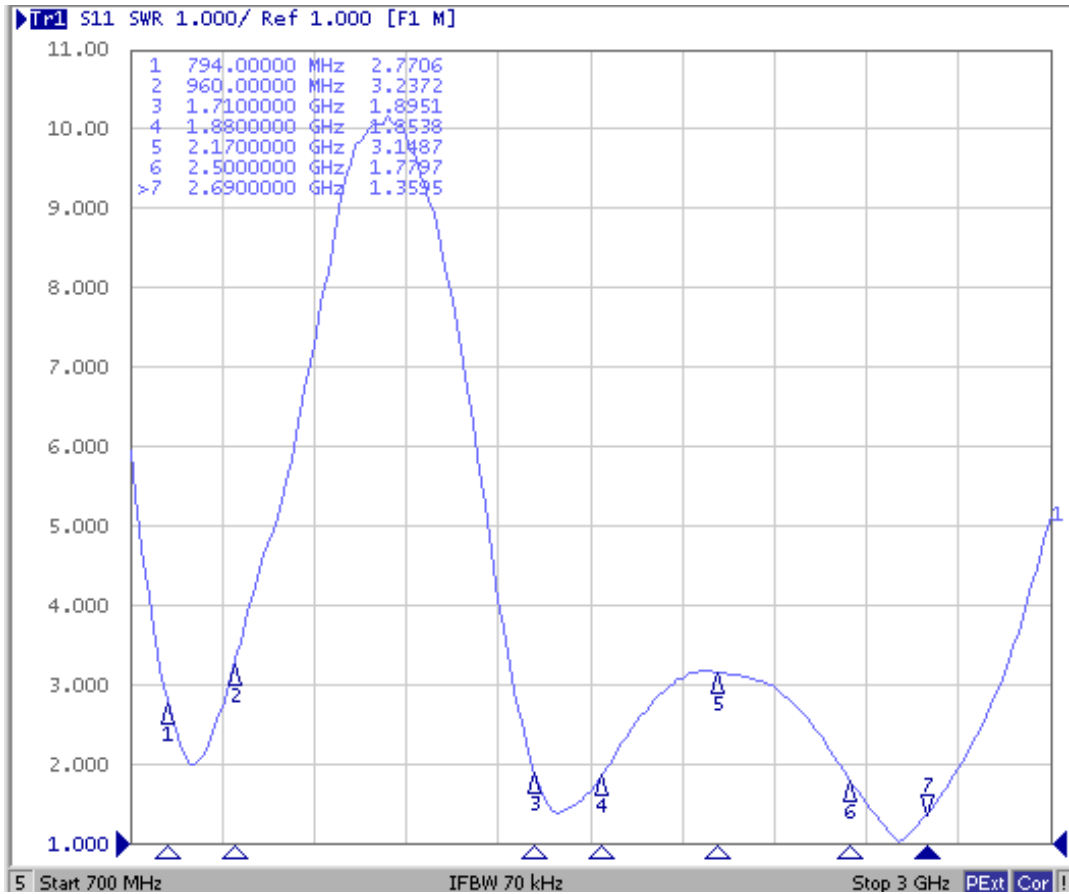
1.1 Test items and equipment

	test item	equipment
Sourceless testing	①.VSWR parameter ②.Return loss parameter	Network analyzer: HP8753D 3D dark chamber antenna test system (ETS test system, network analyzer, comprehensive tester)
Source testing	①。 transmitting power ②。 incoming level ③。 receiving sensitivity	Comprehensive tester: Agilent E5515C 3D dark chamber antenna test system (ETS test system, comprehensive tester)

