

SPECIFICATION

SHEET FOR APPROVAL

(Revision: R: A1)

CUSTOMER	K-Free Limited	
CS P/N	K9701	
PART NAME	DLV Antenna	
FREQUENCY	FDD B2/14/12	
ZTX NO.	1.03.02270	144-00010
DATE	2019/09/06	

CUSTOMER			
QA CHECKED	ME CHECKED	RF CHECKED	MANAGER CHECKED

Remark(备注):

Sign(客户确认签字盖章): _____

ZHONG TIAN XUN TECHNOLOGY CO., LTD				
MANAGER CHECKED	MANAGER CHECKED	ME CHECKED	RF CHECKED	LISTER
		XiaoYu.Huang	Yi.Zou	



深圳市中天迅通信技术有限公司
SHENZHEN ZHONGTIAN XUN Communication Technology Co., Ltd.

Address: No.34, Shilong Avenue, Shiyan Town, Baoan District, Shenzhen, (Tengda Industrial Park) 518000

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ANTENNA SPECIFICATION

CUS P/N:K9701_DL V Antenna
ZTX P/N :K9701_DL V Antenna

Application Date:Sep,06,2019
Editor:

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Revision history

Edition	Date	state
A1	2019/09/06	First edition



ANTENNA SPECIFICATION

CUS P/N:K9701_DL V Antenna
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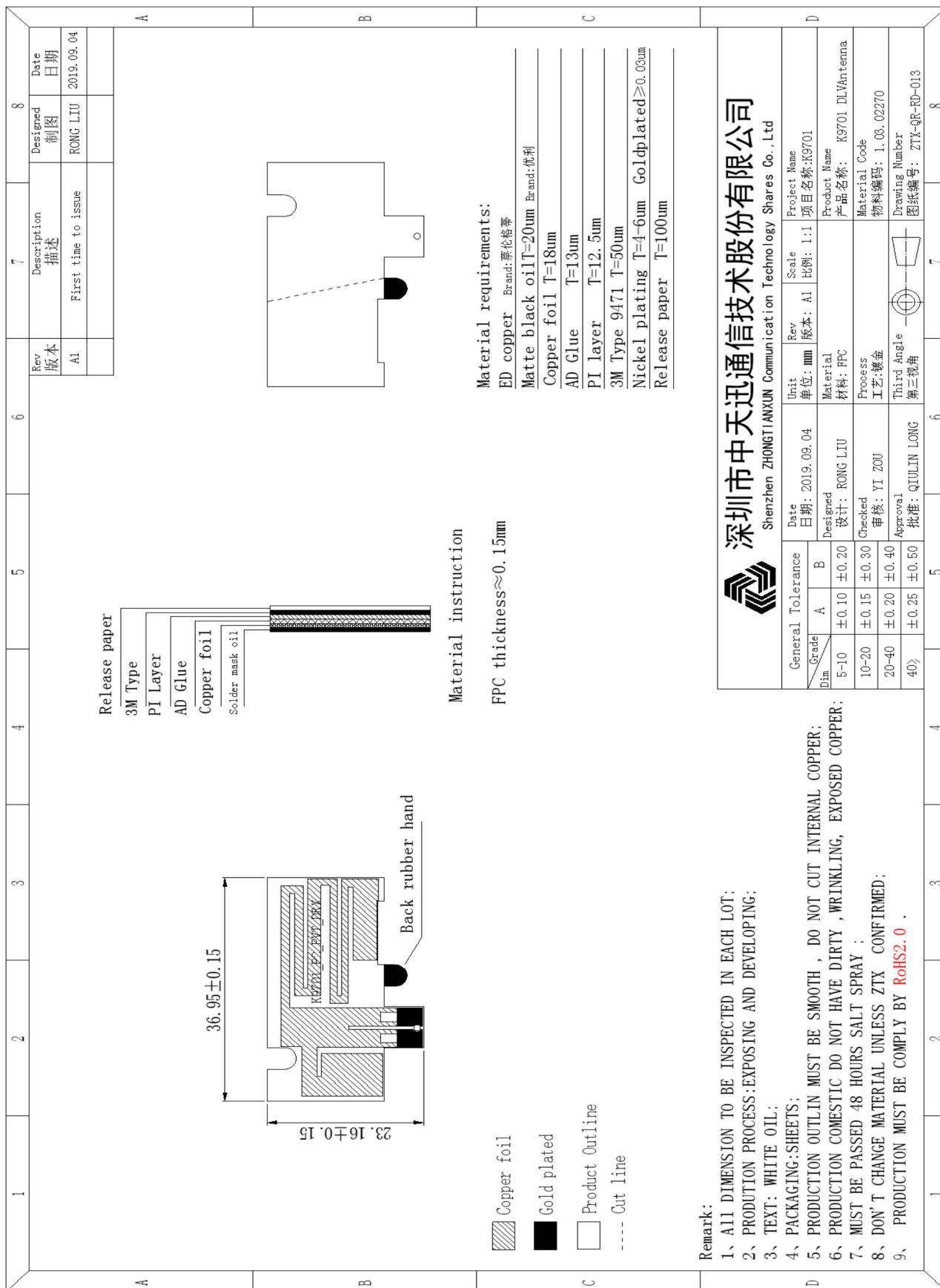
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1-1 Mechanical Configuration (DLV Antenna)



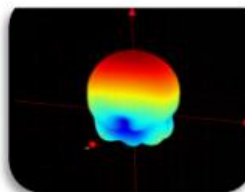
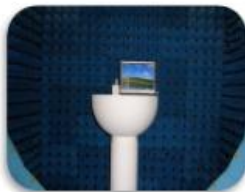
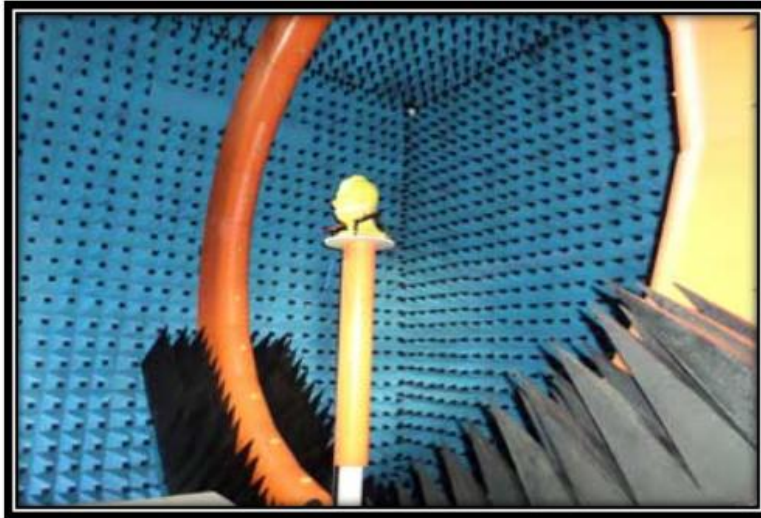
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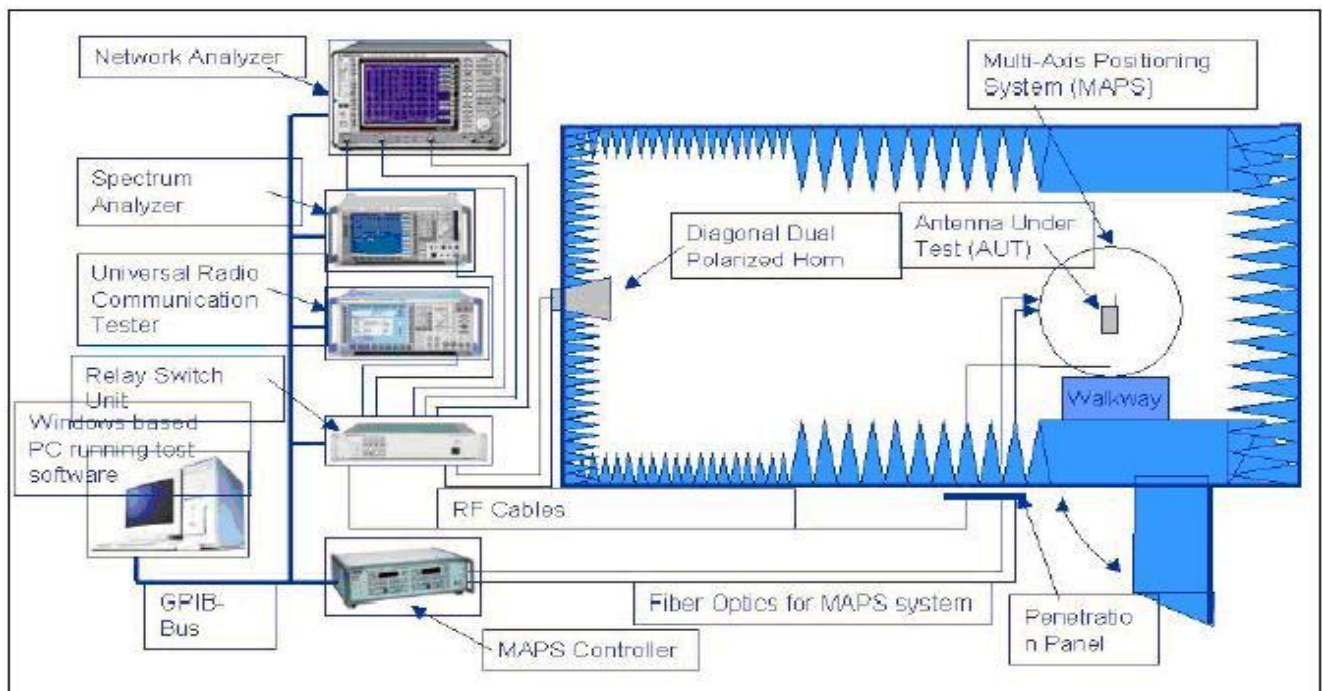
2. Test equipment



