深圳有力科技有限公司
ShenZhen Powerful Technology CO., Limited

規 格 承 認 書
SPECIFICATION FOR APPROVAL

客　　户
CUSTOMER: 冠捷

客 户 料 号
CUSTOMER NO: 368GAAWA1920YL

品　　名
PART NAME: BT天线：PCB黑色/1.37黑同轴线+1代端子/反面贴泡棉20*17*8mm/泡棉双面背胶/外漏线长L=35MM/总长L=46MM/泡棉带撕手位

供 方 料 号
SUPPLIER NO: YL1560-BT-L35

日期 Date: 2024.03.13

客户确认 **CUSTOMER APPROVED BY**		
APPROVAL	CHIEF	SUPERVISOR

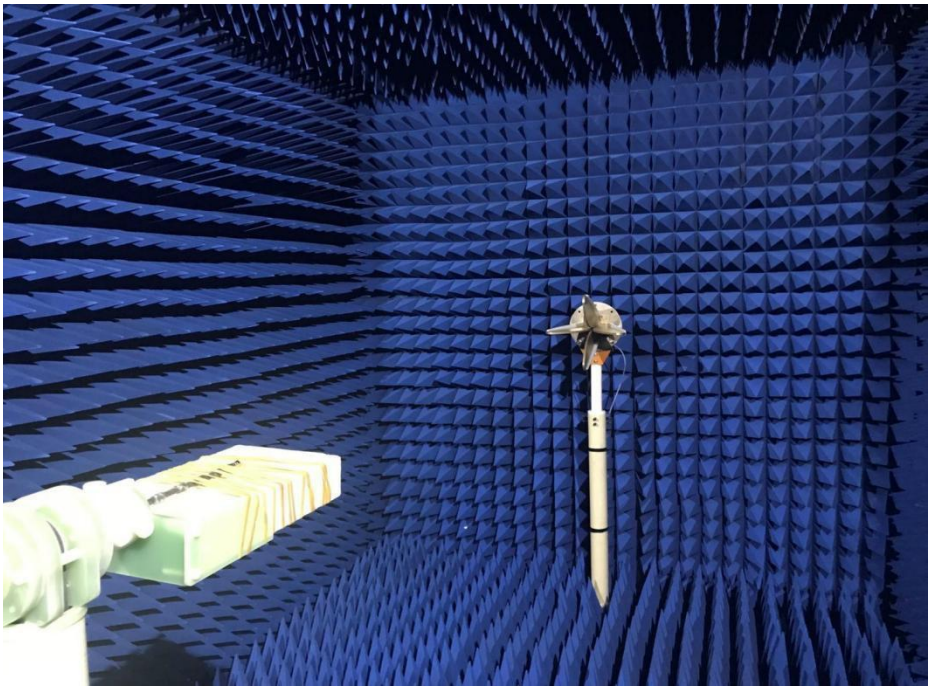
供方确认 **SUPPLIER SIGNATURE**		
APPROVAL	CHECK	DESIGN
赵旋旋	陈娜	张洋