1.2 GSM passive test report

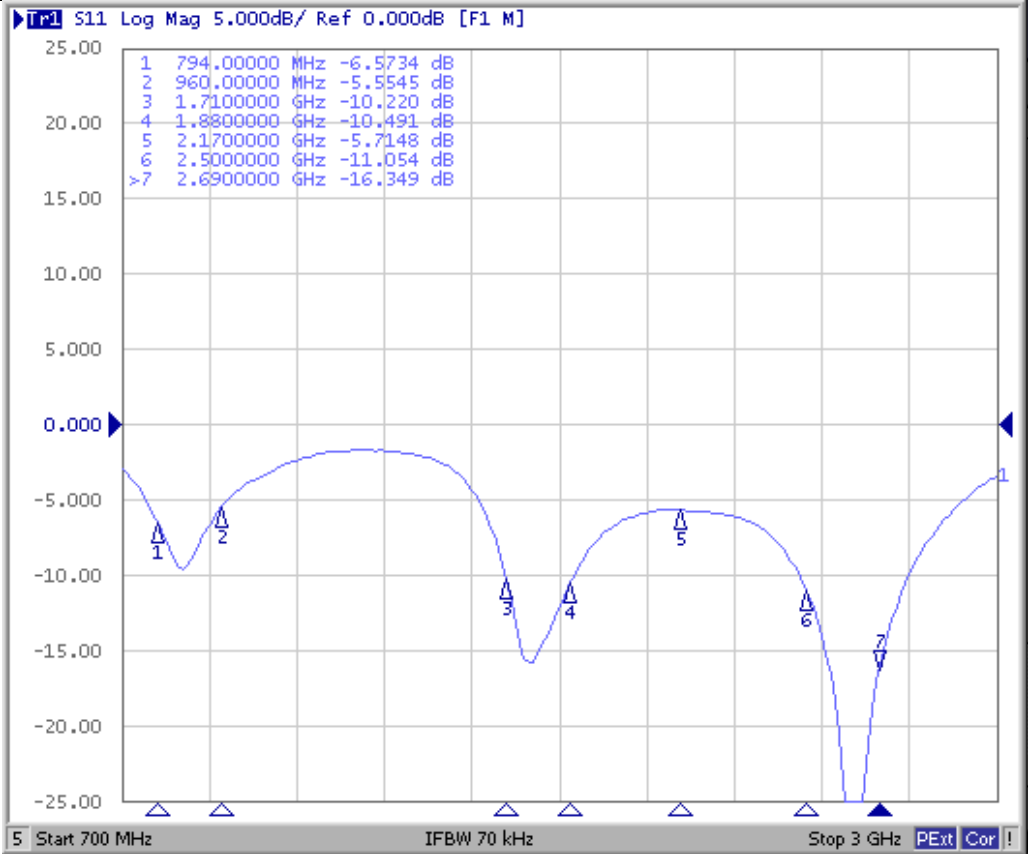
VSWR parameter values

frequency (MHZ)	794	960	1710	1880	2170	2500	2690
RL	2.7	3.2	1.8	1.8	3.1	1.7	1.3



Return loss parameter value

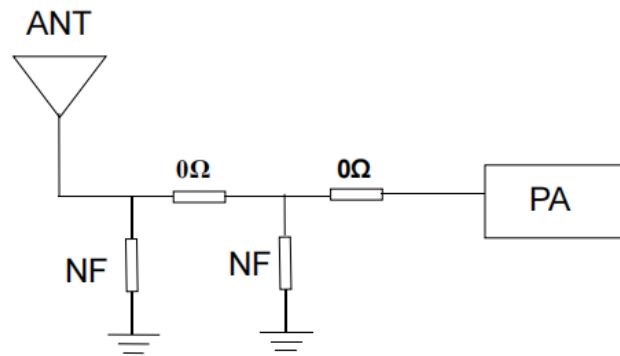
frequency (MHZ)	794	960	1710	1880	2170	2500	2690
RL	-6.5	-5.5	-10.2	-10.4	-5.7	-11	-16.3



2、Complete machine debugging details

Layout	Motherboard						
Overview of antenna	Main antenna	Frequency band		Antenna status	Antenna form	Design area	Matching changes
		2G	850/900/1800/190	FPC sample	PIFA	Shell material	N/A
		3G	W1/2/5/8				
	Other antennas	WIFI/BT	2.4G	Wire sample	MONOPOLE	Shell material	N/A
		GPS	N/A				