Owned 6 microwave dark room, equipped 2 sets world leading France Satimo SG24 OTA certification test systems (one in SHENZHEN, another one in Shanghai), ETS OTA Standard test system, Blue test reverberation test system which is High repeatability, high accuracy and high resolution. It can quickly provide accurate test reports, fully meet the CITA standards.

Testing range:

Support active, passive testing of
GSM/CDMA/WCDMA/TD-
SCDMA/LTE/WIFI/WLAN/WiMax/BT
/GPS/MIMO/UWB within 0.4-6G.



ANTENNA SPECIFICATION

CUS P/N:K9701_DLX Antenna
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3. Antenna test data

3-1 Test Data

FDD B12 分集	Freq (MHz)	Eff	FDD B2 分集	Freq (MHz)	Eff
	726000000	19.37%		1930000000	12%
	728000000	20.38%		1935000000	13%
	730000000	20.40%		1940000000	13%
	732000000	20.09%		1945000000	13%
	734000000	20.11%		1950000000	13%
	736000000	20.44%		1955000000	14%
	738000000	20.87%		1960000000	15%
	740000000	20.45%		1965000000	15%
	742000000	19.35%		1970000000	15%
	744000000	18.56%		1975000000	16%
	746000000	18.37%		1980000000	18%
				1985000000	19%
FDD B4分集	2110000000	48%		1990000000	19%
	2115000000	47%			
	2120000000	46%			
	2125000000	44%			
	2130000000	40%			
	2135000000	37%			
	2140000000	35%			
	2145000000	36%			
	2150000000	35%			
	2155000000	33%			



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Band	GAIN	Band	GAIN
GSM850	1.5dB	WCDMA B4	2.2dB
EGSM	1.5dB	WCDMA B8	1.5dB
DCS	2.1dB	FDD B2	2.2dB
PCS	2.2dB	FDD B4	2.2dB
WCDMA B1	2.4dB	FDD B5	1.5dB
WCDMA B2	2.2dB	FDD B7	2.5dB
WCDMA B5	1.5dB	FDD B12	1.1dB

Band	增益	Band	增益
FDD B20	1.3dB	TD-F	2.2dB
FDD B1	2.4dB	TDD B38	2.3dB
FDD B3	2.1dB	TDD B39	2.1dB
FDD B8	1.5dB	TDD B40	2.2dB
FDD B17	1.2dB	TDD B41	2.4dB
FDD B13	1.2dB		
TD-A	2.2dB		



ANTENNA SPECIFICATION

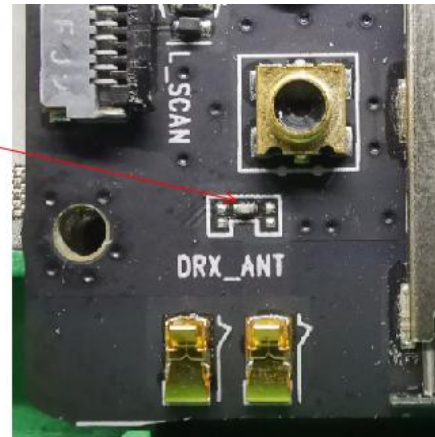
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3-2 Matching circuit

分集天线匹配：把串位0欧姆改成串联3.3pF。



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4.Environment Characteristic

NO.	ITEM	TEST CONDITION	SPECIFICATION
4-1	High Temperature/Humidity Storage Test(non operating)	1.Temperature: $+70 \pm 2^{\circ}\text{C}$ 2.Humidity: 90~95%RH 3.Time: 48hrs	No material deformation is allowed.
4-2	Low Temperature/Humidity Storage Test(non operating)	1.Temperature: $-30 \pm 2^{\circ}\text{C}$ 2.Humidity: 0%RH 3.Time:48hrs	The VSWR, Gain, Radiation Pattern must be met specifications after these test.



ANTENNA SPECIFICATION

CUS P/N:K9701_DLV Antenna
ZTX P/N :K9701 DLV Antenna

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5.The packing way

深圳市中天迅通信科技股份有限公司

SHENZHEN ZHONGTIAN XUN Communication Technology Co.,Ltd., Ltd.

SOP

product name		product model	Antenna Type	Version	document number
Antenna		K9701	PFC	A1	
Packing diagram			Packaging process	matters need attention	
 Figure 1: weighing and bagging  Figure 2: large PE bag for every 10 small bags  Figure 3: small tags and traceability codes  Figure 4: Label and seal box			1 > Each 100PCS product is packaged with (130*90mm) PE sealed plastic bag and tagged with (material name, material code, quantity, date);	1. The label is affixed to the upper right corner of the carton (label content includes: product name / quantity / manufacturing date / order number, etc.)	
			2 > Open PE bag (160*240mm) for every 10 bags (1000PCS); closed PE bag (230*330mm) for every 10 bags (10000PCS); packaging and label containing (material name, material code, quantity, date)		
			3 > Packing, carton specification (25*20*18cm), except for the end of each case (20000~40000pcs); affixed with the outer box label, affixed to the upper right corner of the outer box, the label content includes (manufacturer, model, product name, customer code, quantity, order number, date, QA inspection).		
			4> The case with good label shall be sealed with glue paper in a "a man"-shaped type.		
Packing material detail					Volume per box
Material		material quality		dimensions	1
carton		K=K		(45*32.5*21)cm	
PE bag		PE		(24*16)cm	100PCS
PE bag		PE		230*330mm	10PCS
label					/
Version				Date	Made by
Formulation: Huang Xiaoyu			Audit: long Qiulin approval: Han Zhenyu		

SPECIFICATION

SHEET FOR APPROVAL

(Revision: R: A1)

CUSTOMER	K-Free Limited	
CS P/N	K9701	
PART NAME	GPS Antenna	
FREQUENCY	1555~1600MHz	
ZTX NO.	1.03.02272	144-00011
DATE	2019/09/06	

CUSTOMER			
QA CHECKED	ME CHECKED	RF CHECKED	MANAGER CHECKED

Remark(备注):

Sign(客户确认签字盖章): _____

ZHONG TIAN XUN TECHNOLOGY CO., LTD				
MANAGER CHECKED	MANAGER CHECKED	ME CHECKED	RF CHECKED	LISTER
		XiaoYu.Huang	Yi.Zou	



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Application Date:Sep,06,2019

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深圳市中天迅通信技术股份有限公司
SHENZHEN ZHONGTIAN XUN Communication Technology Co., Ltd.