实验室测试环境及设备

CMW500

E5071B

Aglient 8960



测试项目（Test Project）： S11、S12 、VSWR 、Efficiency、Gain 3D Radiation Pattern 、TRP、TIS

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一.工程图纸.....4
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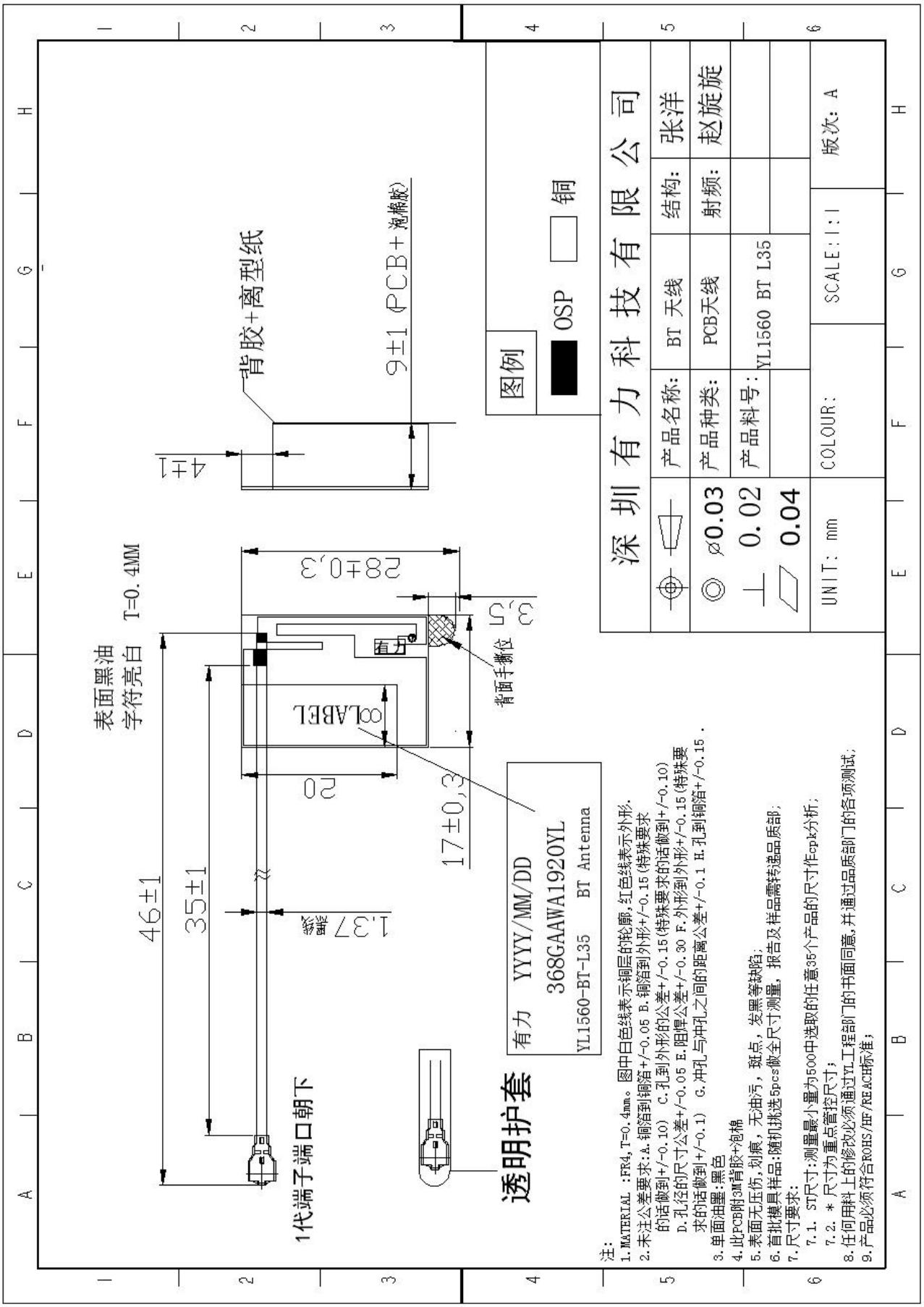
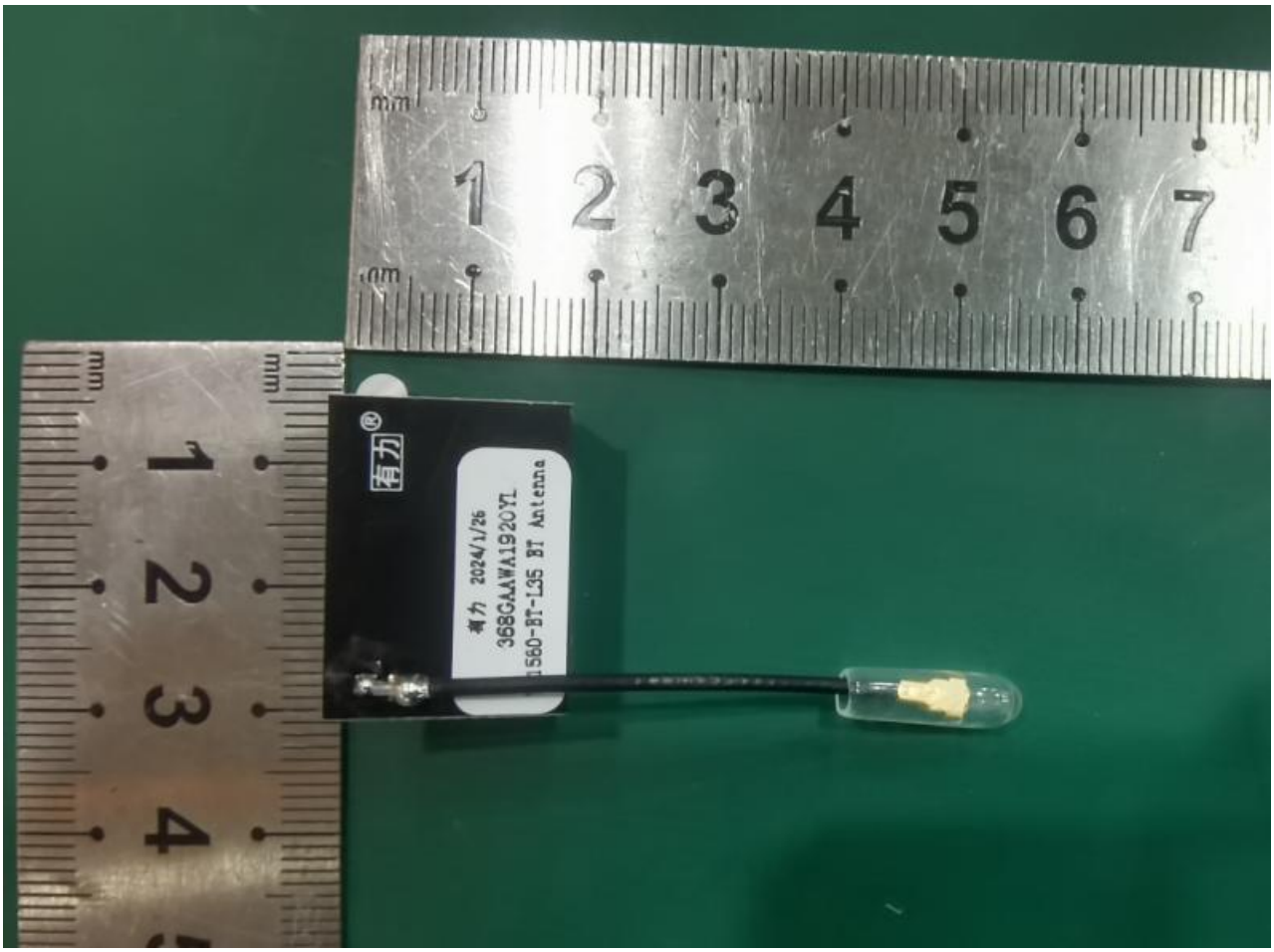
一.工程图纸（Mechanical Drawing）



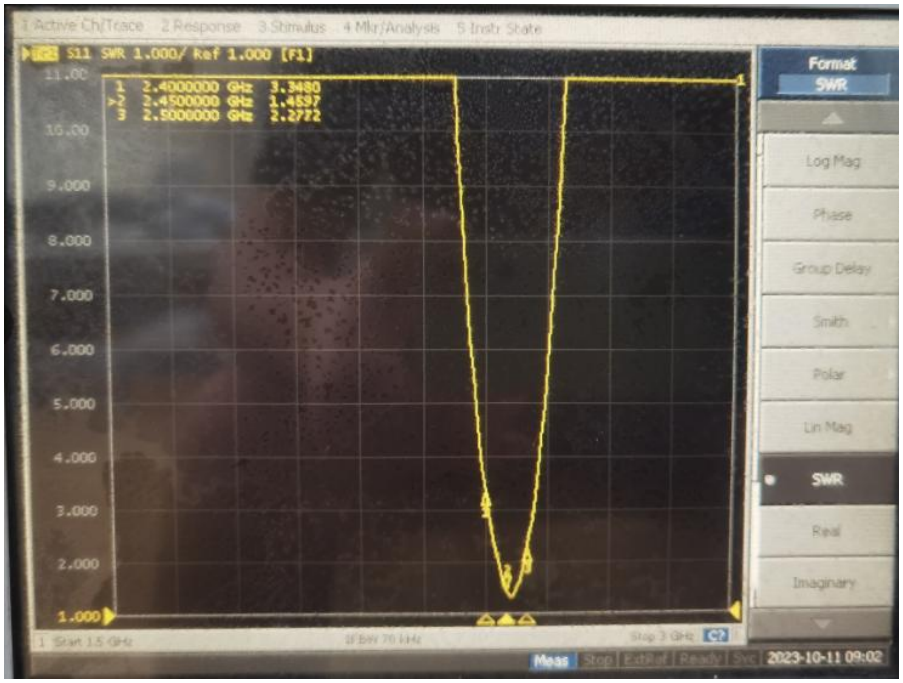
二. 天线成品技术指标（Technical Index）

频率范围 Frequency Range （MHz）	2400-2500MHz
天线增益/Antenna gain	MAX 2.22dBi
输入阻抗 Impedance	50Ω
接头 Termination	1代端子 1.37黑线　线材外漏L=35mm
工作温度 （℃）	-30~+85