3、Matching circuit



The matching circuit is unchanged

4、Efficiency/Gain

2G/3G

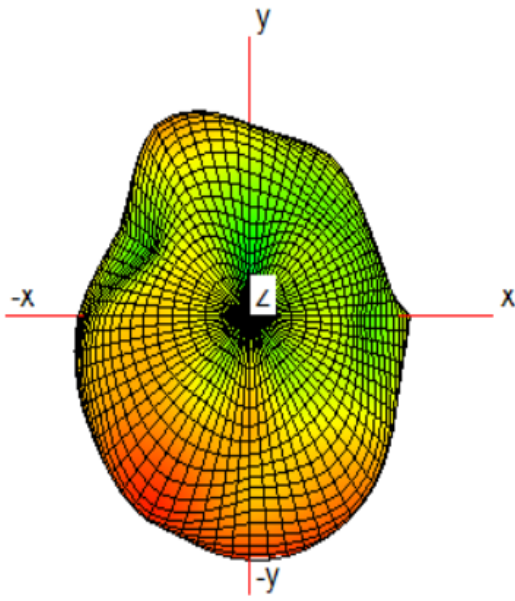
FETUKEJI											
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	800.0	820.0	840.0	860.0	880.0	900.0	920.0	940.0	960.0	980.0	1000.0
Point Values											
Ant. Port Input Pwr. (dBm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot. Rad. Pwr. (dBm)	-11.20	-10.13	-8.85	-7.90	-6.96	-6.27	-6.12	-6.39	-6.98	-7.66	-8.42
Peak EIRP (dBm)	-6.35	-4.92	-3.39	-2.86	-2.42	-2.27	-1.27	-1.59	-1.90	-2.50	-3.30
Directivity (dBi)	4.85	5.21	5.46	5.05	4.54	4.00	4.84	4.80	5.08	5.16	5.12
Efficiency (dB)	-11.20	-10.13	-8.85	-7.90	-6.96	-6.27	-6.12	-6.39	-6.98	-7.66	-8.42
Efficiency (%)	7.60	9.70	13.00	16.20	20.10	23.60	24.50	23.00	20.00	17.20	14.40
Gain (dBi)	-6.35	-4.92	-3.39	-2.86	-2.42	-2.27	-1.27	-1.59	-1.90	-2.50	-3.30
NHPRP $\pm\pi/4$ (dBm)	-12.40	-11.29	-10.06	-9.14	-8.20	-7.45	-7.24	-7.50	-8.07	-8.80	-9.64
NHPRP $\pm\pi/6$ (dBm)	-13.89	-12.72	-11.56	-10.69	-9.79	-9.00	-8.76	-9.03	-9.55	-10.28	-11.23
NHPRP $\pm\pi/8$ (dBm)	-15.03	-13.85	-12.74	-11.88	-10.98	-10.20	-9.97	-10.28	-10.74	-11.42	-12.43
Upper Hem. PRP (dBm)	-14.21	-13.42	-12.29	-11.27	-10.02	-9.13	-8.88	-9.10	-9.84	-10.65	-11.48
Lower Hem. PRP (dBm)	-14.21	-12.88	-11.48	-10.59	-9.91	-9.43	-9.38	-9.71	-10.15	-10.69	-11.39
Upper Hem. PRP (%)	3.79	4.55	5.91	7.47	9.95	12.21	12.93	12.29	10.38	8.62	7.12
Lower Hem. PRP (%)	3.79	5.15	7.12	8.73	10.20	11.39	11.53	10.68	9.66	8.54	7.26
FETUKEJI											
Frequency ID	12	13	14	15	16	17	18	19	20	21	22
Frequency (MHz)	1700.0	1750.0	1800.0	1850.0	1900.0	1950.0	2000.0	2050.0	2100.0	2150.0	2200.0
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)	-4.91	-4.28	-4.26	-4.19	-4.18	-3.83	-3.51	-3.42	-3.69	-3.86	-4.01
Peak EIRP (dBm)	-0.06	0.46	0.62	0.70	0.96	1.27	2.07	1.86	1.10	0.83	0.99
Directivity (dBi)	4.85	4.74	4.89	4.89	5.14	5.10	5.58	5.28	4.79	4.70	4.99
Efficiency (dB)	-4.91	-4.28	-4.26	-4.19	-4.18	-3.83	-3.51	-3.42	-3.69	-3.86	-4.01
Efficiency (%)	32.30	37.30	37.50	38.10	38.20	41.40	44.60	45.50	42.80	41.10	39.70
Gain (dBi)	-0.06	0.46	0.62	0.70	0.96	1.27	2.07	1.86	1.10	0.83	0.99
NHPRP $\pm\pi/4$ (dBm)	-6.18	-5.51	-5.43	-5.38	-5.38	-4.96	-4.66	-4.54	-4.90	-5.09	-5.27
NHPRP $\pm\pi/6$ (dBm)	-7.84	-7.18	-7.05	-7.06	-7.08	-6.57	-6.37	-6.24	-6.49	-6.76	-7.07
NHPRP $\pm\pi/8$ (dBm)	-9.19	-8.51	-8.32	-8.37	-8.44	-7.90	-7.86	-7.73	-7.77	-8.16	-8.66
Upper Hem. PRP (dBm)	-8.01	-7.33	-7.14	-7.25	-7.15	-6.89	-6.61	-6.56	-6.92	-7.08	-7.20
Lower Hem. PRP (dBm)	-7.84	-7.25	-7.41	-7.15	-7.23	-6.79	-6.43	-6.31	-6.49	-6.67	-6.84
Upper Hem. PRP (%)	15.81	18.47	19.33	18.84	19.27	20.46	21.83	22.07	20.35	19.57	19.04
Lower Hem. PRP (%)	16.45	18.85	18.14	19.28	18.94	20.93	22.73	23.38	22.45	21.51	20.70