ANTENNA SPECIFICATION

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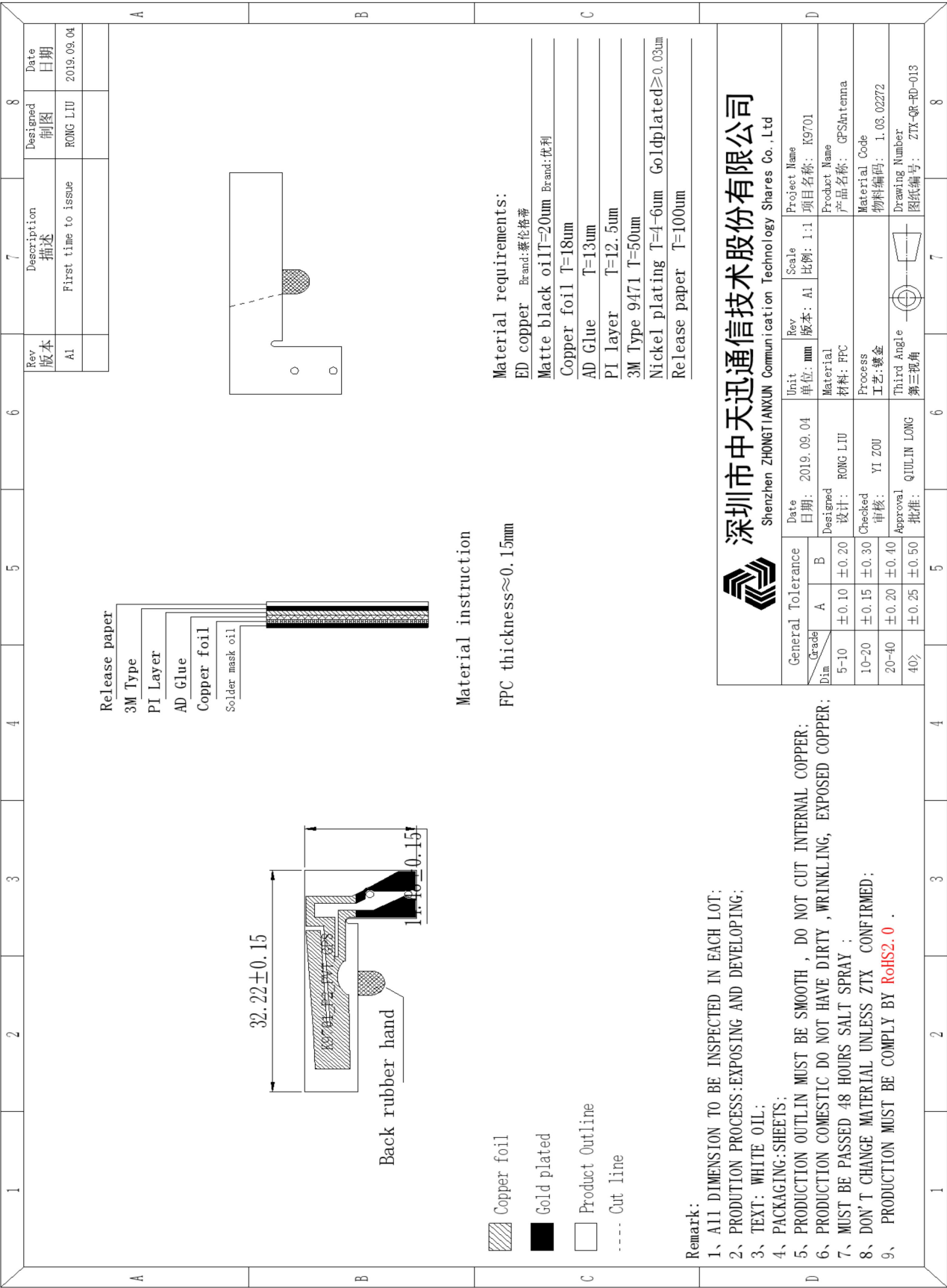
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1. Mechanical Specification

1-1 Mechanical Configuration (GPS Antenna)



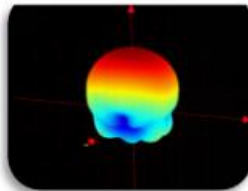
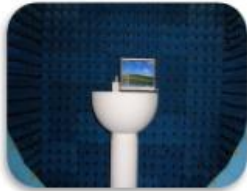
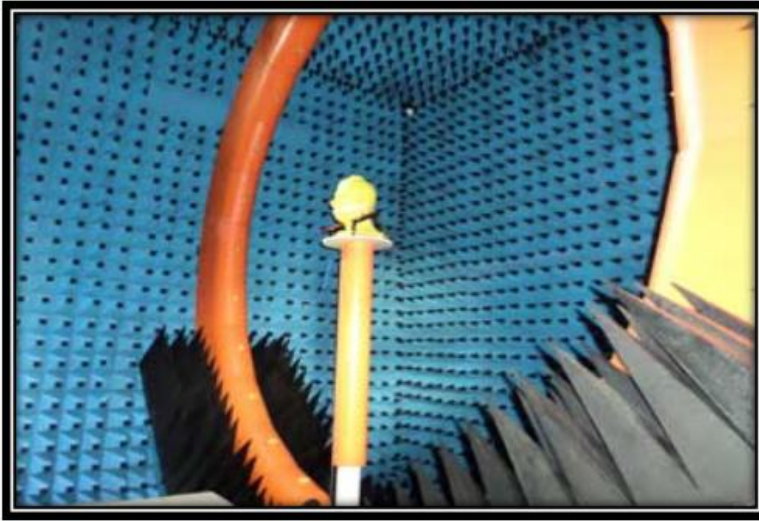
ANTENNA SPECIFICATION