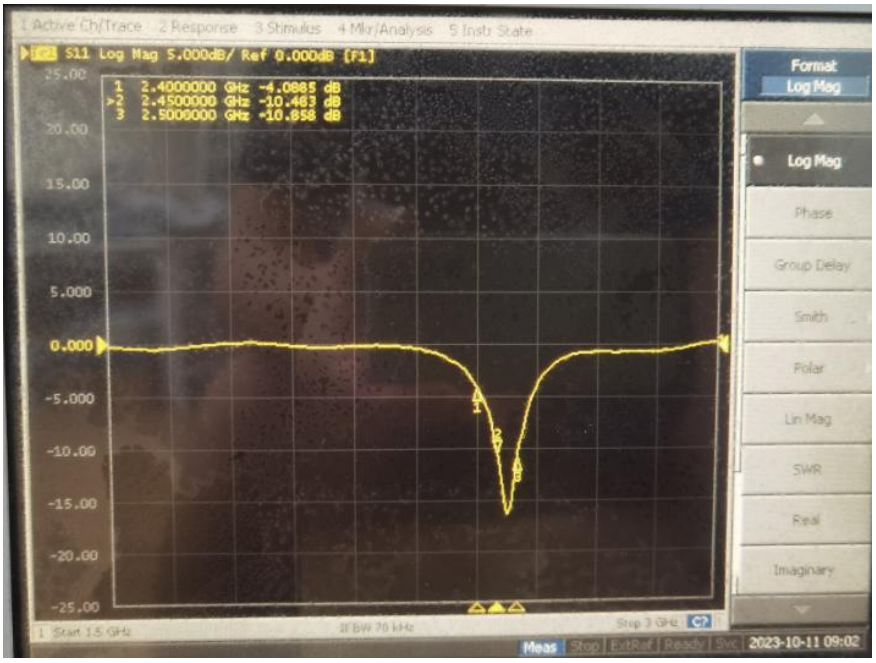


2-1 天线成品网分测试数据（驻波比/回损）

SWR测试结果



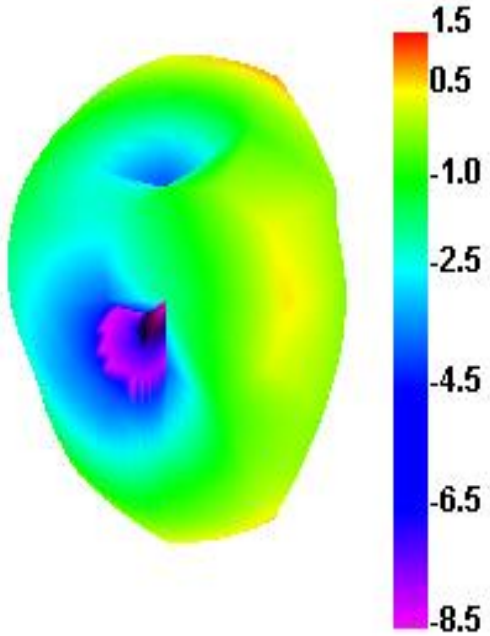
Log Mag测试结果



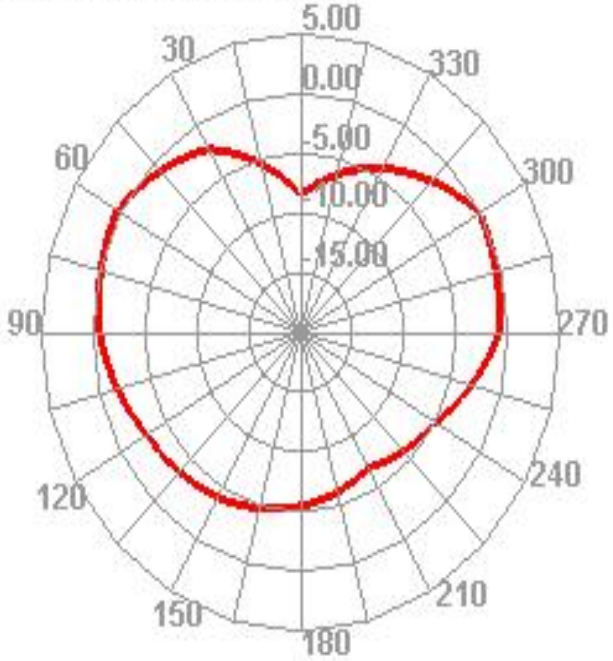
2-2天线效率/增益

Passive Test For 2.4G		
Freq (MHz)	Effi (%)	Gain (dBi)
2400	53.21	1.51
2405	51.77	1.33
2410	53.18	1.38
2415	54.5	1.44
2420	56.16	1.49
2425	55.06	1.41
2430	54.54	1.36
2435	57.62	1.61
2440	58.41	1.72
2445	57.92	1.76
2450	58.97	1.89
2455	58.59	1.96
2460	58.38	2.03
2465	57.41	1.99
2470	55.41	1.87
2475	55.92	1.92
2480	56.69	2.02
2485	56.97	2.1
2490	57.75	2.18
2495	56.12	2.09
2500	57.6	2.22

