



福州中天迅通信技术有限公司

Fuzhou ZHONGTIANXUN Communication Technology Co., Ltd

项目名称(Project Name): DX4000 (LOB) -MAIN

天线型号(Antenna model): ZTX-DX4000-LOB-MAIN

A

物料编码(Item number): F.00000561

MPN 码 (MPN) : B0680320D

日期 (Date) : 2022-12-1

设计公司: 福州中天迅通信技术有限公司

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版本 version	日期 date	状态 status
A1	2022-8-23	规格书制定。 First issue.
A2	2022-12-1	FPC 外形，线路更新；丝印第一行去掉 “-ANT” 离型纸及背胶更新，同轴线中剥位置更新。 Performance optimization; FPC appearance, circuit update; Remove the first line of silk screen. “-ANT” release paper and adhesive are updated, and the stripping position of coaxial line is updated.





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1 名词解释 (Explanation of Nouns)

dB _i	Decibel relative isotropic antenna
T _x	Transmit frequency
R _x	Receive frequency
TRP	Total Radiated Power
TIS	Total Isotropic Sensitivity
VSWR	Voltage Standing Wave Ratio
GSM	Global Service for Mobile communication
DCS	Digital Communication System
CDMA	Code Division Multiple Access
WCDMA	Wideband Code Division Multiple Access

2 测试设备 (Test equipment)

矢量网络分析仪 (Vector network analyzer) 安捷伦 8753E (Agilent 8753E)

频谱分析仪 (Frequency analyzer)

综合测试仪 (General-purpose tester) 安捷伦 8960 E5515C

标准高性能无反射屏蔽暗室 (High performance no-reflection shielding darkroom) ETS
8m*4m*4m

3 适用频段 (Applied frequency band)

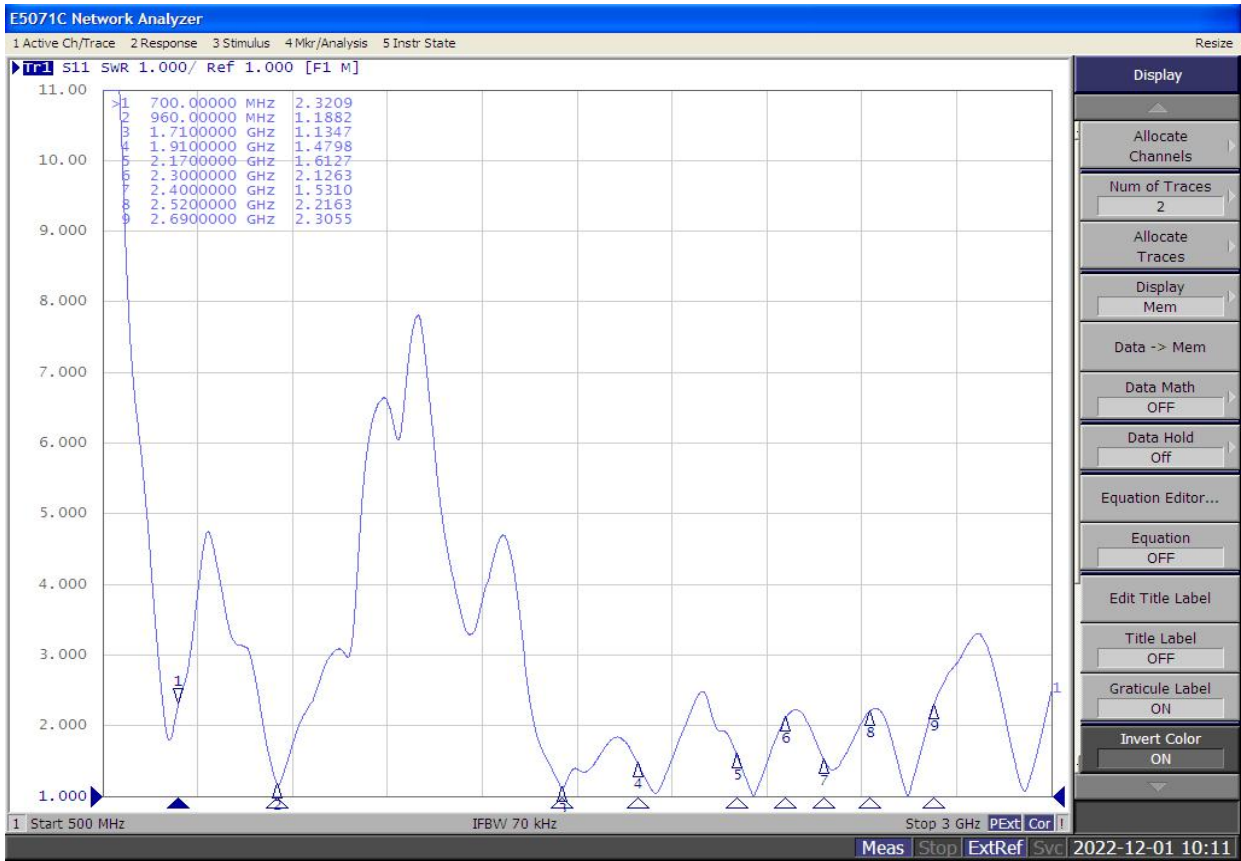
频段 Frequency Band	频率 Frequency
MAIN	700-2710MHz。