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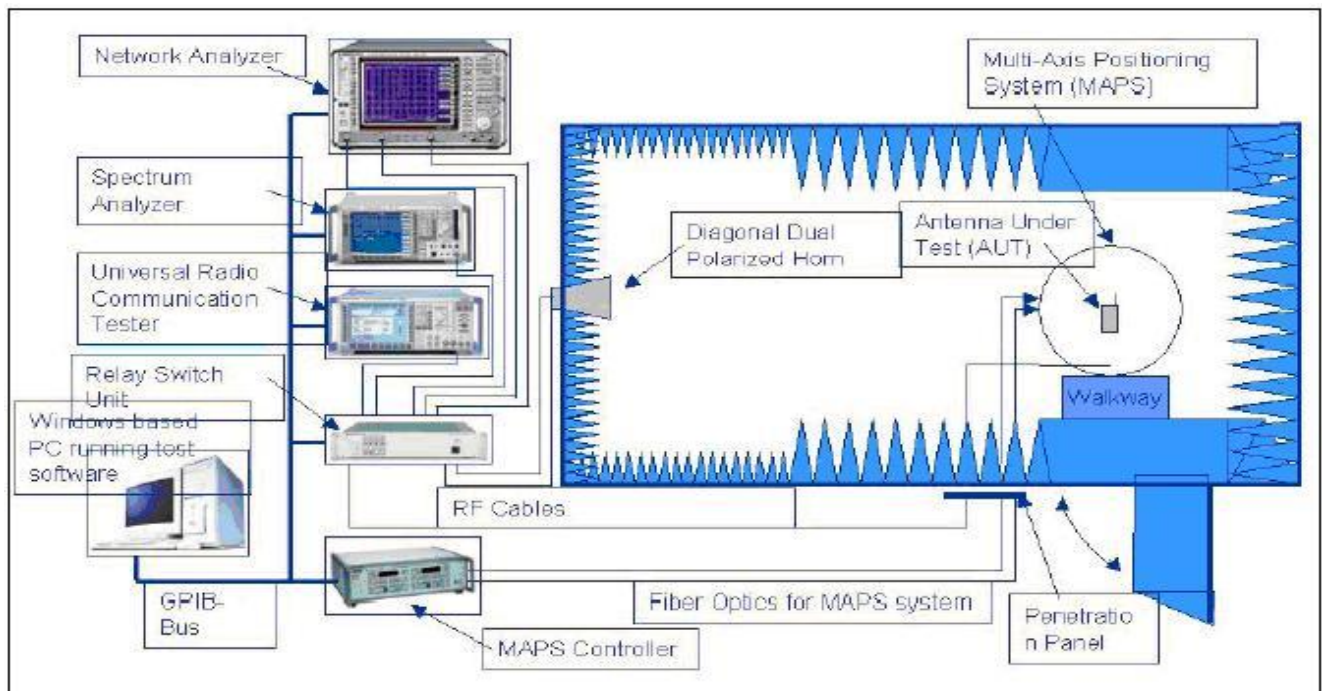
2. Test equipment



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Testing range:

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GSM/CDMA/WCDMA/TD-
SCDMA/LTE/WIFI/WLAN/WiMax/BT
/GPS/MIMO/UWB within 0.4-6G.



ANTENNA SPECIFICATION

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3.Antenna test data

3-1 No-source test data

Frequency	Efficiency	Efficiency . dB
1550000000	48%	-3.2
1555000000	48%	-3.2
1560000000	48%	-3.1
1565000000	49%	-3.1
1570000000	49%	-3.1
1575000000	49%	-3.1
1580000000	49%	-3.1
1585000000	50%	-3.0
1590000000	50%	-3.0
1595000000	49%	-3.1
1600000000	48%	-3.1

Band	GAIN
GPS	2.6dB

3-2 Matching circuit

N/A



ANTENNA SPECIFICATION

CUS P/N:K9701_GPS Antenna
ZTX P/N :K9701_GPS Antenna

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4.Environment Characteristic

NO.	ITEM	TEST CONDITION	SPECIFICATION
4-1	High Temperature/Humidity Storage Test(non operating)	1.Temperature: $+70 \pm 2^{\circ}\text{C}$ 2.Humidity: 90~95%RH 3.Time: 48hrs	No material deformation is allowed.
4-2	Low Temperature/Humidity Storage Test(non operating)	1.Temperature: $-30 \pm 2^{\circ}\text{C}$ 2.Humidity: 0%RH 3.Time:48hrs	The VSWR, Gain, Radiation Pattern must be met specifications after these test.



ANTENNA SPECIFICATION

CUS P/N:K9701_GPS Antenna
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5.The packing way

SOP				
深圳市中天迅通信技术有限公司 SHENZHEN ZHONGTIAN XUN Communication Technology Co.,Ltd.,Ltd.		product name	product model	Antenna Type
Antenna		K9701	FPC	
Version		A1		
document number				
matters need attention		1. The label is affixed to the upper right corner of the carton (label content includes: product name / quantity / manufacturing date / order number, etc.)		
Packing process		1 > Each 100PCS product is packaged with (130*90mm) PE sealed plastic bag and tagged with (material name, material code, quantity, date); 2 > Open PE bag (160*240mm) for every 10 bags (1000PCS); closed PE bag (230*330mm) for every 10 bags (10000PCS); packaging and label containing (material name, material code, quantity, date) 3 > Packing, carton specification (25*20*18cm), except for the end of each case (20000~40000pcs); affixed with the outer box label, affixed to the upper right corner of the outer box, the label content includes (manufacturer, model, product name, customer code, quantity, order number, date, QA inspection). 4> The case with good label shall be sealed with glue paper in a "a man"-shaped type.		
Packing material detail				
Material	material quality	dimensions	Volume per box	
carton	K=K	(45*32.5*21)cm	1	
PE bag	PE	(24*16)cm	100PCS	
PE bag	PE	230*330mm	10PCS	
label			/	
Contents		Date	Made by	
Version				
Formulation: Huang Xiaoyu		approval: Han Zhenyu		
Audit: long Qiulin				



SPECIFICATION

SHEET FOR APPROVAL

(Revision: R: A1)

CUSTOMER	K-Free Limited	
CS P/N	K9701	
PART NAME	GSM Antenna	
FREQUENCY	GSM850/EGSM/DCS/PCS/FDD B2/4/5/12/WCDMA B2/4	
ZTX NO.	1.03.02269	144-00009
DATE	2019/09/06	

CUSTOMER			
QA CHECKED	ME CHECKED	RF CHECKED	MANAGER CHECKED

Remark(备注):