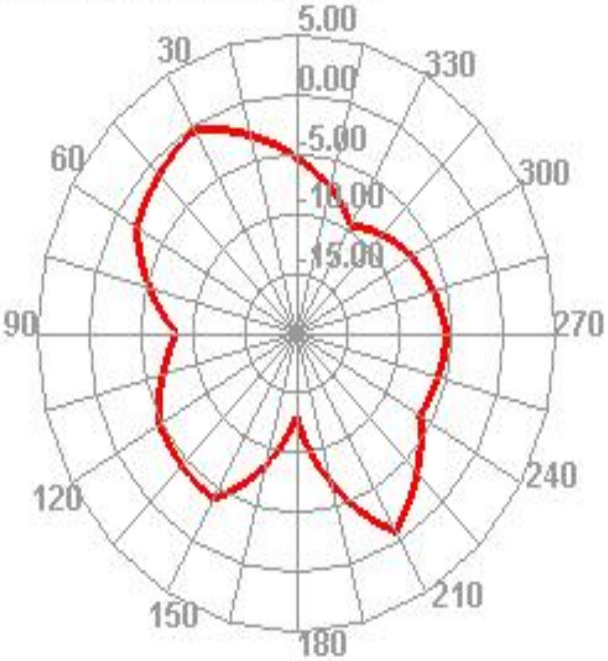
2400.000MHz



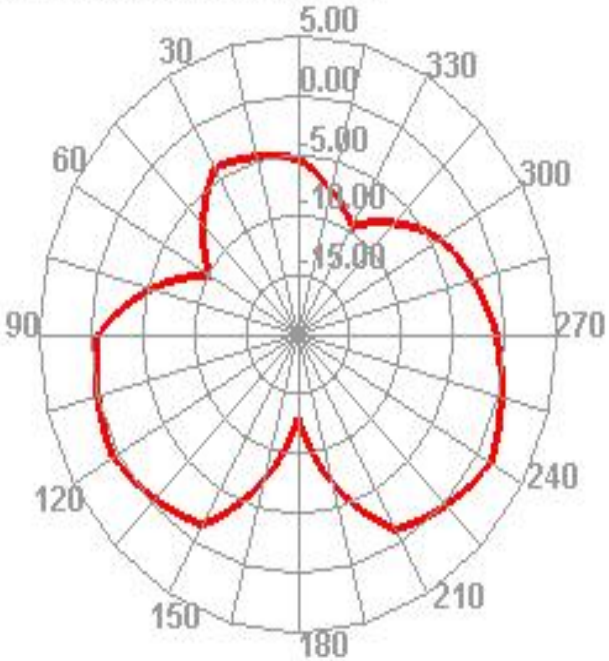
2400.000MHz H



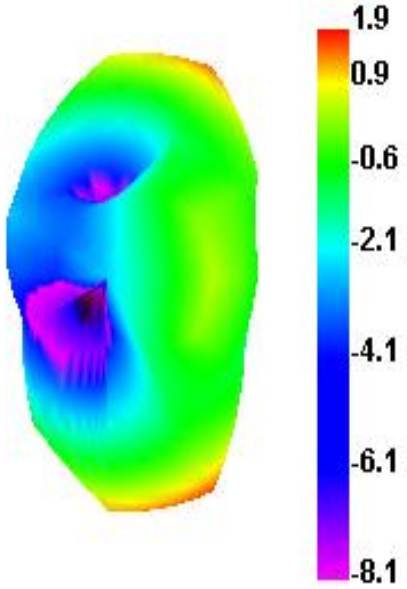
2400.000MHz E1



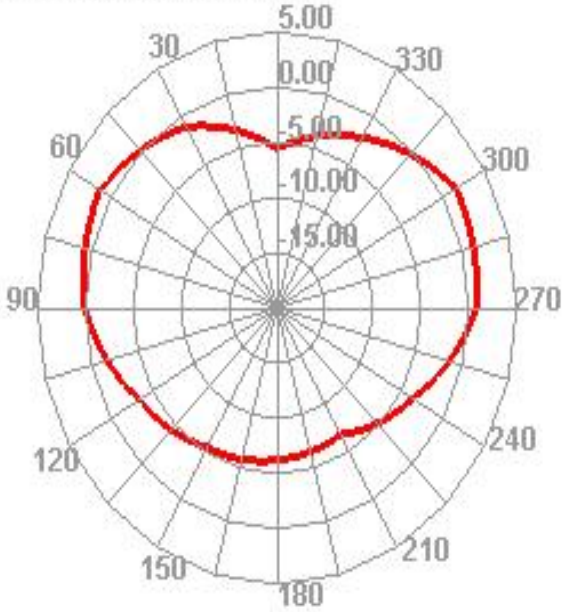
2400.000MHz E2



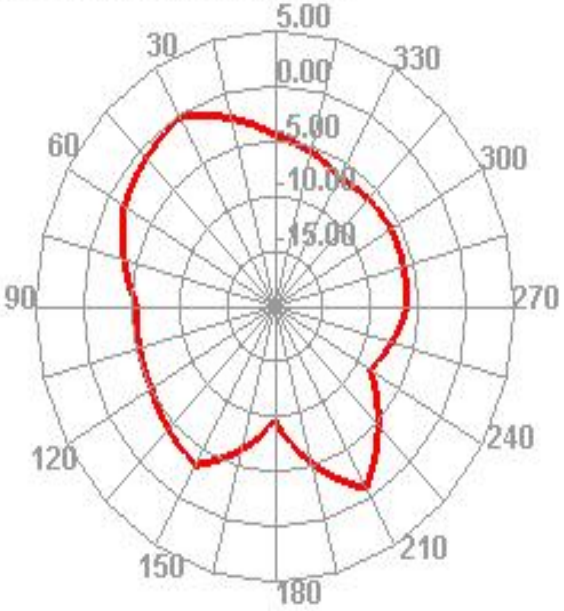
2450.000MHz



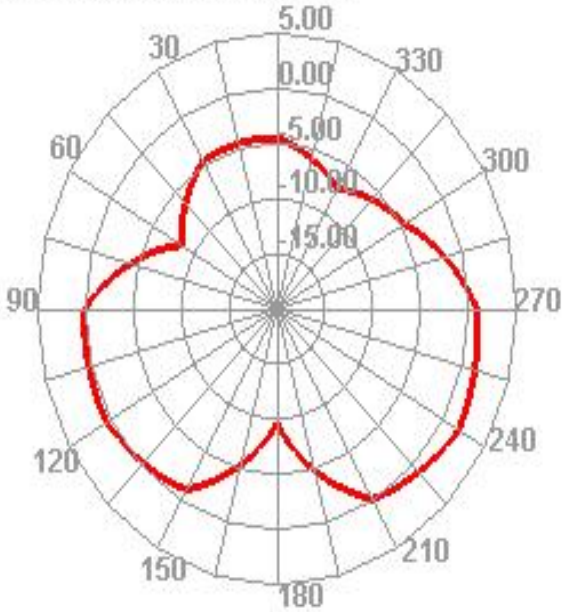
2450.000MHz H



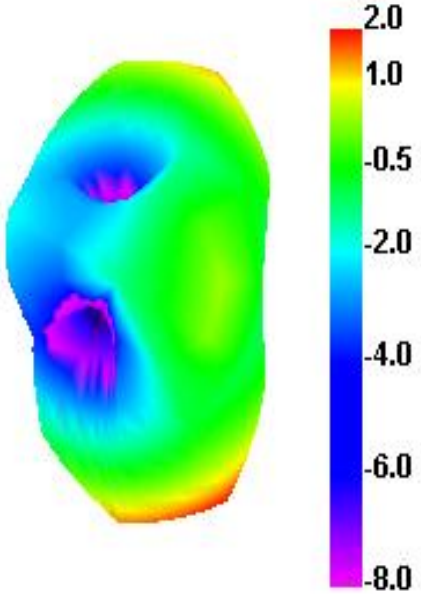
2450.000MHz E1



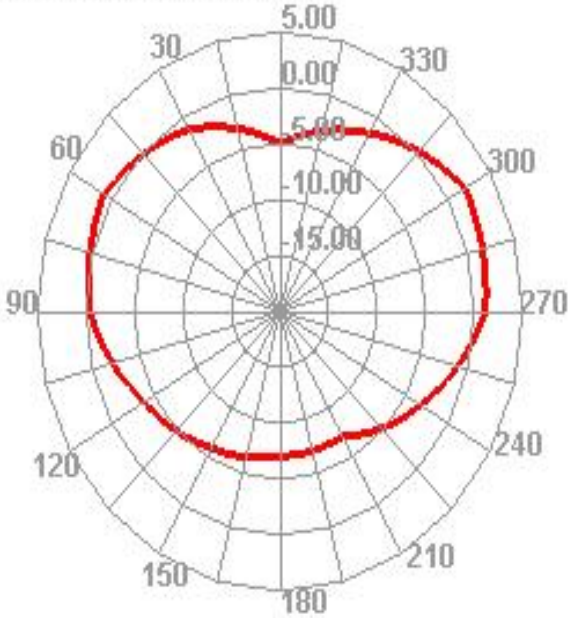
2450.000MHz E2



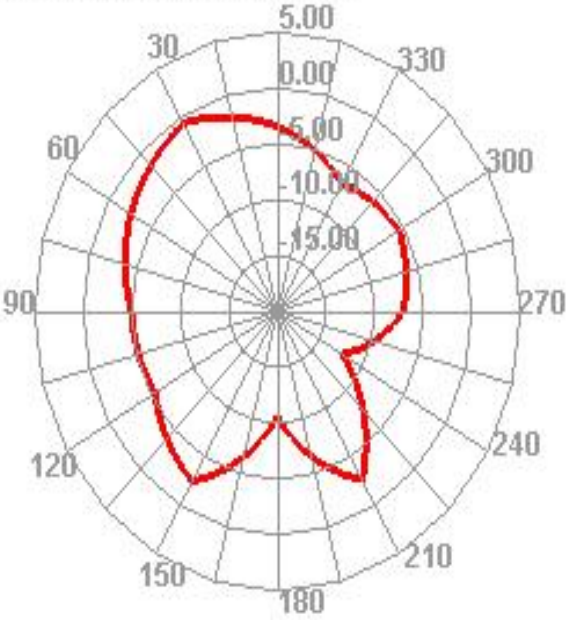
2480.000MHz



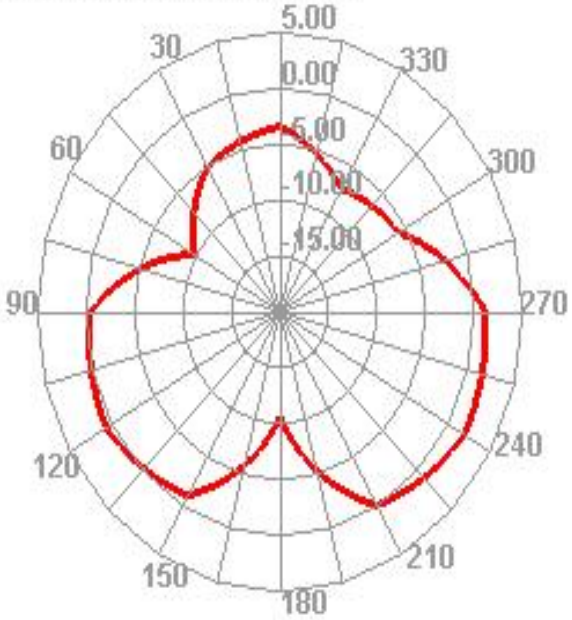
2480.000MHz H



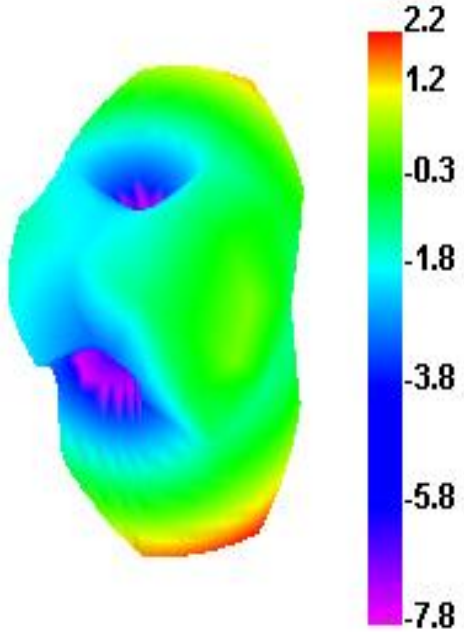
2480.000MHz E1



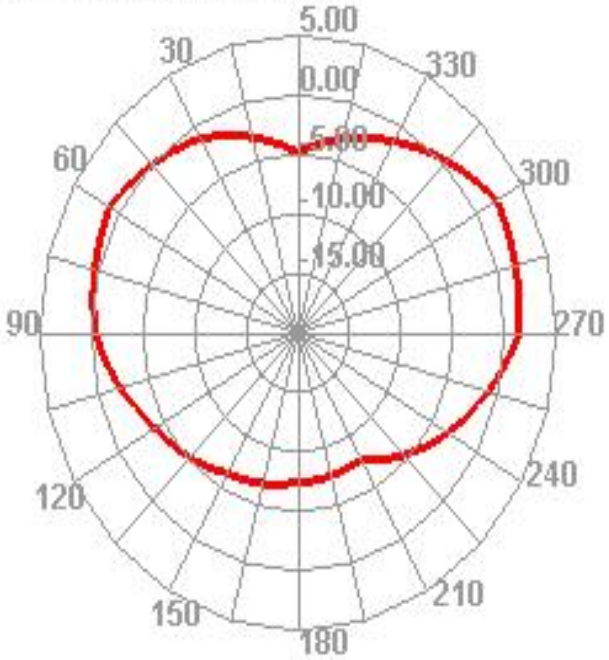
2480.000MHz E2



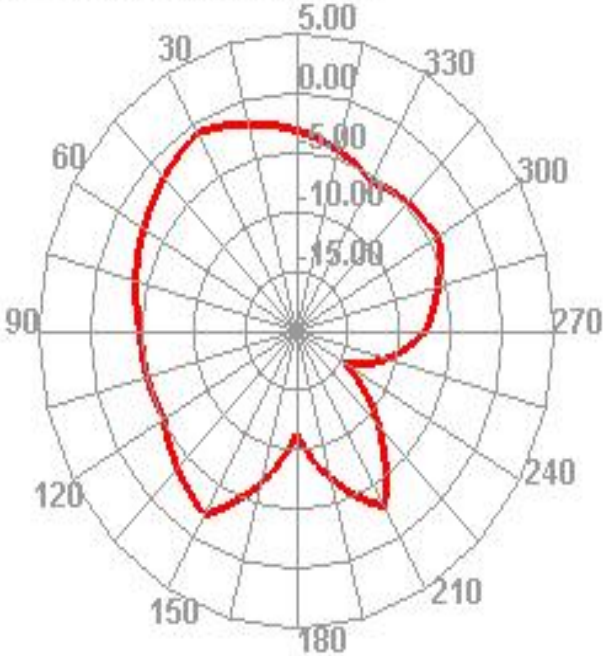
2500.000MHz



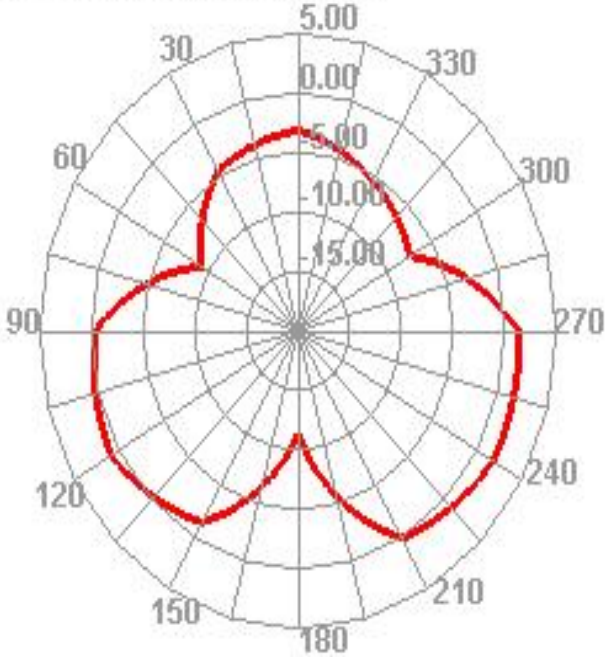
2500.000MHz H



2500.000MHz E1



2500.000MHz E2



三.单线材规格

产品规格 Product Type	RF137/50