4. 测试指标和数据图表 (Test project)

4.1 驻波图 (VSWR)





4.2 无源效率 (Antenna passive test)

chNo	Freq	Gain	Efficiency_Pcent
1	700	-2.288073016	22.68634139
2	720	-2.429535285	21.48145846
3	740	-3.178583407	17.35829817
4	760	-3.717804711	16.66499078
5	780	-2.810505174	20.35600295
6	800	-2.66035576	21.32944781
7	820	-1.848223016	23.1245182
8	840	-2.098447417	23.02361483
9	860	-1.805128294	22.06705796
10	880	-2.07699895	22.30777951
11	900	-0.165400954	32.21016889
12	920	-0.309489771	28.66863739
13	940	-0.352836232	31.18360345
14	960	-0.022026081	33.54662408
15	1710	0.536556634	43.36904889
16	1740	1.656001956	44.06609021





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17	1770	1. 686061366	42. 88806347
18	1800	1. 139063962	40. 83897197
19	1830	1. 21390608	45. 45429158
20	1860	1. 063229962	44. 96851434
21	1890	1. 270616726	49. 23153072
22	1920	1. 48123778	47. 90927019
23	1950	1. 598413239	50. 05794741
24	1980	1. 644575553	50. 3170152
25	2010	1. 442725259	44. 88029816
26	2040	1. 164253037	42. 73028435
27	2070	1. 130784984	39. 35763868
28	2100	1. 483451607	37. 57864197
29	2130	2. 594679197	43. 45196288
30	2160	2. 241632015	44. 27436459
31	2170	2. 461684065	45. 71139531
32	2300	-0. 0011857	34. 72693271



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33	2320	0.465403708	34.87890988
34	2340	0.952485843	33.58335242
35	2360	1.564699767	37.35403277
36	2380	2.382956269	42.16177624
37	2400	2.805969623	48.28068102
38	2500	3.462992926	44.26781216
39	2520	3.746827035	43.02845565
40	2540	3.79178005	40.05734482
41	2560	3.478905893	39.98739643
42	2580	3.23500062	39.23391092
43	2600	3.138298742	40.27707146
44	2620	3.07202793	40.58527427
45	2640	2.744507977	40.70459476
46	2660	2.7428351	40.23412705
47	2680	2.572809272	39.19016361
48	2690	2.665730381	39.78938477



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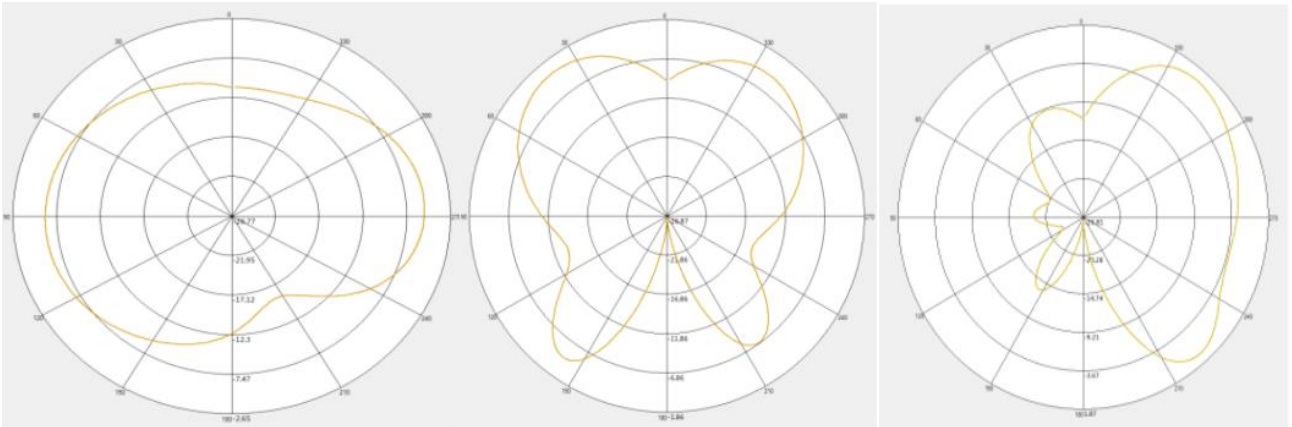
4.3 2D 方向图 (2D direction diagram)