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CUS P/N:K9701_GSM Antenna

Application Date:Sep,06,2019

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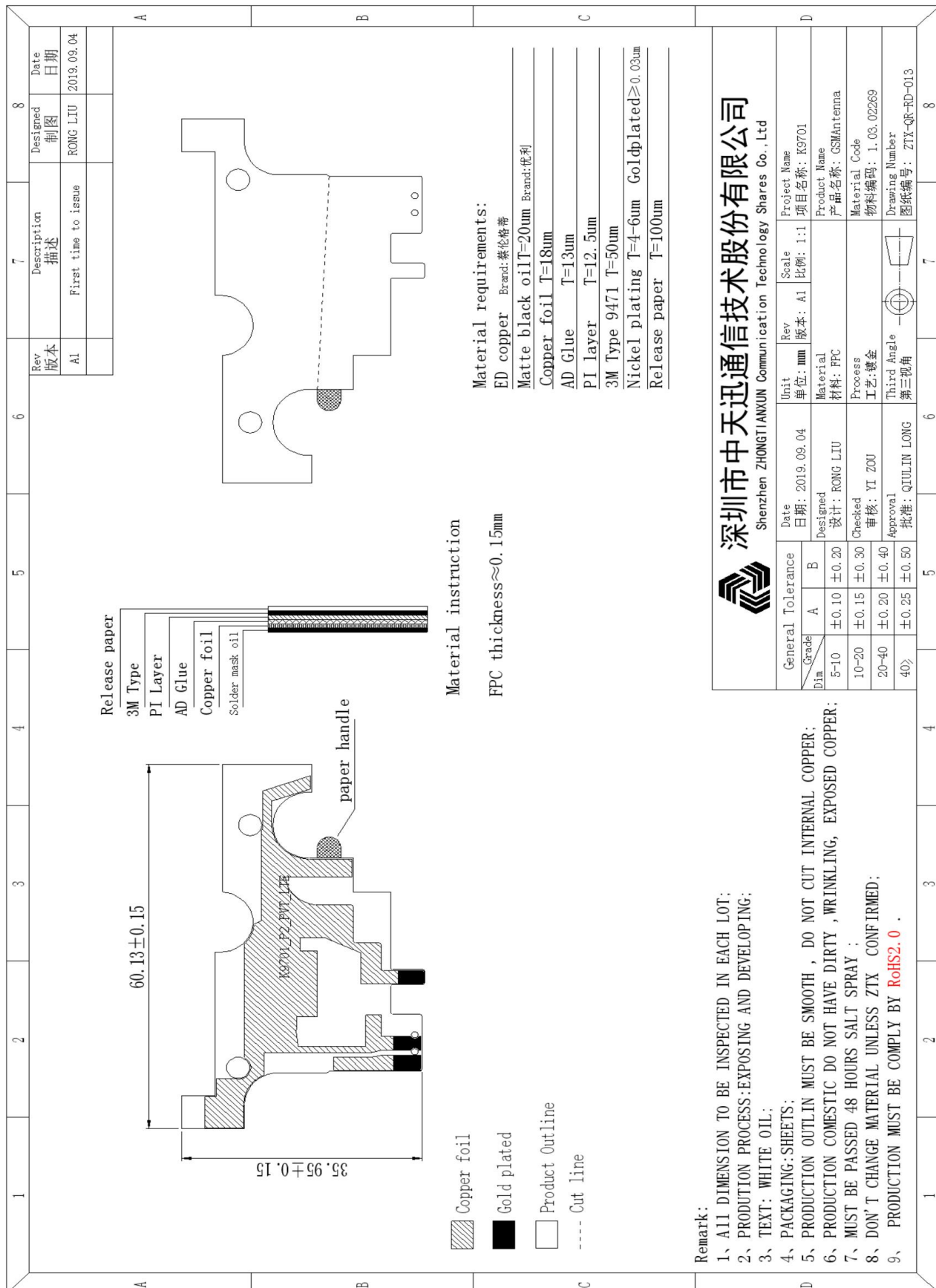
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1. Mechanical Specification

1-1 Mechanical Configuration (GSM Antenna)



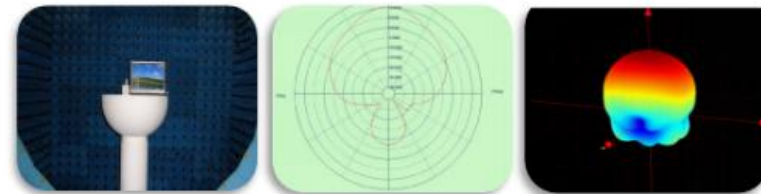
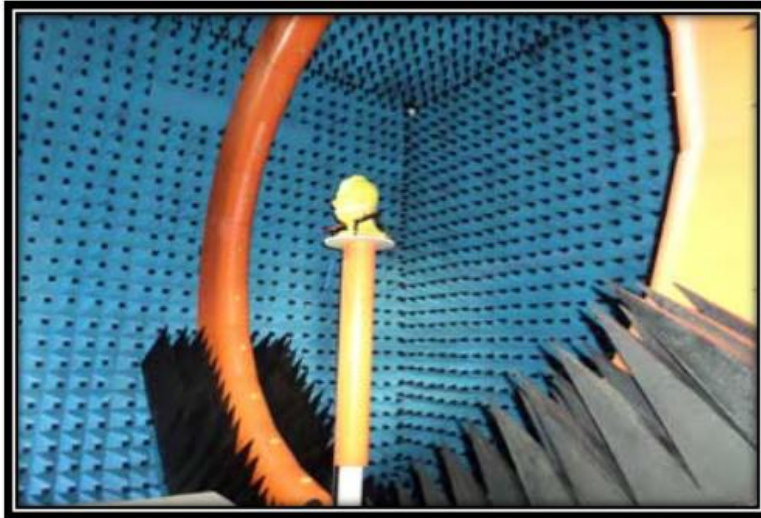
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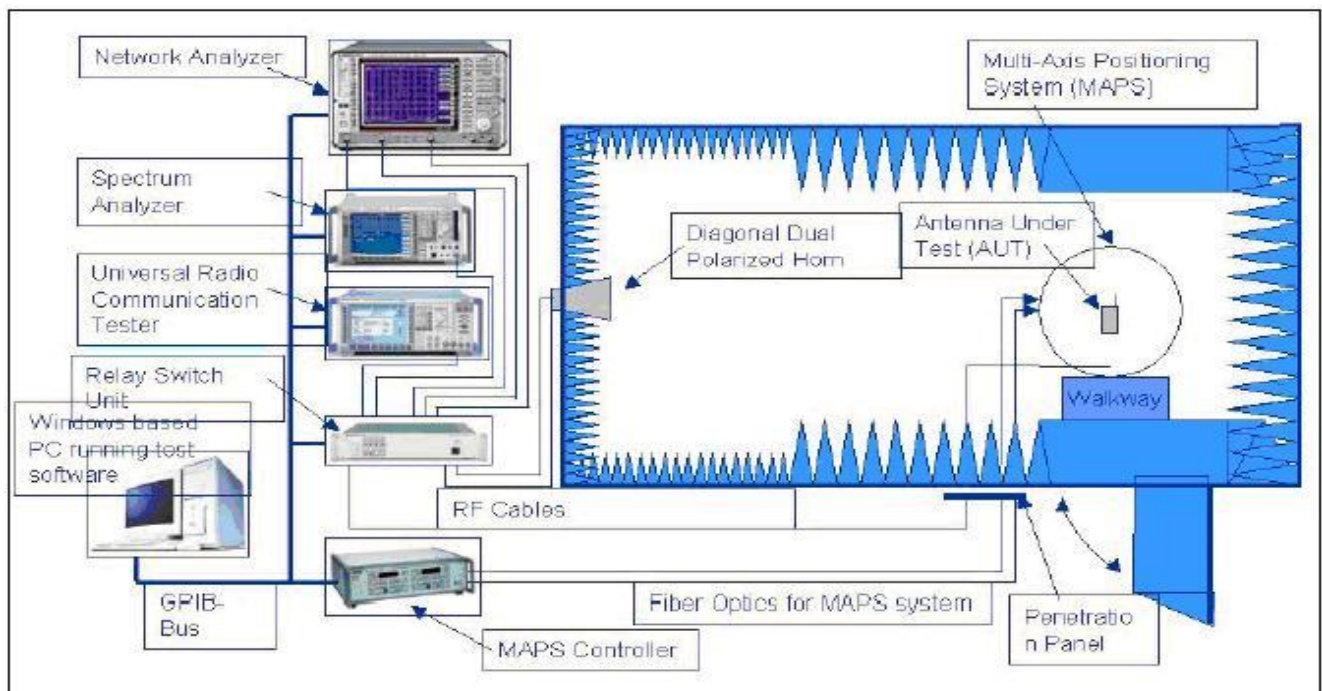
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3.Antenna test data

3-1 Test Data

Band	主天线3D数据	
	TRP (3D)	TIS (3D)
FDD B2	17.95	-
	17.58	-
	17.35	-94.48
FDD B4	16.88	-
	17.46	-
	17.5	-94.61
FDD B12	16	-
	16.5	-
	16.86	-85.91
FDD B5	17.7	-
	18.46	-
	18.97	-89.19

Band	主天线3D数据	
	TRP (3D)	TIS (3D)
WCDMA B2	17.34	-
	17.04	-
	16.85	-103.76
WCDMA B4	17.45	-
	17.92	-
	18.2	-106.61