BT

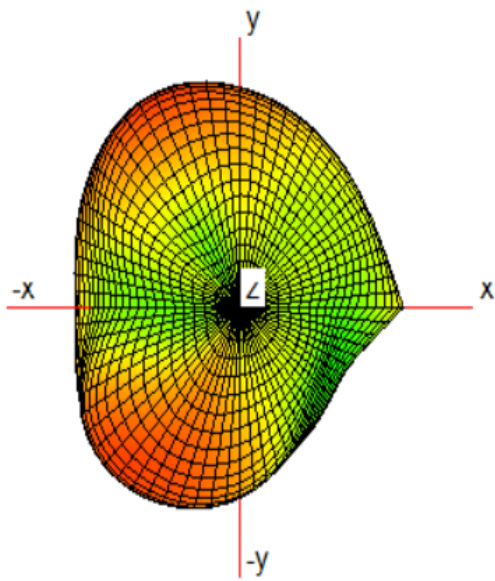
FETUKEJI											
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Point Values											
Ant. Port Input Pwr. (dBm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot. Rad. Pwr. (dBm)	-3.01	-3.07	-3.04	-3.17	-3.15	-3.15	-3.03	-3.11	-3.15	-3.14	-3.06
Peak EIRP (dBm)	1.92	1.91	2.01	1.95	1.96	1.87	1.88	1.86	1.91	1.93	1.92
Directivity (dBi)	4.93	4.98	5.05	5.12	5.11	5.02	4.91	4.97	5.07	5.06	4.99
Efficiency (dB)	-3.01	-3.07	-3.04	-3.17	-3.15	-3.15	-3.03	-3.11	-3.15	-3.14	-3.06
Efficiency (%)	50.00	49.30	49.70	48.20	48.40	48.40	49.80	48.80	48.40	48.50	49.40
Gain (dBi)	1.92	1.91	2.01	1.95	1.96	1.87	1.88	1.86	1.91	1.93	1.92
NHPRP $\pm \pi/4$ (dBm)	-4.38	-4.44	-4.41	-4.54	-4.53	-4.54	-4.44	-4.53	-4.57	-4.55	-4.48
NHPRP $\pm \pi/6$ (dBm)	-5.68	-5.77	-5.75	-5.89	-5.87	-5.86	-5.74	-5.82	-5.87	-5.86	-5.80
NHPRP $\pm \pi/8$ (dBm)	-6.69	-6.79	-6.79	-6.92	-6.89	-6.87	-6.73	-6.79	-6.84	-6.84	-6.79
Upper Hem. PRP (dBm)	-7.01	-7.01	-6.93	-7.04	-7.04	-7.09	-7.00	-7.10	-7.17	-7.19	-7.10
Lower Hem. PRP (dBm)	-5.22	-5.31	-5.32	-5.46	-5.43	-5.39	-5.25	-5.32	-5.35	-5.31	-5.24
Upper Hem. PRP (%)	19.89	19.92	20.28	19.76	19.78	19.55	19.96	19.48	19.17	19.10	19.49
Lower Hem. PRP (%)	30.06	29.41	29.41	28.43	28.62	28.89	29.82	29.35	29.19	29.43	29.89