800MHz

XOY面

XOZ面

YOZ面

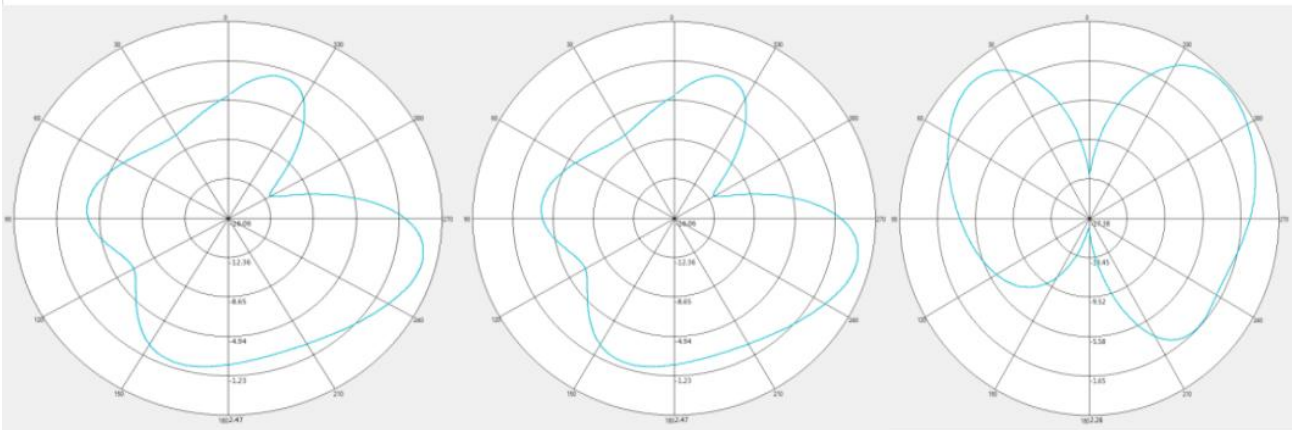


1860MHz

XOY面

XOZ面

YOZ面





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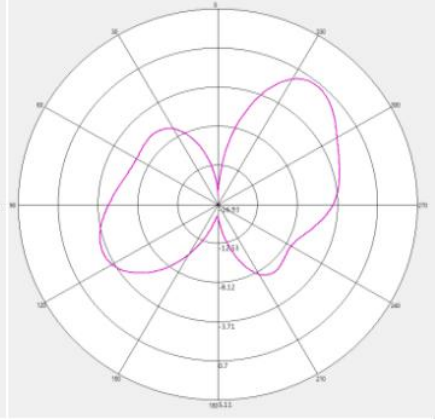
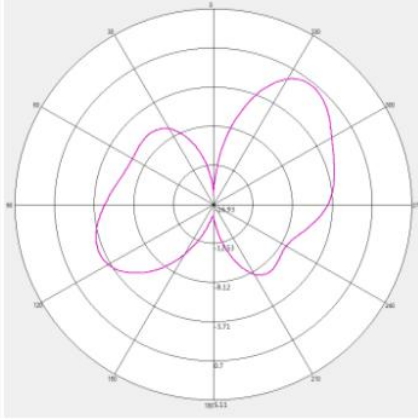
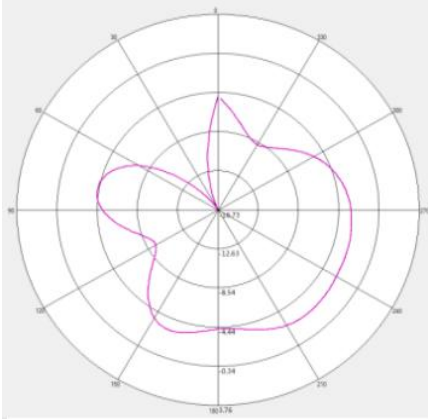
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2500MHz