3-2 No-source test data

新主板主路串0欧姆并10nh,								
	开关r4 并10nh (B12)		开关r1 并18pf(B5/2)		开关r2 并3nh(B4)		开关r3 并3nh	
Frequency	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB
698000000	22%	-6.5	5%	-12.7	7%	-11.5	7%	-11.5
700000000	23%	-6.5	5%	-12.7	7%	-11.4	7%	-11.4
710000000	29%	-5.4	7%	-11.6	10%	-9.8	10%	-10.1
720000000	33%	-4.9	8%	-11.0	13%	-8.7	12%	-9.1
730000000	32%	-4.9	9%	-10.6	16%	-8.0	15%	-8.3
740000000	32%	-4.9	10%	-10.0	19%	-7.3	18%	-7.5
750000000	29%	-5.4	11%	-9.7	21%	-6.7	20%	-6.9
824000000	13%	-9.0	37%	-4.3	42%	-3.8	45%	-3.5
830000000	12%	-9.0	40%	-4.0	40%	-3.9	44%	-3.6
840000000	11%	-9.5	43%	-3.6	37%	-4.3	41%	-3.9
850000000	10%	-10.0	44%	-3.5	33%	-4.9	36%	-4.5
860000000	9%	-10.5	43%	-3.7	29%	-5.4	31%	-5.1
870000000	8%	-10.8	40%	-4.0	25%	-6.0	27%	-5.7
880000000	8%	-11.0	37%	-4.3	23%	-6.3	25%	-6.1
890000000	8%	-11.2	33%	-4.8	21%	-6.8	22%	-6.6
894000000	8%	-11.1	33%	-4.8	21%	-6.8	22%	-6.5

新主板主路串0欧姆并10nh,								
	开关r4 并10nh (B12)		开关r1 并18pf(B5/2)		开关r2 并3nh(B4)		开关r3 并3nh	
Frequency	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB	Efficiency	Efficiency . dB
1710000000	43%	-3.7	39%	-4.1	44%	-3.5	45%	-3.5
1730000000	43%	-3.7	39%	-4.1	44%	-3.5	45%	-3.5
1750000000	41%	-3.9	38%	-4.2	42%	-3.8	42%	-3.7
1850000000	41%	-3.9	43%	-3.7	42%	-3.8	41%	-3.8
1870000000	41%	-3.9	44%	-3.5	41%	-3.8	41%	-3.9
1890000000	39%	-4.1	42%	-3.8	39%	-4.1	39%	-4.1
1910000000	41%	-3.9	44%	-3.6	41%	-3.9	40%	-3.9
1930000000	41%	-3.9	44%	-3.6	40%	-3.9	40%	-3.9
1950000000	40%	-4.0	43%	-3.6	40%	-4.0	40%	-4.0
1970000000	42%	-3.8	45%	-3.4	42%	-3.8	41%	-3.8
1990000000	39%	-4.1	44%	-3.6	40%	-4.0	40%	-4.0
2110000000	33%	-4.9	34%	-4.7	35%	-4.6	34%	-4.7
2130000000	28%	-5.6	28%	-5.5	30%	-5.3	30%	-5.2
2150000000	29%	-5.3	30%	-5.2	31%	-5.1	32%	-4.9



ANTENNA SPECIFICATION

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Band	GAIN	Band	GAIN
GSM850	1.5dB	WCDMA B4	2.2dB
EGSM	1.5dB	WCDMA B8	1.5dB
DCS	2.1dB	FDD B2	2.2dB
PCS	2.2dB	FDD B4	2.2dB
WCDMA B1	2.4dB	FDD B5	1.5dB
WCDMA B2	2.2dB	FDD B7	2.5dB
WCDMA B5	1.5dB	FDD B12	1.1dB

Band	增益	Band	增益
FDD B20	1.3dB	TD-F	2.2dB
FDD B1	2.4dB	TDD B38	2.3dB
FDD B3	2.1dB	TDD B39	2.1dB
FDD B8	1.5dB	TDD B40	2.2dB
FDD B17	1.2dB	TDD B41	2.4dB
FDD B13	1.2dB		
TD-A	2.2dB		



ANTENNA SPECIFICATION

CUS P/N:K9701_GSM Antenna

ZTX P/N :K9701_GSM Antenna

Application Date:Sep,06,2019

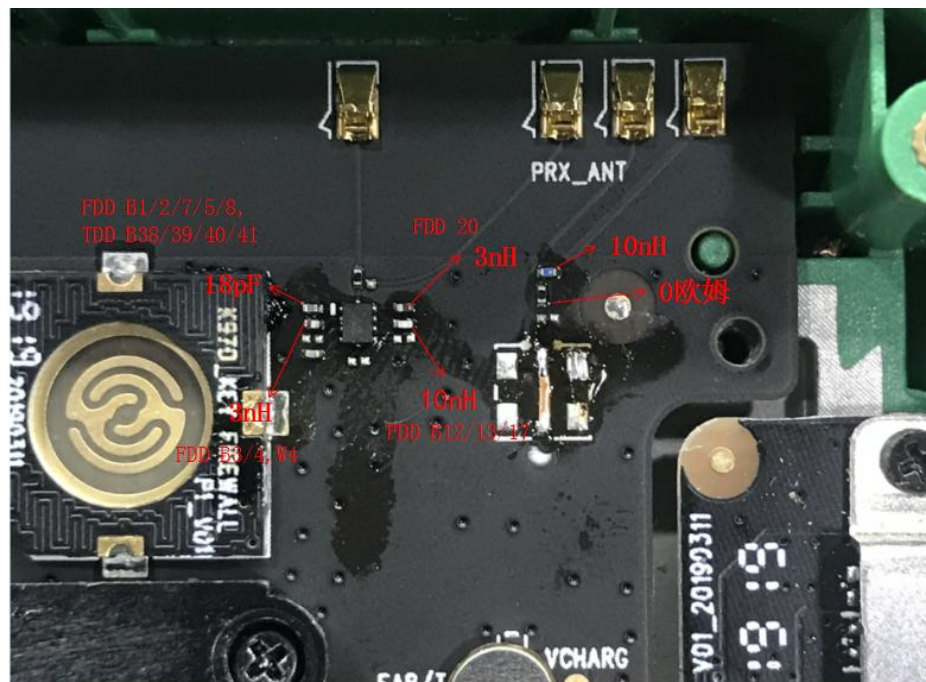
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3-3 Matching circuit

loop+寄生方案



注意：GPS和WiFi没有调试匹配，板子默认。



ANTENNA SPECIFICATION

CUS P/N:K9701_GSM Antenna
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4.Environment Characteristic

NO.	ITEM	TEST CONDITION	SPECIFICATION
4-1	High Temperature/Humidity Storage Test(non operating)	1.Temperature: $+70 \pm 2^{\circ}\text{C}$ 2.Humidity: 90~95%RH 3.Time: 48hrs	No material deformation is allowed.
4-2	Low Temperature/Humidity Storage Test(non operating)	1.Temperature: $-30 \pm 2^{\circ}\text{C}$ 2.Humidity: 0%RH 3.Time:48hrs	The VSWR, Gain, Radiation Pattern must be met specifications after these test.