5 Direction map

2G/3G

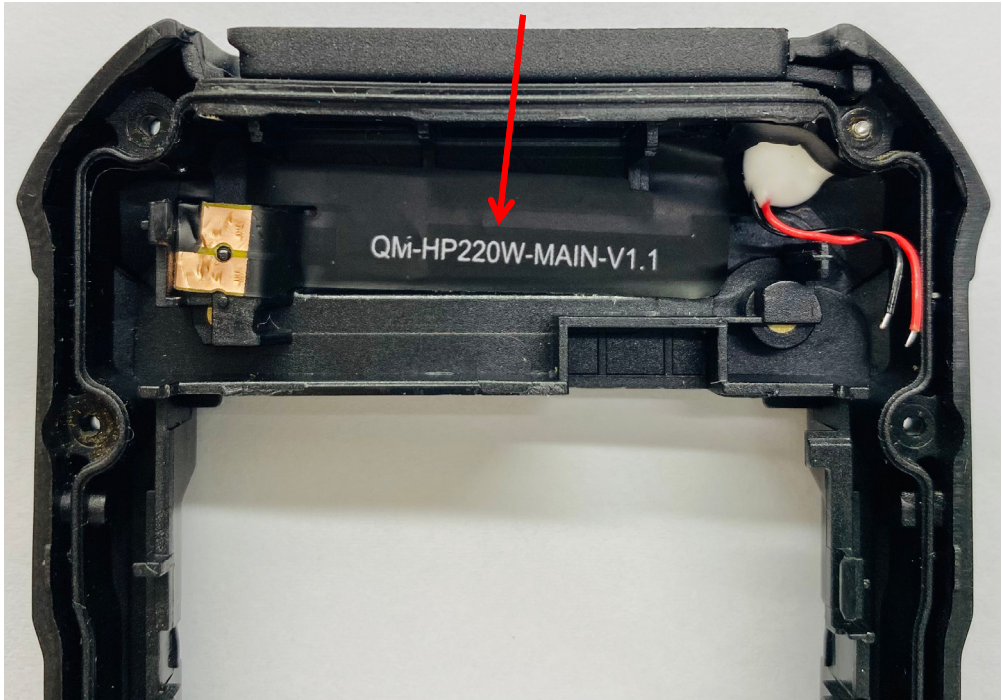


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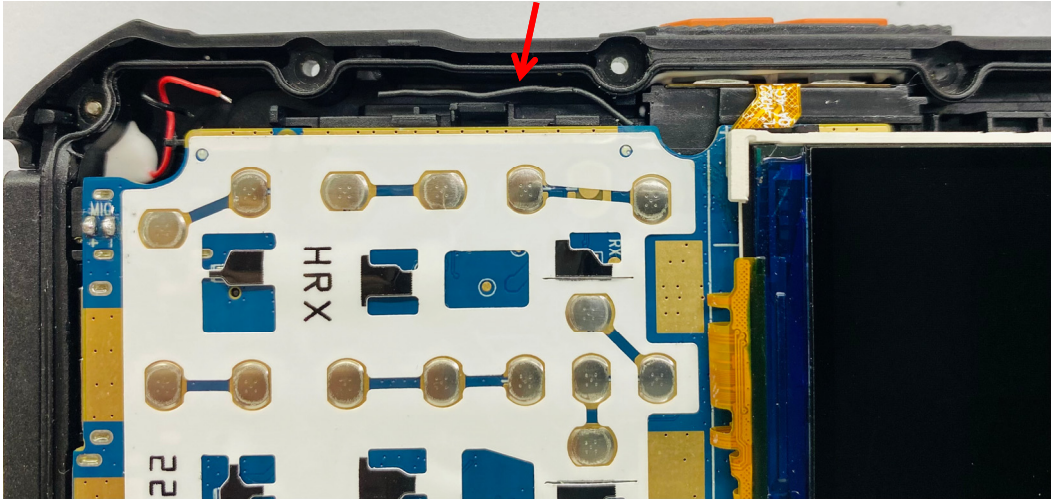