XOY面

XOZ面

YOZ面

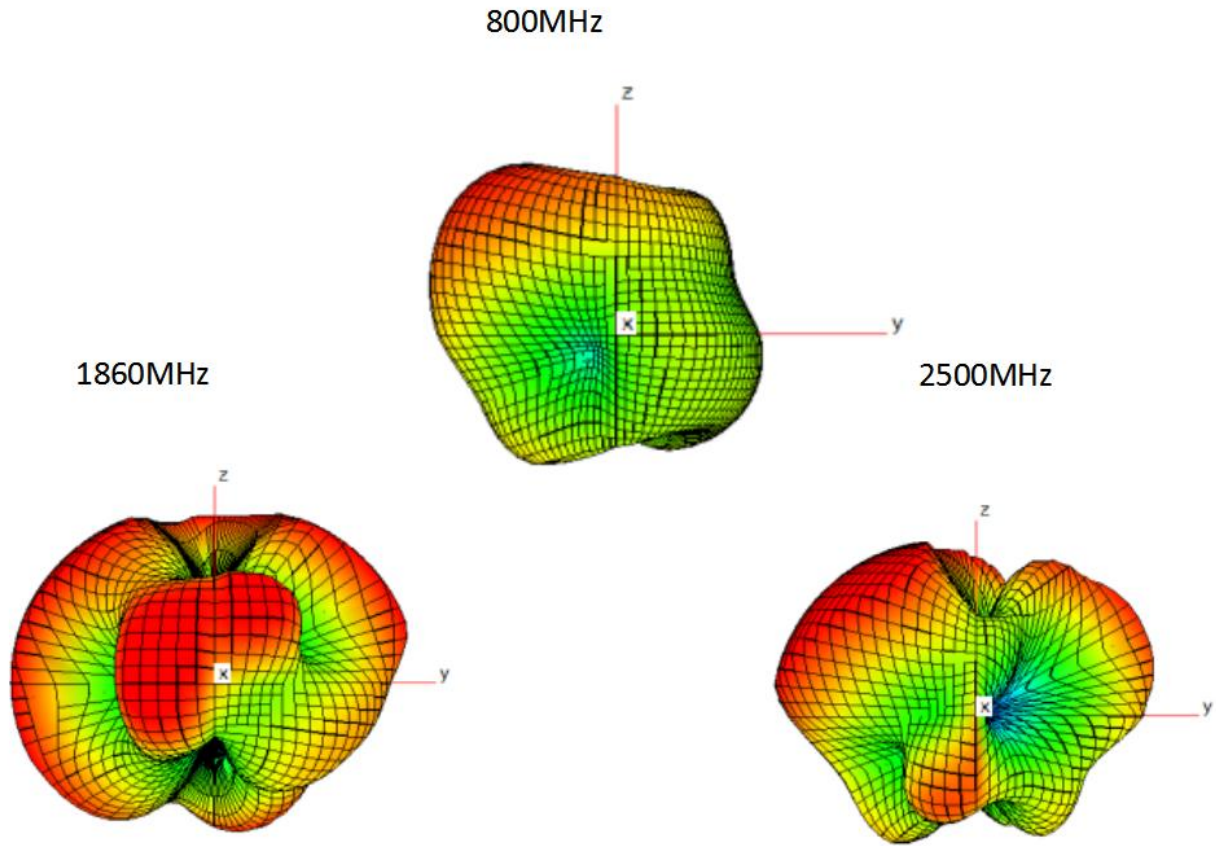


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4.4 3D 方向图 (3D direction diagram)





4.5 有源数据 (Active test data)

频段	参数\信道	10562	10700	10838
W1	TRP	18.37	18.97	18.42
	TIS	-103.77	-103.91	-104.34
频段	参数\信道	9662	9800	9938
W2	TRP	17.59	17.70	17.89
	TIS	-103.07	-102.97	-103.94

频段	参数\信道	4357	4408	4458
W5	TRP	17.16	17.20	18.02
	TIS	-105.43	-104.98	-105.68
频段	参数\信道	2937	3013	3088
W8	TRP	19.93	20.55	19.54
	TIS	-105.28	-106.13	-106.64
频段	参数\信道	50	300	550
band1	TRP	19.11	19.40	18.67
	TIS	-89.34	-90.34	-90.80
频段	参数\信道	1250	1575	1900
band3	TRP	18.97	18.56	18.44
	TIS	-90.27	-89.98	-89.26
频段	参数\信道	2450	2525	2600
band5	TRP	18.11	17.79	18.44
	TIS	-94.51	-94.63	-94.30
频段	参数\信道	2850	3100	3350
band7	TRP	17.25	17.17	17.82
	TIS	-91.34	-91.82	-91.57





频段	参数\信道	3500	3625	3750
band8	TRP	20.00	21.18	18.26
	TIS	-91.25	-90.89	-91.00
频段	参数\信道	2420	2430	2440
band20	TRP	17.93	18.60	18.96
	TIS	-90.40	-90.98	-90.11
频段	参数\信道	9260	9360	9460
band28	TRP	19.68	19.39	17.36
	TIS	-90.89	-92.16	-93.16
频段	参数\信道	37850	38000	38150
band38	TRP	18.89	18.72	17.29
	TIS	-88.15	-88.00	-87.86
频段	参数\信道	38750	39150	39550
band40	TRP	18.71	18.94	19.19
	TIS	-90.60	-89.23	-88.8
频段	参数\信道	40340	40640	41140
band41	TRP	19.19	18.72	17.47
	TIS	-88.71	-87.69	-86.9





4.6 装配图 (Environment treatment)

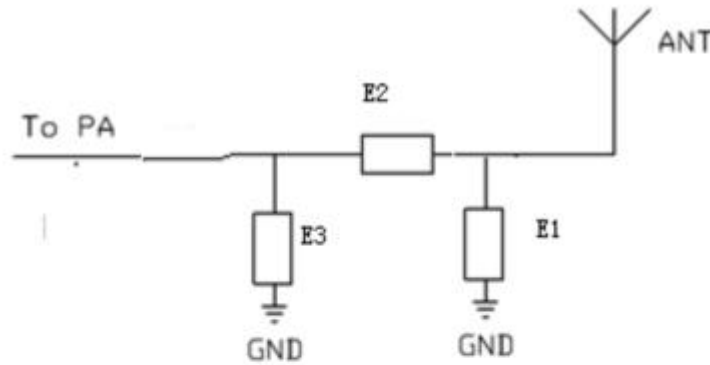


注意： 打印机排线没有接导电泡棉。





5. 匹配说明 (Matching circuit)

