

天线规格书
Antenna specification for approval

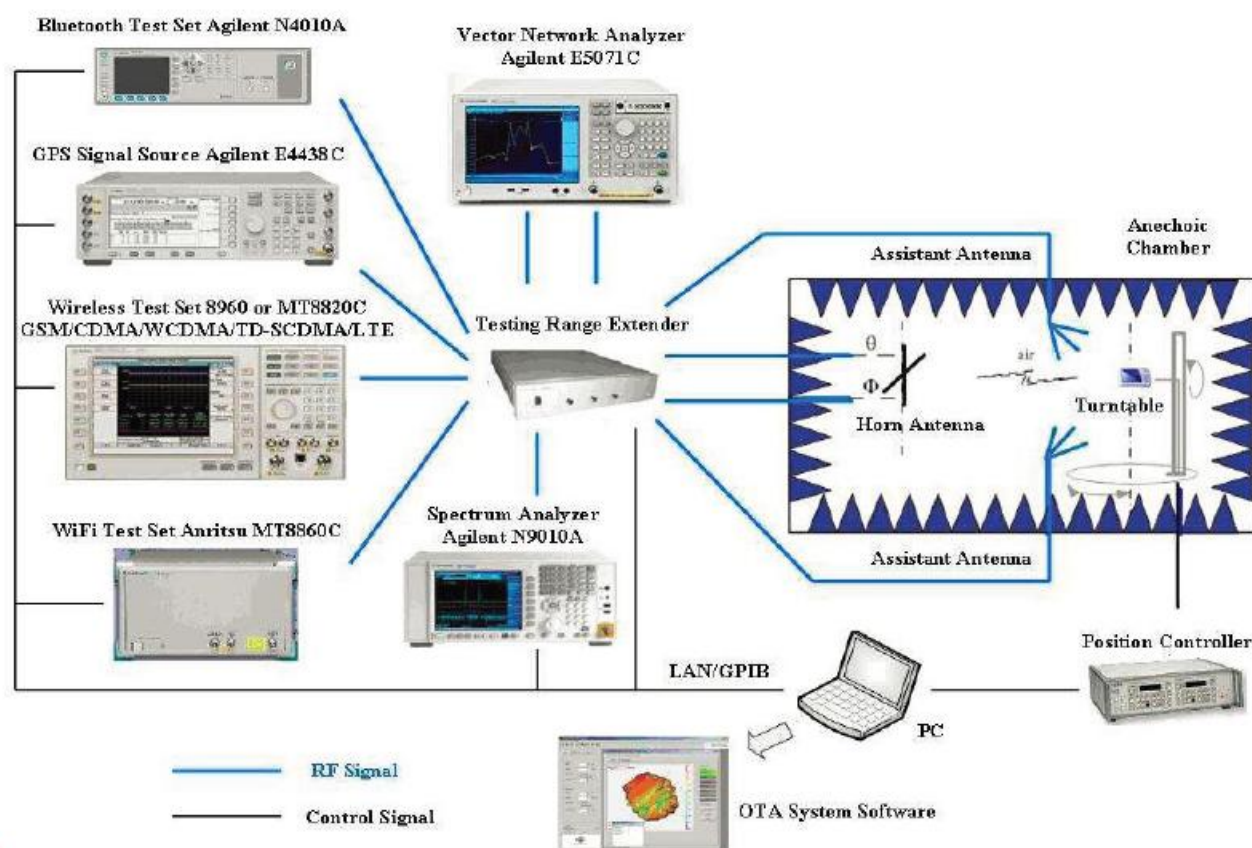
客户名称 Customer name	Shenzhen Lianlijia Technology Co.,Ltd		
机型 Model	K06PRO (2.85 寸记录仪-NT96560-8189FTV 模块)		
天线频段 Antenna frequency	2.4GHZ		
天线功能 Antenna function	WIFI antenna		
天线材质 Antenna material	FPC	FPC 颜色 FPC color	black
型号 model	SF1948A-1B2-A		
料号 Material number	SF1948A-1L22B-100-A		
客户料号 Customer Part Number			
索沃德承认签章 Ward accepted the signature		客户承认签章 Client acknowledges signature	
结构 structure		采购 Purchase	
文控 Document control		结构 structure	
射频 radio frequency		工程 engineering	
审核 To examine		品质 QC	
承辦人 Responsible Tingting Li		审核 To examine	
日期 date 2024.12.09	盖章区 Seal area	日期 date 2024.12.09	盖章区 Seal area