结构图 Structure Drawing	

结构特性 Structure Characteristics

结 构 Structure	项目 Item	标准值 Standard Value
内导体Inner Conductor	材质 Material	镀银铜线 Silverplated Copper Wire
	结构 Construction(mm)	7/0.105
	标称外径 Nom.Dia(mm)	0.32±0.02
绝缘层 Insulation	材质 Material	聚全氟乙丙烯 FEP
	标称外径 Nom.Dia(mm)	0.90±0.03
外导体Outer Conductor	材质 Material	镀锡铜线 Tinned Copper Wire 16*5/0.05
	标称外径 Nom.Dia(mm)	1.13±0.05
	编织覆盖率 Coverage Ratio(%)	90±5
护套 Jacket	材质 Material	聚全氟乙丙烯 FEP
	标称外径 Nom.Dia(mm)	1.37±0.05

电气性能 Electrical Characteristics

项目 Item	标准值 Standard Value	项目 Item	频率 Frequency	标准值 Standard Value
阻抗 Impedanc（Ω）	50±2	衰 减 Attenuation@20℃ (dB/m)	1GHz	1.70
电容 Capacitance(pF/m)	96		2GHz	2.50
速率 Velocity(%)	70		3GHz	3.00
驻波比 VSWR	≤1.30@DC-6GHz		4GHz	3.50
最大工作电压 Max.Operating Voltage(V)	1000		5GHz	4.00
最大工作频率 Max.Operating Frequency(GHz)	6		6GHz	4.50

可靠性 Dependability

最小弯曲半径(单次)Min.Bending Radius/Single	mm	5