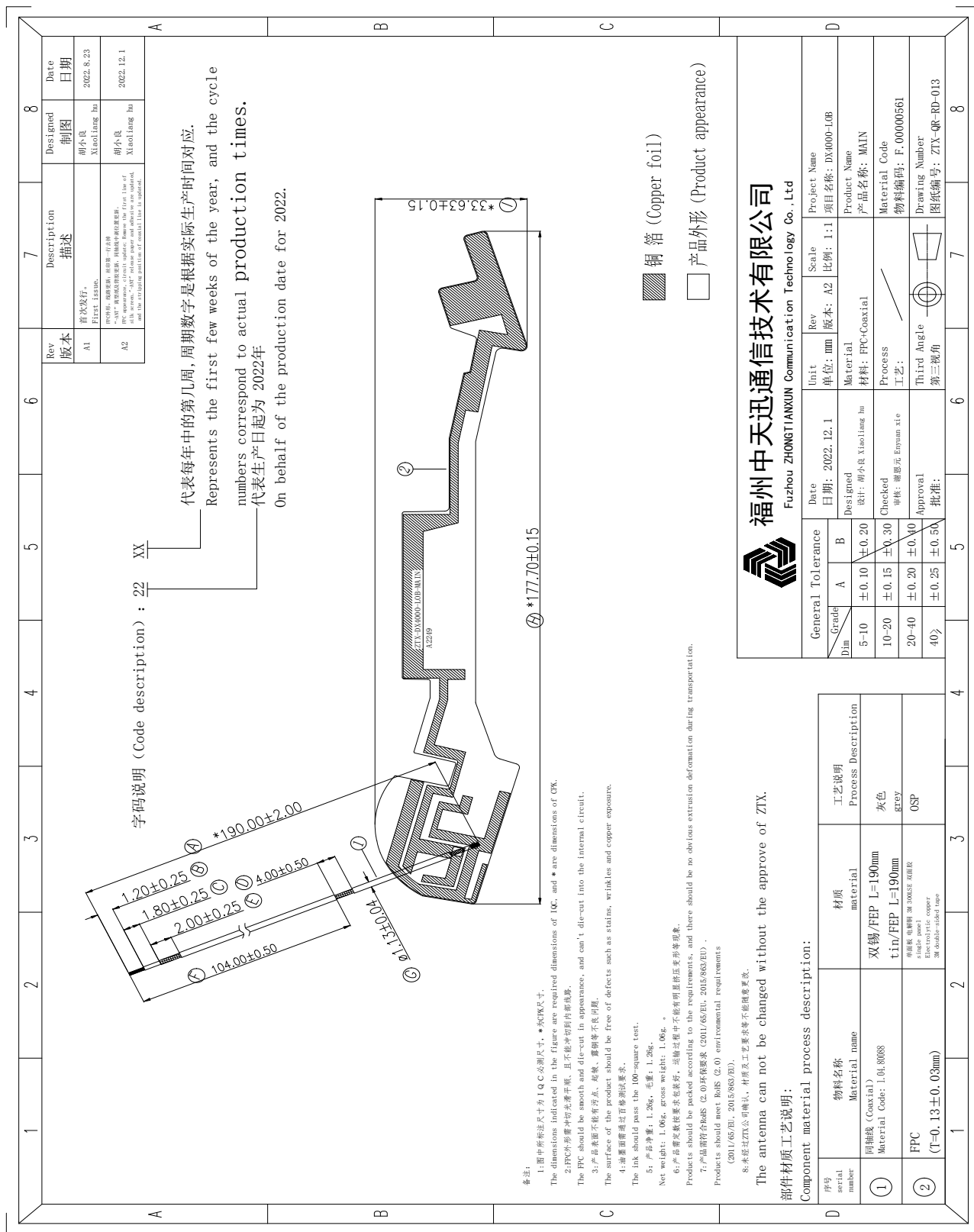


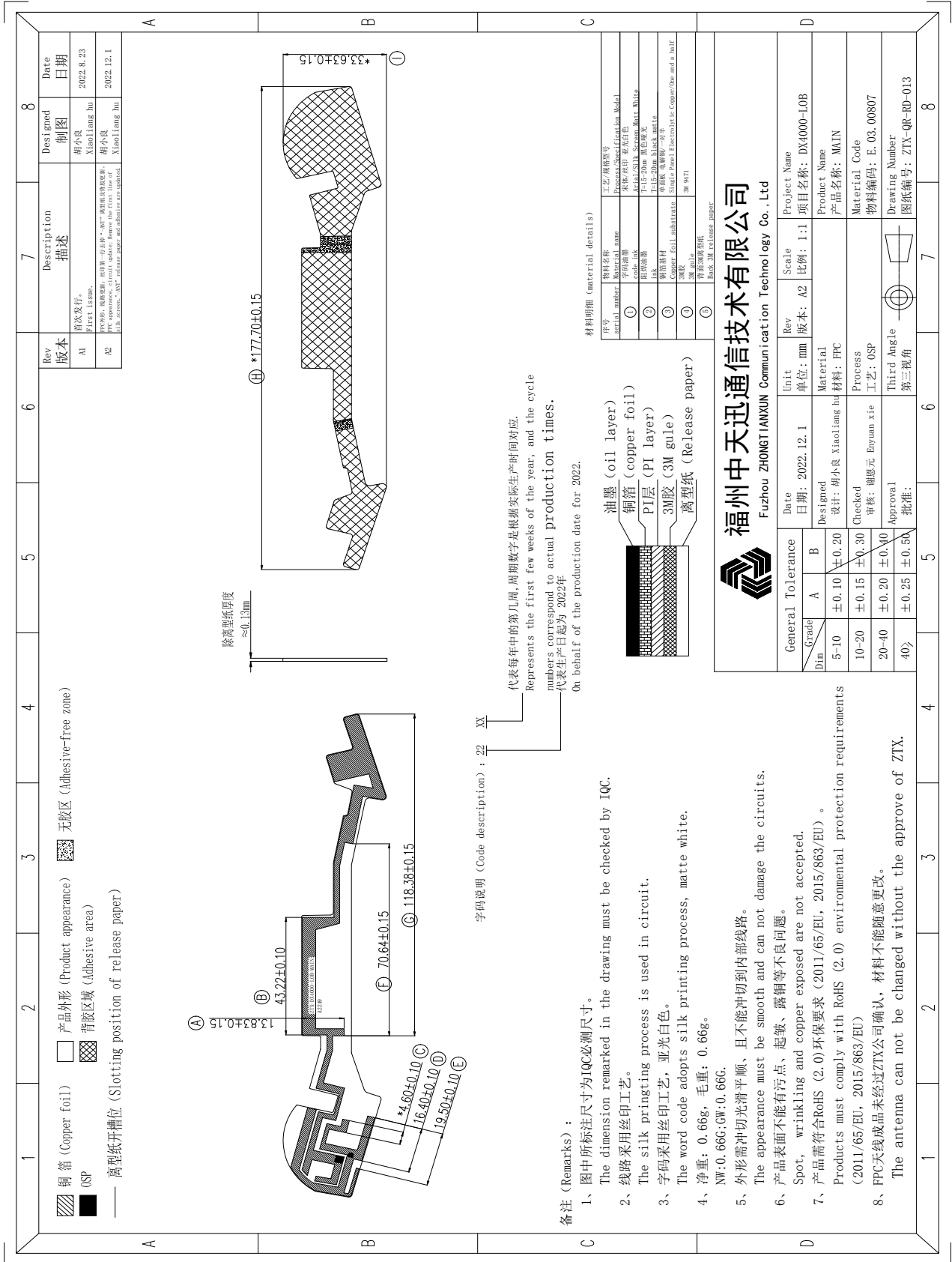
Matching description	LTE
E1	NC
E2	0 Ω
E3	NC