序号	认证编号	材质类型	发证日期	备注
1	A2240182175102001E	tinned wird	2024-04-12	one year
2	A2240123200101001E	halogen	2024-03-15	one year
3	CANEC24000523102	gum	2024-01-11	one year
4	SHAEC23021984701	FEP jacket	2024-01-04	one year
5	SHAEC23020095573	FEP insulate	2023-12-12	one year
6	SZXEC24002306404	solder	2024-07-24	one year
7	SZXEC24002306408	tin bar	2024-07-24	one year
8	ETR24600712	printing ink	2024-06-14	one year
9	A2240123200102001E	base material	2024-03-20	one year
10	CANEC23017402018	EVA Foam	2024-01-03	one year
11	A2240439752101001	Conductive cloth	2024-07-29	one year
12	SZXEC24002471802	Gold coating	2024-08-08	one year

catalogue

一: Equipment support&Testable antenna type.....	1
二: summary.....	2
三: Matching circuit diagram&Machine picture.....	3
四: antenna standing wave ratio&Antenna efficiency.....	4
五: BT measure with instruments&Download rate.....	5
六: 3D pattern.....	6
七: structural drawings.....	7

一:Equipment support&Testable antenna type



天线功能	频率范围	测试仪器	测试方式	测试标准
2G天线 (GSM)	824MHz-960MHz, 1710MHz-1990MHz	5071B、8960、OTA 暗室	有源测试、无源测试	索沃德标准、客户要求
3G天线 (WCDMA/TDSCDMA/CDMA- EVDO/2000)	824MHz-960MHz, 1710MHz-2170MHz	5071B、8960、OTA 暗室	有源测试、无源测试	索沃德标准、客户要求
4G天线 (LTE-FDD/LTE-TDD)		5071B、CMW500、 SP8011、OTA暗室	有源测试、无源测试	索沃德标准、客户要求
WIFI天线	2.4GHz-2.48GHz, 5.15GHz-5.35GHz, 5.725GHz-5.825GHz	5071B、CMW500、 OTA暗室、路由器、 PC	有源测试、无源测试、 APK实测、吞吐量测试	索沃德标准、客户要求
BT天线	2.4GHz-2.48GHz	5071B、OTA暗室、 蓝牙音箱	有源测试、无源测试、 实测	索沃德标准、客户要求
定位天线 (GPS、GLONASS、北斗、 伽利略)	1575.42MHz±10MHz 1602MHz±0.5625MHz 1561MHz±2.046MHz	5071B、OTA暗室、 APK	有源测试、无源测试、 实测	索沃德标准、客户要求
NFC天线	13.56MHz	5071B、专用测试治 具、OTA暗室、APK	无源测试、实测	索沃德标准、客户要求
遥控天线	433MHz	5071B、OTA暗室	无源测试、实测	索沃德标准、客户要求
NB_IOT	同LTE-FDD	CMW500 (高配版)	有源测试、无源测试	筹建中 (功率标准与4G基 本一致)

二:summary

(1)Antenna performance

- 1.This approval sheet supports for MID project. FPC antennas include in this project. This report is for the performance of WIFI antenna.
- 2.Antenna shape size: Meet the requirement of MID
- 3.Antenna band: 2400MHz~2500MHz
- 4.Antenna material: Antenna material meet the requirement of MID
- 5.Adhesive performance: Adhesive performance meet the requirement of MID
- 6.Antenna performance meet the spec below:

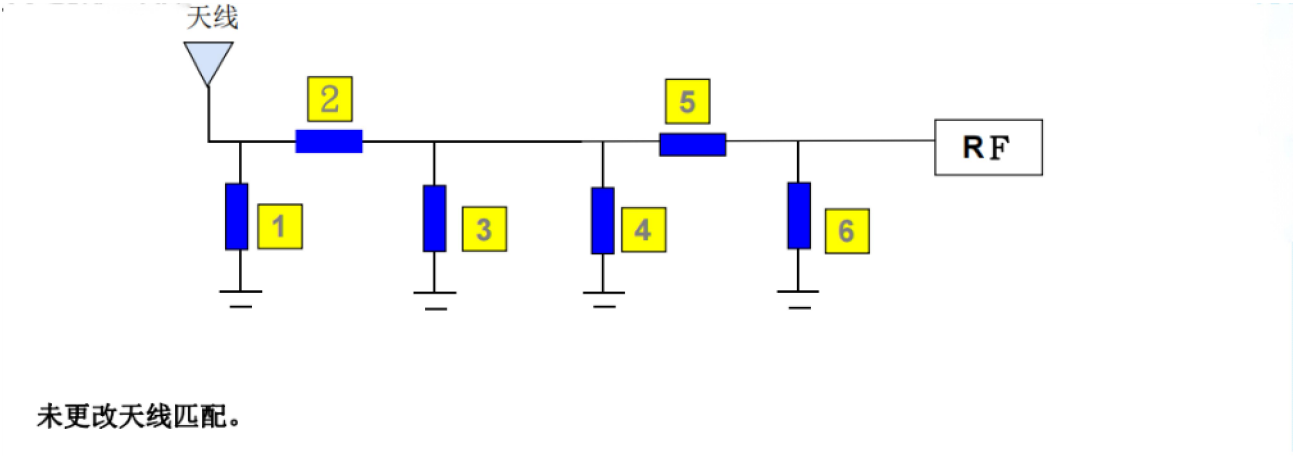
Description	2. 4GHZ~2. 5GHz	Units
VSWR	≤ 2.0	
Average Antenna Gain	≥ -4.5	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2)Mechanical Information

Mechanical Dimension	
Cable Length	100mm/BLACK
Description	WIFI antenna
Material	FPC
Coaxial Cable	50Ω/O. D. 0. 81mm
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

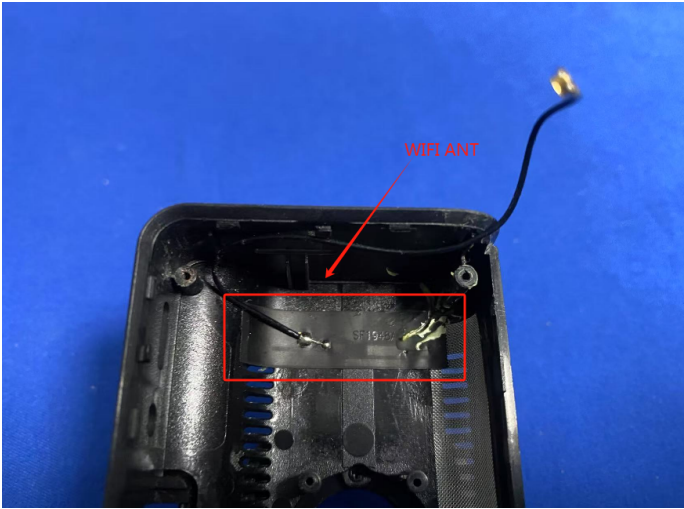
三:Matching circuit diagram&Machine picture&Antenna