最小弯曲半径（重复）Min.Bending Radius/Repeated	mm	20
工作温度范围 Operating Temperature	℃	-55-+200

包装 Packing

包装方式 Packing Mode	纸盘 Papery Reel
包装长度 The Length of Each Reel(m)	500
每盘段数 The Joints of Each Reel	≤3
最小段长 Min. Segment Length(m)	≥10

使用提示 Trips for Use

存储环境 Storage Environment	温度：30℃以下，湿度：20-65%
最佳保存周期 The Best Save Cycle	2 个月，2 个月以上上锡效果变差，但电性能不受影响，夏季高温高湿环境开剥后需尽快流转

四.天线成品摇摆测试报告

客戶：冠捷　　天线连接类型：端子+同轴线　　编号：YL20231008

试验说明：　1.总次数：20000次以上　2.荷重：100g　类别：■样品

3.频率：35次/分　4.治具R值：10mm　□IPQC

使用设备：摇摆试验机　5.摇摆角度:180°　□其它

测试内容：用5条样品测试，分析试验后情况。

试验次数：20000次以上。

判定：不能出现短路或断路现象。

测试图示：

测试结果	一・摆动次数／线别：									
	编号	测试说明	天线							
	1	摆动次数	21000							
		同轴线类型	RG1.13							
	2	摆动次数	21000							
		同轴线类型	RG1.13							
	3	摆动次数	21000							
		同轴线类型	RG1.13							
	4	摆动次数	21000							
		同轴线类型	RG1.13							
	5	摆动次数	21000							
		同轴线类型	RG1.13							

试验分析：5条样品无短路/断路现象.