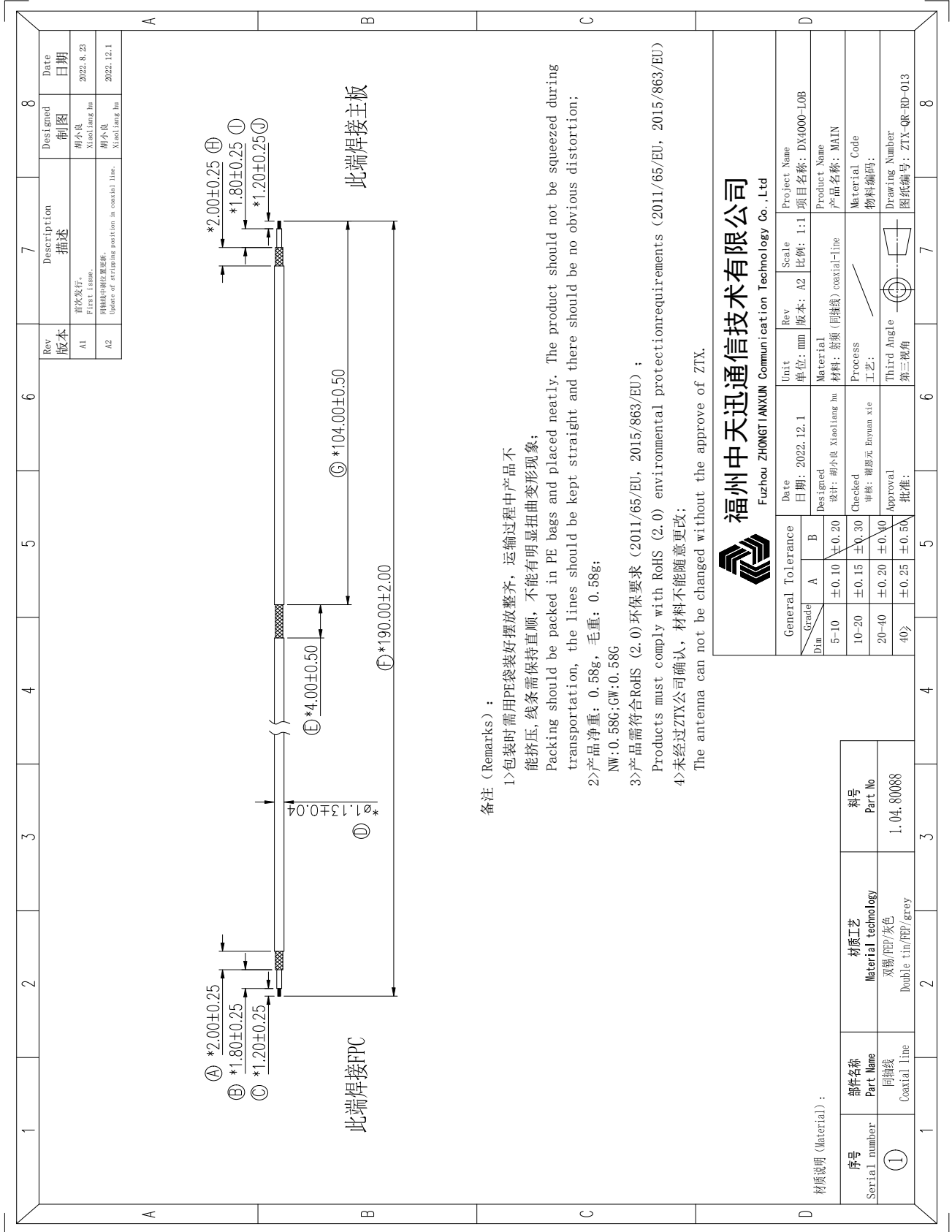




6. 天线外形图 (Mechanical Specification)







备注 (Remarks) :

- 1> 包装时需用PE袋装好摆放整齐, 运输过程中产品不能挤压, 线条需保持直顺, 不能有明显扭曲变形现象; Packing should be packed in PE bags and placed neatly. The product should not be squeezed during transportation, the lines should be kept straight and there should be no obvious distortion;
- 2> 产品净重: 0.58g, 毛重: 0.58g; NW: 0.58G; GW: 0.58G
- 3> 产品需符合RoHS (2.0) 环保要求 (2011/65/EU, 2015/863/EU) ; Products must comply with RoHS (2.0) environmental protection requirements (2011/65/EU, 2015/863/EU)
- 4> 未经过ZTX公司确认, 材料不能随意更改; The antenna can not be changed without the approve of ZTX.



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General		Tolerance		Date	Unit	Rev	Scale	Project Name	
Date		Date		2022.12.1	mm	A2	比例: 1:1	DX4000-LOB	
Designed		Material		设计: 胡小亮 Xiao Liang hu	材料: 射频 (同轴线) coaxial-line		Product Name		
Checked		Process		审核: 谢德元 Eshuan xie	工艺:		产品名称: MAIN		
Approval		Third Angle		批准:	第三视角		物料编码:		
Drawing Number		图纸编号		ZTX-QR-RD-013					

序号	部件名称	材质工艺	料号
1	同轴线	双锡/PP/灰色	1.04.800688
	Coaxial line	Double tin/PP/grey	





7. 包装作业指导 (The packing way)

福州中天迅通信技术有限公司 Fuzhou ZHONGTIANXUN Communication Technology Co., Ltd		包装规范	
产品名称	产品型号	工序序号/名称	版本
MAIN	DY4000-LOB	包装	A1