picture(1)matching circuit



主天线	1	2	3	4	5	6	备注
原始匹配	2.4nH	2.7pF	-	-	0Ω	-	
变更匹配	-	-	-	-	-	-	

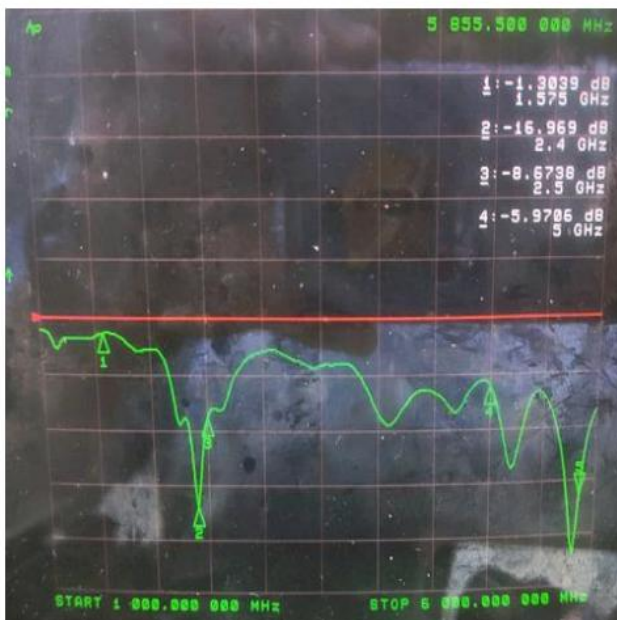
(2) Machine picture&Antenna picture



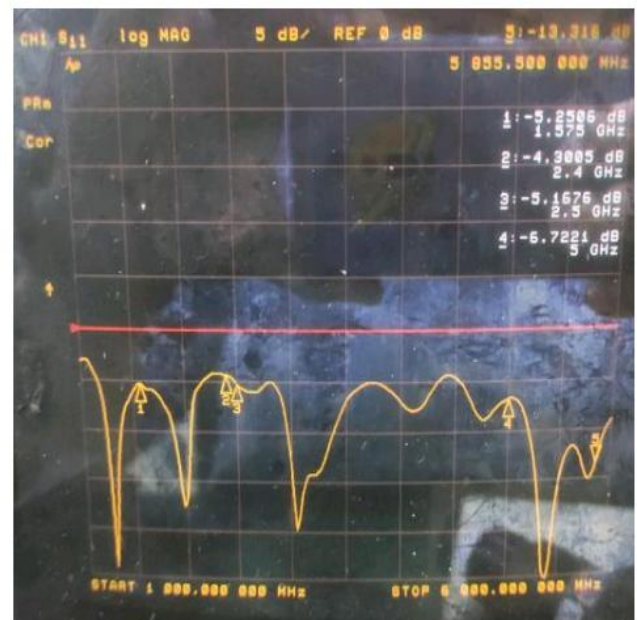


四:antenna standing wave ratio&Antenna efficiency

客户样机状态（未去屏蔽盖）



客户样机（已去屏蔽盖）



Customer prototype status (without shielding cover removed)

Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	41.53	-3.82	0.32	-1.83	22.392	19.139	0.32	-20.41
2410	40.21	-3.96	0.18	-1.97	21.819	18.388	0.18	-20.84
2420	42.39	-3.73	0.54	-1.61	23.231	19.162	0.54	-20.48
2430	44.18	-3.55	0.72	-1.43	24.394	19.785	0.72	-19.38
2440	46.77	-3.3	1.1	-1.05	25.975	20.791	1.1	-17.26
2450	48.06	-3.18	1.4	-0.75	26.836	21.221	1.4	-15.25
2460	47.32	-3.25	1.42	-0.73	26.514	20.809	1.42	-13.59
2470	47.42	-3.24	1.47	-0.68	26.612	20.81	1.47	-13.44
2480	50.79	-2.94	1.68	-0.47	28.303	22.483	1.68	-12.18
2490	56.98	-2.44	2.06	-0.09	31.482	25.494	2.06	-10.78
2500	58.62	-2.32	2.01	-0.14	31.869	26.751	2.01	-10.83