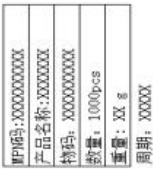
ANTENNA SPECIFICATION

CUS P/N:K9701_GSM Antenna
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5.The packing way

SOP				
product name	product model	Antenna Typ	Version	document number
Antenna	K9701	FPC	A1	
Packing diagram			Packaging process	matters need attention
 Figure 1: weighing and bagging  Figure 2: large PE bag for every 10 small bags  Figure 3: small tags and traceability codes  Figure 4: Label and seal box			1 > Each 100PCS product is packaged with (130*90mm) PE sealed plastic bag and tagged with (material name, material code, quantity, date); 2 > Open PE bag (160*240mm) for every 10 bags (1000PCS); closed PE bag (230*330mm) for every 10 bags (10000PCS); packaging and label containing (material name, material code, quantity, date) 3 > Packing, carton specification (25*20*18cm), except for the end of each case (20000~40000pcs); affixed with the outer box label, affixed to the upper right corner of the outer box, the label content includes (manufacturer, model, product name, customer code, quantity, order number, date, QA inspection). 4> The case with good label shall be sealed with glue paper in a "a man"-shaped type.	1. The label is affixed to the upper right corner of the carton (label content includes: product name / quantity / manufacturing date / order number, etc.)
			Packing material detail	
			Material	material quality
			carton	K=K
			PE bag	PE
			PE bag	PE
			label	
			dimensions	Volume per box
			(45*32.5*21)cm	1
			(24*16)cm	100PCS
			230*330mm	10PCS
				/
Version	Contents			Date
				Made by
Formulation: Huang Xiaoyu			approval: Han Zhenyu	
			Audit: long Qiulin	



SPECIFICATION

SHEET FOR APPROVAL

(Revision: R: A1)

CUSTOMER	K-Free Limited	
CS P/N	K9701	
PART NAME	WIFI/BT Antenna	
FREQUENCY	2400~2500MHz/5150~5850MHz	
ZTX NO.	1.03.02271	144-00012
DATE	2019-07-04	

CUSTOMER			
QA CHECKED	ME CHECKED	RF CHECKED	MANAGER CHECKED

Remark(备注):

Sign(客户确认签字盖章): _____

ZHONG TIAN XUN TECHNOLOGY CO., LTD				
MANAGER CHECKED	MANAGER CHECKED	ME CHECKED	RF CHECKED	LISTER
		XiaoYu.Huang	Yi.Zou	



深圳市中天迅通信科技股份有限公司
SHENZHEN ZHONGTIAN XUN Communication Technology Co., Ltd.

Address: No.34, Shilong Avenue, Shiyao Town, Baoan District, Shenzhen, (Tengda Industrial Park) 518000

Tel.: 0755-27588320 Fax: 0755-27588045 <http://www.chinaztx.com>

ANTENNA SPECIFICATION

CUS P/N:K9701_WIFI/BT Antenna

Application Date:Sep,06,2019

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Revision history

Edition	Date	state
A1	2019/09/06	First edition



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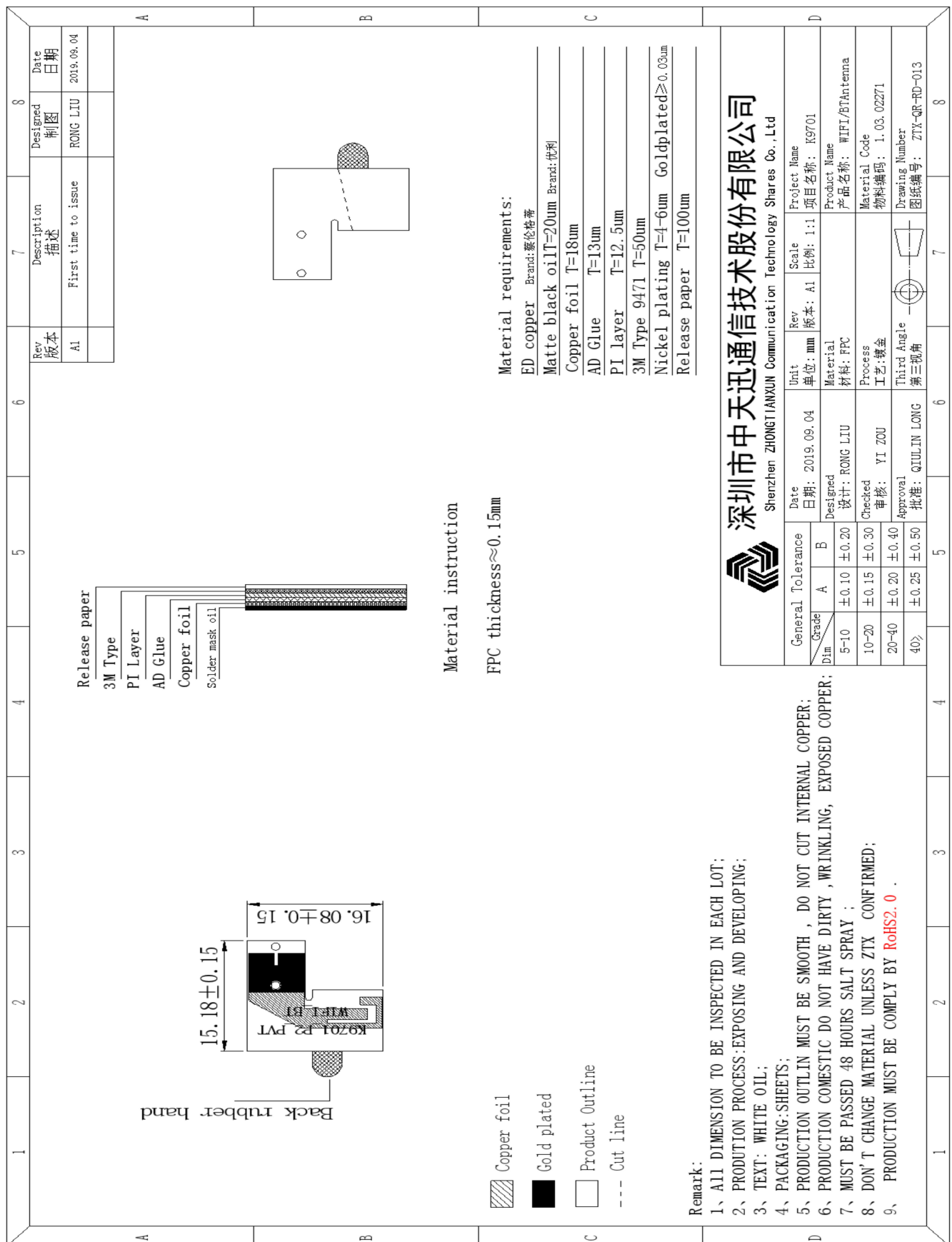
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2		Test equipment	4
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1-1 Mechanical Configuration (WIFI/BTAntenna)



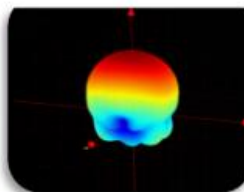
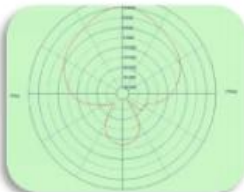
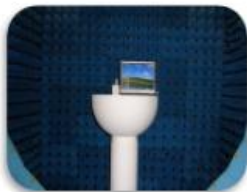
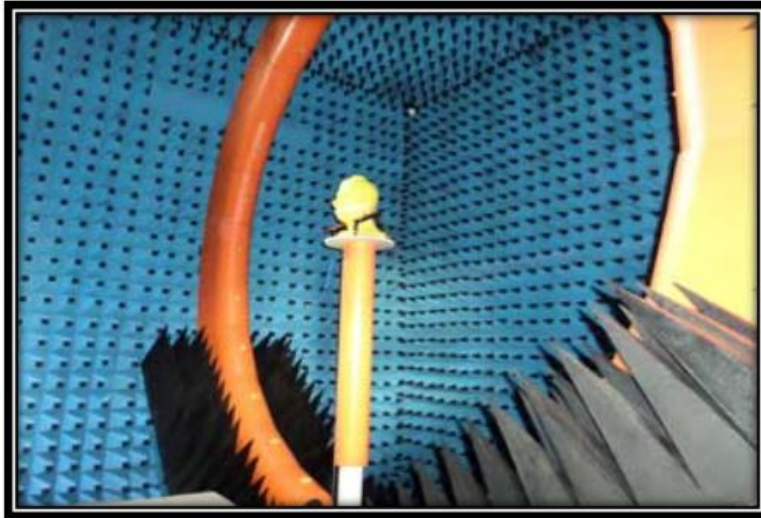
ANTENNA SPECIFICATION