		<p>文件编号 ZTY-QD-WI-023</p> <p>仪器校准及要求: 1. 测试设备必须接地; 2. 重新连接接口后或连接测试时不稳定时,需对仪器进行校正; 3. 测试产品时保证无线号悬空,并远离人体或金属器件30cm以上;</p> <p>作业方法/作业参数 (自检验工序作业合格后,方能流入下一道工序) 1. 确认数量50pcs产品橡皮筋包扎; 2. 将50pcs产品装入 (240*160mm) PE开口袋中,贴小标签,填写产品名称、物料号、数量、周期等信息; 3. 每5袋装入 (330*230mm) PE封口袋装好 (250PCS)的PE装袋,贴小标签,填写产品名称、物料号、数量、周期等信息; 3. 装箱: 纸箱规格 (45*32.5*21cm), 每箱装 (5000pcs) 尾数除外, 并附手写检验报告一份; 4. 标签贴于外箱的右上角, 外标签内容 (含: 企业名称, 供应商代码, 客户规格号, 生产周期, 生产批次包装数量, 供应商代码, 内附检验报告, RQC等); 5. 将贴好标签的箱子用胶纸以“工”字型封箱;</p> <p>操作防护要求: 1. 作业人员需带手套进行操作, (特殊产品需带手套); 2. 检测过程中检测产品做到轻拿轻放; 3. 操作测试治具时, 严格按照操作规范使用, 避免伤手; 6S要求: 1. 保持检测现场台面整洁, 无尘、水、油污; 2. 物料摆放整齐, 标识清楚;</p> <p>注意事项: 1. 客户物料编码和数量是否正确, 标签必须用机打印的 2. 内标签、外标签、出货报告、送货单内容需一致。 3. 如是试产物料或有变更均需贴相应标识, 尾数箱需贴尾数标识, 内附检验报告等</p>	
<p>图1: 确认数量</p>		<p>物料名称</p> <p>PE开口袋</p> <p>PE封口袋</p> <p>纸板</p> <p>纸箱</p> <p>标签</p> <p>橡皮筋</p> <p>规格</p> <p>240*160*0.05mm</p> <p>330*230*mm</p> <p>42*30cm</p> <p>45*32.5*21cm</p> <p>用量</p> <p>100/袋</p> <p>10/袋</p> <p>2张/箱</p> <p>1/箱</p> <p>备注</p>	
<p>图2: 封口PE袋包装/贴标签</p>		<p>修订日期</p> <p>修订内容</p> <p>修订人</p>	
<p>图3: 封口PE袋包装/贴标签</p>		<p>物料代码</p> <p>1. 12. 000030</p> <p>1. 12. 000023</p> <p>1. 13. 000003</p> <p>1. 12. 000086</p>	
<p>图4: 装箱</p>		<p>审核</p> <p>胡小良</p> <p>批准</p> <p>张武民</p>	
<p>图5: 贴外箱标签 贴出货检验报告</p>		<p>制订</p> <p>易爱玲</p>	