Customer prototype (with shield cover removed)

Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	26.98	-5.69	-2.07	-4.22	16.036	10.948	-2.07	-11.16
2410	23.95	-6.21	-2.56	-4.71	14.205	9.745	-2.56	-11.23
2420	22.79	-6.42	-2.83	-4.98	13.513	9.28	-2.83	-11.76
2430	22.83	-6.41	-2.79	-4.94	13.513	9.32	-2.79	-11.87
2440	25.64	-5.91	-2.33	-4.48	15.215	10.422	-2.33	-11.54
2450	31.06	-5.08	-1.54	-3.69	18.65	12.408	-1.54	-10.6
2460	33.71	-4.72	-1.27	-3.42	20.524	13.182	-1.27	-9.98
2470	32.49	-4.88	-1.52	-3.67	20.004	12.49	-1.52	-10.52
2480	29.71	-5.27	-1.97	-4.12	18.329	11.385	-1.97	-11.19
2490	31.08	-5.08	-1.79	-3.94	19.099	11.977	-1.79	-11.09
2500	31.98	-4.95	-1.66	-3.81	19.473	12.503	-1.66	-10.69

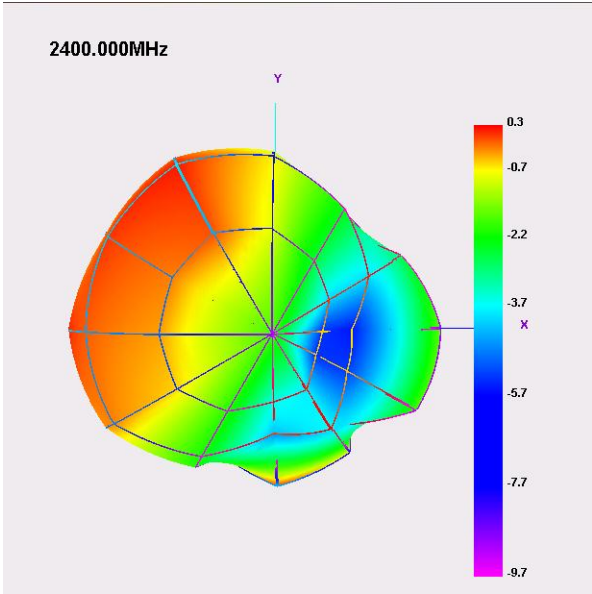
五: BT actual measurement&Download rate

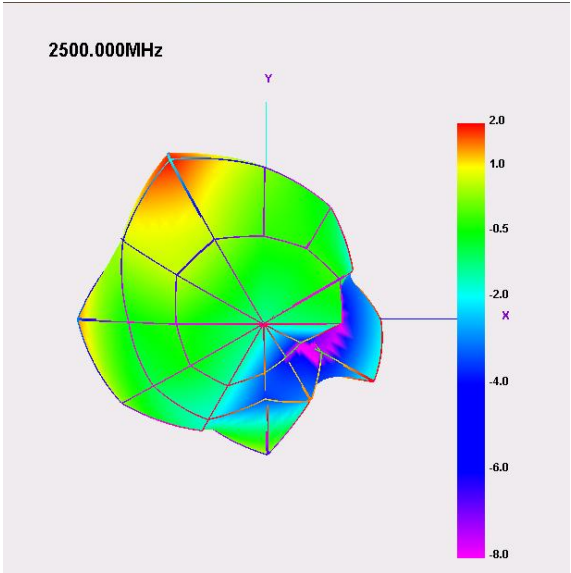
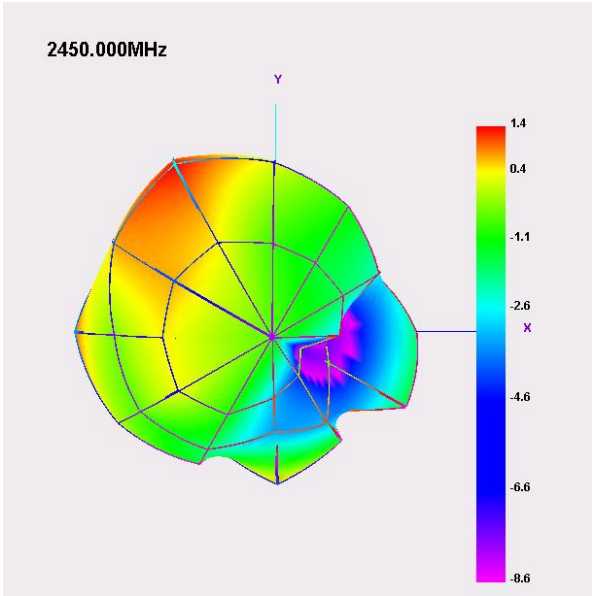
实测效果	
测试环境	索沃德研发中心
测试设备	Redmi K20 Pro
样机-测试距离	15 米
去屏蔽盖-测试距离	13 米