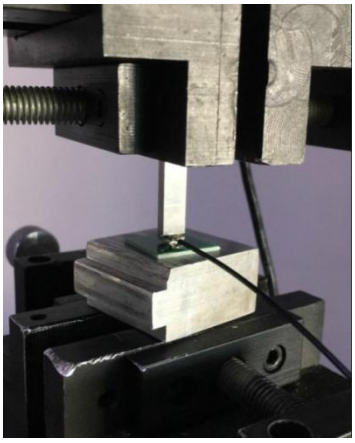
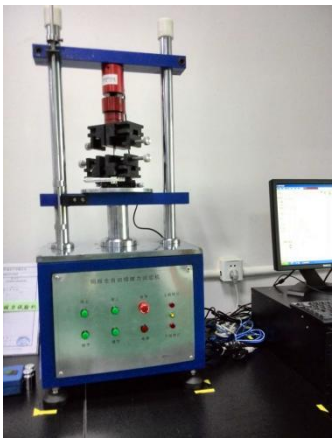
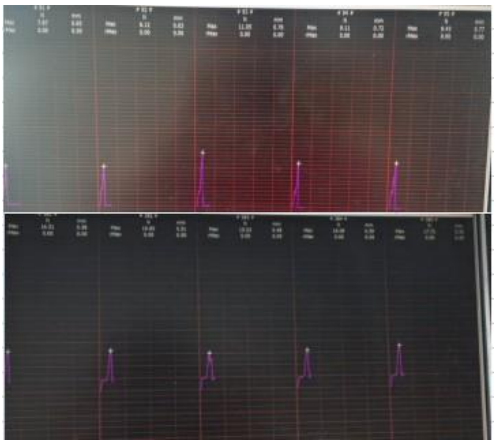
判定：OK

核准：赵旋旋　　确认：陈娜　　承认：张洋

五.端子座插拔力测试

步骤	测试项目	条件	测试结果			PASS/ FAIL
			初始	插入力	拔出力	
1	插拔力	插入力：30N最大 拔出力：5N最小 速度：25.4mm/分钟	1	16.44	8.13	PASS
			2	15.52	11.65	
			3	16.01	9.11	
			4	17.32	9.43	
			5	15.23	10.47	
			单位：N			

测试照片

测试设备

序号	名称	规格/型号	厂商	管制编号
1	插拔力试验机	1220S	ZD	YL-WJ-006

六. 天线组件包装说明

一般要求：
1.说明客户名，项目名称，型号。
2.图片说明内外箱，出货时包装方式，层数，单层数量等。
3.备注栏内填写包装所用材料名称，数量等。
此天线线材短于80mm不利于包扎泡棉，散装入袋每包,端子头胶套保护。

图1 装袋100PCS

图2：装箱PE 袋周围泡棉包住保护

图3：外包装箱外形

图4：贴标签，整箱出货

产品料号：	YL1560-BT-L35
产品名称：	PCB天线
产品版本：	V1
包装方式：	PE袋+外箱
单包数量	100pcs
单PE袋数量	100PCS/袋
单箱数量	2000PCS/箱

7.单端子座产品规格书

NO.SPEC-ANC-1002

MHF series micro coaxial connector

（Product NO. ANC*137*-*）**

	APPROVED	CHECKED	PREPARED	ISSUED BY:
By	Wesley.Wang	Roy.Duan	Roy.Duan	
Date	2020-10-25	2020-10-25	2020-10-25	

***** REVISION HISTORY *****

Rev.	Date	Revision Page No.	Notes
A	**2011-06-18**	**New Reversion**	初次发行
B	**2020-10-25**	修改参数	
C			
D			
E			
F			
G			
H			
J			
K			
L			
M			
N			
P			
Q			
R			
S			
T			
U			
V			
W			
Y			
Z			

1. Scope

Micro series micro coaxial connector is a wire to board connector for RF I 1.37 coaxial cable.

2. Objectives

This specification covers the requirements for product performance and test methods of MHF series micro coaxial connector.

3. Part No.，construction，material and finish

（1） Part No. Plug：ANC*137*-***，Receptacle：ANB0200*-12*

（2） Construction，material and finish of the connector are covered as each drawing.

4. Applicable cable

4-1 Part No. ANC*137*-***

（1） Description

Inner conductor ：AWG#30（7/0.102）

Silver plating annealed copper wire or silver plating tin-copper alloy

Dielectric core：Fluoro-plastics，diameter 0.88（+0.04，-0.02）mm，nominal thickness 0.22mm

Outer conductor：8/5/0.05，nominal diameter 1.13mm，silver plating annealed copper wire

Jacket：Fluoro-plastics，diameter 1.37（+0.04，-0.02）mm，nominal thickness 0.12mm

（2） Requirements

Characteristic impedance：50（+2，-2）ohm by TDR method

Nominal capacitance（Reference value）：98 pF/m

Conductor resistance of inner conductor at 293K（20℃）（Reference value）：320 ohm/km

Insulation resistance：1500 mega-ohm.km MIN.

Dielectric withstand voltage：no breakdown at AC 1500V for 1 minutes.

5. Ratings

Rated voltage	AC60Vrms
Nominal characteristic Impedance	50 ohm
Frequency	DC~6GHz
VSWR	Plug：0.1~3GHz 1.3Max 3~6GHz 1.5Max Receptacle： 0.1~3GHz 1.3Max 3~6GHz 1.4Max
Service Temperature	233K~363K(-40℃~90℃)

6. Test and Performance

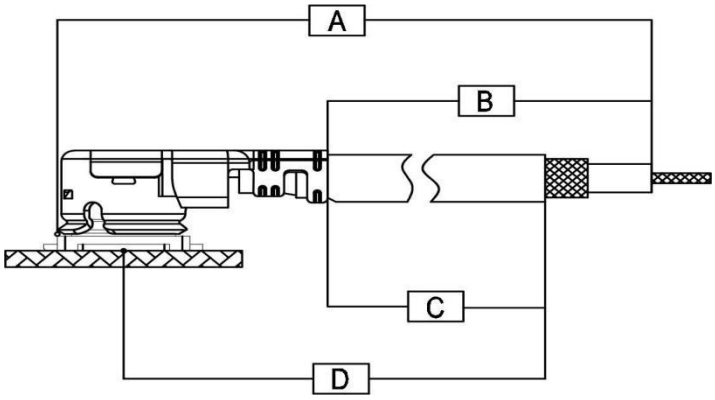
Test Condition

Unless otherwise specified，all tests and measurements shall be performed under the following condition in accordance with MIL-STD-202G.

Temperature -----288K~308K(15℃~35℃)

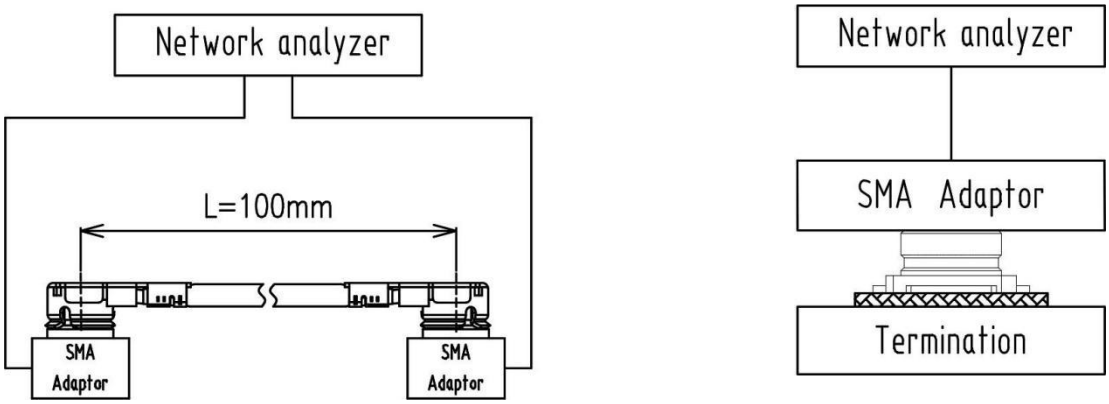
Humidity ------45~75%R.H.