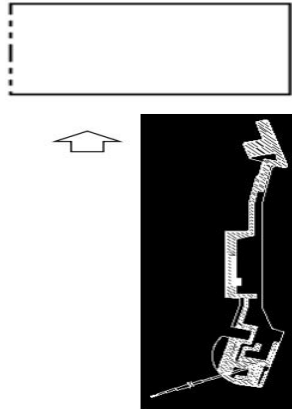




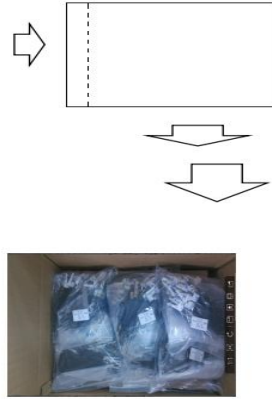
product name		Product number		Process number/name		File Number		Instrument calibration and requirements:	
MAIN		DY4000-LOB		package		ZIV-QD-WI-023		1. The test equipment must be grounded. 2. After reconnecting the interface or when the connection test is unstable, the instrument needs to be calibrated. 3. When testing the product, make sure that the antenna is suspended and kept away from the human body or metal devices at least 30cm.	
				1. Confirm the quantity of 50pcs products for rubber band wrapping. 2. Put 50pcs product into (240*160mm) PE open bag, paste small label, fill in product name, material number, quantity, period and other information. 4. Packing, carton size (45*32.5*21cm), except for the mantissa of each box (5000pcs), and a handwritten inspection report is attached. 5. The label is affixed to the upper right corner of the outer box, and the contents of the outer label (including: company name, supplier code, customer specification number, production cycle, production batch packaging quantity, supplier code, enclosed inspection report, ROHS, etc.). 6. Seal the labeled box with adhesive tape in the shape of "I";				Operational protection requirements: 1. Operators need to wear finger cots for operations (special products with cotton gloves). 2. During the testing process, the tested products should be handled with care. 3. When operating the test fixture, use it in strict accordance with the operating specifications to avoid	
								6S requirements: 1. Keep the test site clean and tidy, free of dust, water, and oil. 2. The materials are placed neatly and clearly marked.	
								Note: 1. Whether the customer material code and quantity are correct, the label must be printed by the machine. 2. The contents of the inner label, outer label, shipping report, and delivery note must be consistent. 3. If it is a test product or there is a change, the corresponding mark shall be affixed, the mantissa mark shall be affixed to the mantissa box, and the inspection report shall be enclosed.	
Material name	Material code	Specification	Dosage	Remarks					
PE open pocket	1.12.000030	240*160*0.05mm	100/bag						
PE sealed bag	1.12.000023	330*230*0mm	10/bag						
cardboard	1.13.000003	42*30cm	25张/box						
Carton	1.12.000056	45*32.5*21cm	1/box						
Label									
Rubber band									
version	modify the content			Revision date		Revised by			
Formulate	Xiaoliang hu	Review	Ailing yi	Approve		Wumin zhang			

SOP

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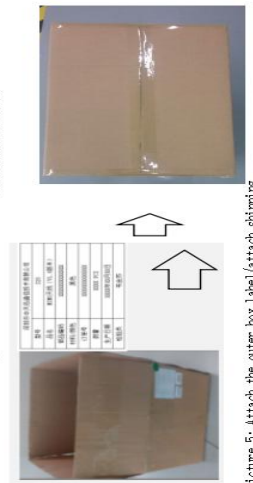


Picture 2: Sealed PE bag packaging/labeling



Picture 3: Sealed PE bag packaging/labeling

Figure 4: Packing



Picture 5: Attach the outer box label/attach shipping inspection report

Figure 6: Sealing