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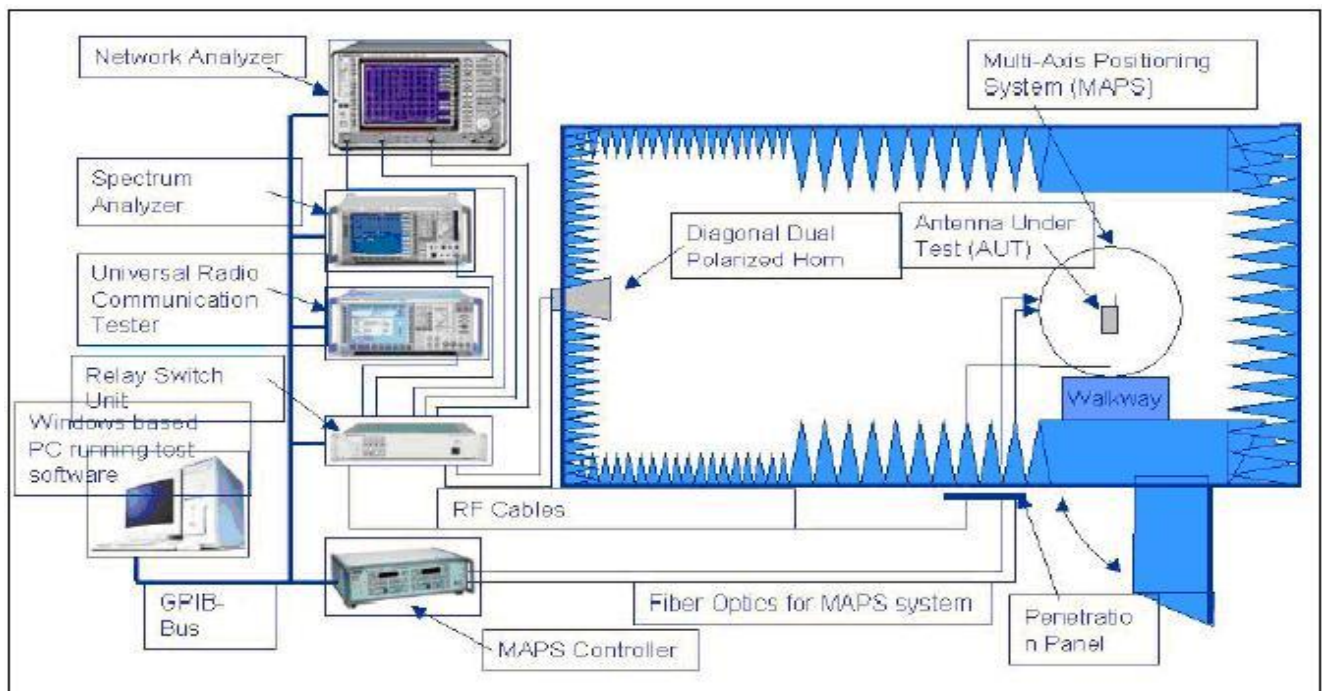
2. Test equipment



Owned 6 microwave dark room, equipped 2 sets world leading France Satimo SG24 OTA certification test systems (one in SHENZHEN, another one in Shanghai), ETS OTA Standard test system, Blue test reverberation test system which is High repeatability, high accuracy and high resolution. It can quickly provide accurate test reports, fully meet the CITA standards.

Testing range:

Support active, passive testing of
GSM/CDMA/WCDMA/TD-
SCDMA/LTE/WIFI/WLAN/WiMax/BT
/GPS/MIMO/UWB within 0.4-6G.



ANTENNA SPECIFICATION

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3.Antenna test data

3-1 Test Data

Band	Channel	WiFi3D	
		TRP (3D)	TIS (3D)
2.4_11B	1	13.26	-77.54
	6	12.55	-73.75
	11	12.71	-67.72
2.4_11G	1	10.63	-79.89
	6	10.47	-73.38
	11	10.6	-83.73
5.8_11A	36	12.64	-86.67
	149	11.72	-89.56
	165	11.38	-88.81
5.8_11N	36	12.35	-71.43
	149	11.72	-67.23
	165	11.5	-64.17

Band	GAIN
WiFi 2.4G	3.2dB
WiFi 5G	4.1dB



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3-2 No-source test data

Frequency	Efficiency	Efficiency . dB
2400000000	31%	-5.1
2410000000	30%	-5.2
2420000000	32%	-5.0
2430000000	35%	-4.6
2440000000	36%	-4.4
2450000000	38%	-4.3
2460000000	37%	-4.3
2470000000	40%	-4.0
2480000000	40%	-4.0
2490000000	37%	-4.3
2500000000	37%	-4.3

注意：WiFi馈脚和地脚弹片在原来基础上反向焊接，
使天线出线远离电池。

Frequency	Efficiency	Efficiency . dB
5150000000	40%	-4.0
5200000000	40%	-4.0
5250000000	40%	-3.9
5300000000	41%	-3.9
5350000000	42%	-3.8
5400000000	42%	-3.8
5450000000	41%	-3.8
5500000000	41%	-3.9
5550000000	41%	-3.9
5600000000	42%	-3.8
5650000000	40%	-3.9
5700000000	40%	-4.0
5750000000	40%	-4.0
5800000000	38%	-4.2
5850000000	38%	-4.2

3-3 Matching circuit N/A



ANTENNA SPECIFICATION

CUS P/N:K9701_WIFI/BT Antenna
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4.Environment Characteristic

NO.	ITEM	TEST CONDITION	SPECIFICATION
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5.The packing way

SOP								
product name		product model	Antenna Typ	Version	document number			
Antenna		K9701	FPC	A1				
Packing diagram				Packaging process	matters need attention			
 Figure 1: weighing and bagging  Figure 2: large PE bag for every 10 small bags  Figure 3: small tags and traceability codes  Figure 4: Label and seal box				1 > Each 100PCS product is packaged with (130*90mm) PE sealed plastic bag and tagged with (material name, material code, quantity, date); 2 > Open PE bag (160*240mm) for every 10 bags (1000PCS); closed PE bag (230*330mm) for every 10 bags (1000PCS); packaging and label containing (material name, material code, quantity, date) 3 > Packing, carton specification (25*20*18cm), except for the end of each case (20000~40000pcs); affixed with the outer box label, affixed to the upper right corner of the outer box, the label content includes (manufacturer, model, product name, customer code, quantity, order number, date, QA inspection). 4> The case with good label shall be sealed with glue paper in a "a man"-shaped type.	1. The label is affixed to the upper right corner of the carton (label content includes: product name / quantity / manufacturing date / order number, etc.)			
				Packing material detail				
				Material	material quality	dimensions	Volume per box	
				carton	K=K	(45*32.5*21)cm	1	
PE bag	PE	(24*16)cm	100PCS					
PE bag	PE	230*330mm	10PCS					
label			/					
Version	Contents			Date	Made by			
Formulation: Huang Xiaoyu					approval: Han Zhenyu			