6、 Antenna placement

2G/3G antenna

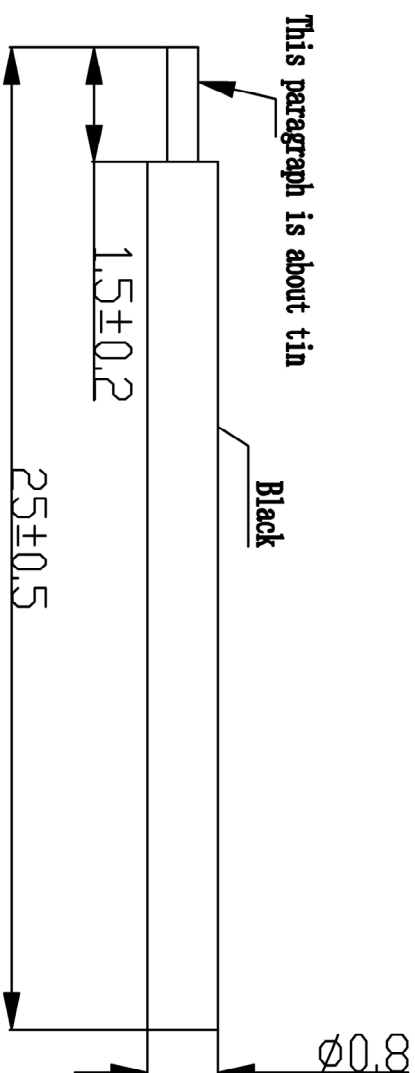


BT antenna



7、Antenna drawings

1	2	3	4	5	6	7	8																																								
Note: the FPC to use a half, and the toughness is better, not easy to tear.																																															
○ Peripheral and through holes ● Copper platinum ▨ Base material ● Gold-plated nickel plating — Zigzag paper break line □ Backless zone □ Back glue area 22.27±0.15 66.94±0.15 QM-HP220W-MALIN-V1.1																																															
technical requirement: 1.Side A represents the copper wire of FPC, and side B represents the 3M 9471 tape paper; 2.The total thickness of FPC is 0.24mm, and the thickness of brush gold is 11um~3um and nickel plating; 3.Material using a single layer of PI substrate, electrolytic copper; 4.Oil film matte black, character bright white; 5.The mark with the * number is the key size.																																															
<table><tr><td>0~10</td><td>±0.10</td><td>第三角法</td><td>○</td><td>0.02</td></tr><tr><td>10~20</td><td>±0.12</td><td></td><td>◎</td><td>0.03</td></tr><tr><td>20~40</td><td>±0.15</td><td></td><td>└</td><td>0.02</td></tr><tr><td>40~50</td><td>±0.20</td><td></td><td>└</td><td>0.04</td></tr><tr><td></td><td></td><td></td><td>└</td><td>0.02</td></tr></table>								0~10	±0.10	第三角法	○	0.02	10~20	±0.12		◎	0.03	20~40	±0.15		└	0.02	40~50	±0.20		└	0.04				└	0.02															
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<table><tr><td colspan="2">FPC</td><td colspan="2">DESIGN</td><td colspan="2">WANG</td><td colspan="2">DATE</td></tr><tr><td colspan="2">HP220W</td><td colspan="2"></td><td colspan="2">EE:YANG</td><td colspan="2">2024-09-06</td></tr><tr><td colspan="2">NUMBER</td><td colspan="2">QM-HP220W</td><td colspan="2">MR:KING</td><td colspan="2">DATE</td></tr><tr><td colspan="2">PI SUBSTRATE, ELECTROLYTIC</td><td colspan="2">Check</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td colspan="2">Proportion:PT1</td><td colspan="2">Unit:mm</td><td colspan="2"></td><td colspan="2"></td></tr></table>								FPC		DESIGN		WANG		DATE		HP220W				EE:YANG		2024-09-06		NUMBER		QM-HP220W		MR:KING		DATE		PI SUBSTRATE, ELECTROLYTIC		Check						Proportion:PT1		Unit:mm					
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