下载速率	
测试环境	索沃德研发中心-1米
测试设备	Redmi K20 Pro
样机-测试速率	2. 5Mbps~2. 9Mbps
去屏蔽盖-测试速率	2. 3Mbps~2. 5Mbps

六:3D pattern

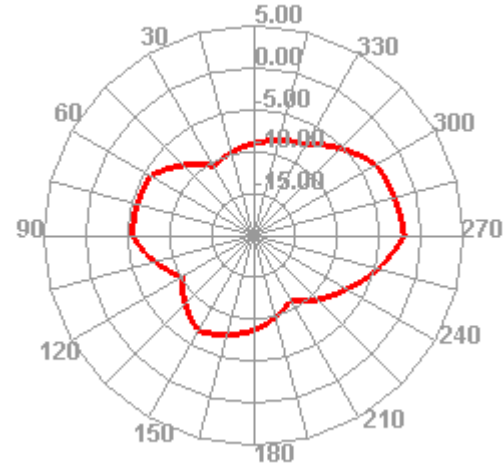
Unshielded cover



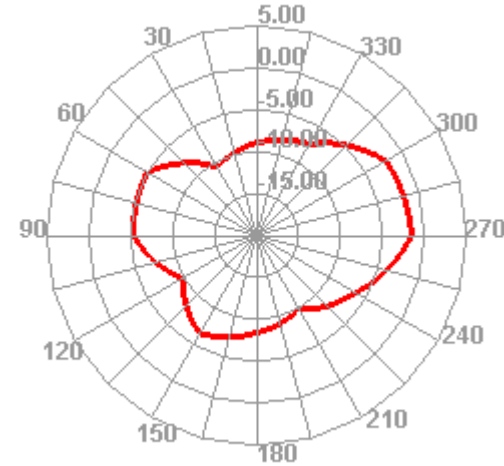


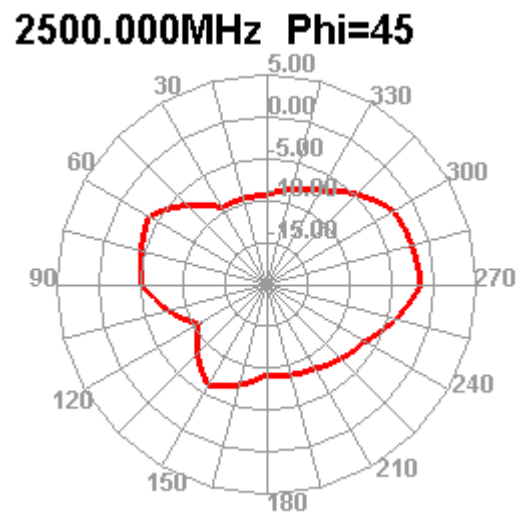
Demystifying cover

2400.000MHz Phi=45



2450.000MHz Phi=45





七:structural drawings