6-1 Electrical Performance

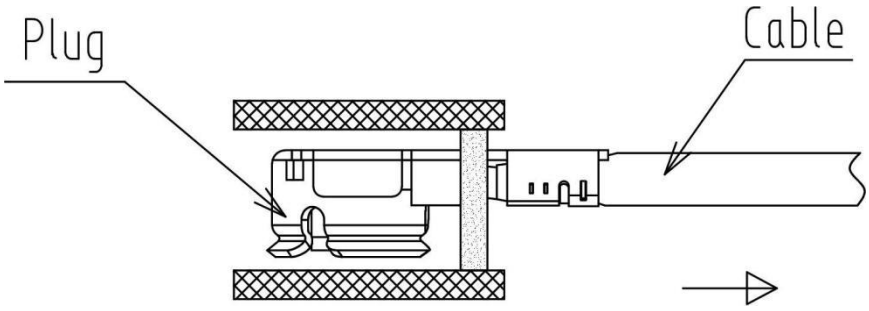
NO	Item	Test conditions	Specifications
1	Contact resistance	Subject the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in Fig.1 by the four terminal method. Apply the low level condition in accordance with MIL-STD-202G, Method307. Open circuit voltage：20mV MAX Circuit current ： 10mA MAX (DC or AC1kHz) Contact resistance of Inner contact=A-B Contact resistance of Ground contact=D-C	Contact resistance of inner contact Initial: 20 mΩ Max. After testing: 25 mΩ Max. Contact resistance of Ground contact Initial: 10 mΩ Max. After testing: 15 mΩ Max.
	Fig1		
2.	Insulation Resistance	Mate the receptacle and plug connector together, and then apply DC 100V between the inner contact and the ground contact in accordance with MIL-STD-202G, Method 302.	Initial :500MΩ Min. After testing :100 MΩ Min.

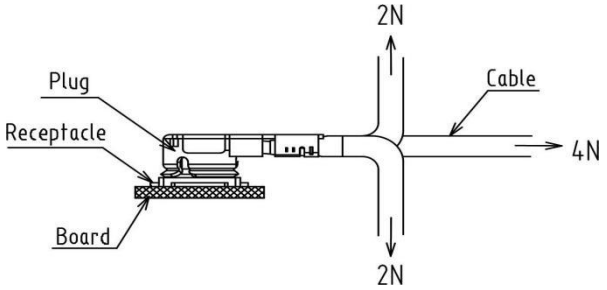
NO	Item	Test conditions	Specifications
3	Dielectric Withstanding Voltage	Mate the receptacle and plug connector together, and then apply AC 200V rms between the inner contact and the ground contact for a minute in accordance with MIL-STD-202G, Method 301.	No creeping discharge, flashover, no insulator breakdown shall occur.
4.	VSWR	Measure the VSWR as shown in Fig2 by the network analyzer. Frequency: 100M~6GHz	1.3Max. at 0.1~3GHz 1.5Max .at 3~6GHz

Fig2



6-2 Mechanical Performance

NO	Item	Test conditions	Specifications
1	Mating Force And Un-mating Force	Solder the receptacle connector to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/un-mating 30 cycles ata speed 25±3mm/min. along the mating axis.	Total Mating force Initial : 30 N Max. 30cycles: 30 N Max. Total un-mating force Initial :5N Min. After 30 cycles:3N Min. Un-mating force of inner contact Initial : 0.15N Min. After 30 cycles:0.10N Min.
2	Crimp strength	Pull the cable as shown in Fig3 at speed 25±3mm/minutes by tensile strength machine.	25N Min.
	Fig.3 		
3	Durability	Mate and un-mate the receptacle connector(soldered to the test board) and plug connector 30 cycles at speed 25±3 mm/minutes along the mating by the push-on / pull–off machine.	［Appearance］No abnormality ［Contact Resistance］ Shall meet 6.1.1

NO	Item	Test conditions	Specifications
4	Contact resistance with force on the cable	Apply force on the cable as shown in Fig4 During the testing, run 100mA DC to check electrical discontinuity.	［Appearance］ Looseness between the parts chipping, breakage or other abnormality shall not occur. ［Electrical discontinuity］ No electrical discontinuity grater than 1μs shall occur. ［Contact Resistance］ Shall meet 6.1.1
	Fig.4 		
5	Vibration	Apply the following vibration to the mating connector. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz →100 Hz →10Hz/approx 15 minutes. Half amplitude, Peak value of acceleration : 1.5mm or 59m/s²(6G) Directions, cycle: 3 mutually perpendicular direction,5 cycles about each direction.	［Appearance］ Looseness between the parts chipping, breakage or other abnormality shall not occur. ［Electrical discontinuity］ No electrical discontinuity grater than 1μs shall occur. ［Contact Resistance］ Shall meet 6-1-1
6	Shock	Apply the following vibration to the mating connector in accordance with MIL-STD-202, Method 213,Condition B.During the testing, run 100mA DC to check electrical discontinuity. Peak value of acceleration: 735 m/s²(75G) Duration :11msec Wave Form :half sinusoidal Direction, cycle : 6 mutually perpendicular direction, 3cycle about each direction.	［Appearance］ Looseness between the parts chipping, breakage or other abnormality shall not occur. ［Electrical discontinuity］ No electrical discontinuity grater than 1μs shall occur. ［Contact Resistance］ Shall meet 6-1-1

6-3 Environmental Performance

NO	Item	Test conditions	Specifications
1	Thermal Shock	Apply the following environment to the mating connector. Temperature, duration in accordance with MIL-STD-202G,Method 107G, Condition A. Temperature : 233K (-40℃)/ 30 minutes →278~308K(5~35℃)/5 minutes Max. →363K(90℃)/30 minues →278~308K(5~35℃)/5 minutes Max. No. of cycles ： 5 cycles	［Appearance］ Looseness between the parts，chipping，breakage or other abnormality shall not occur. ［Contact Resistance］ Shall meet 6-1-1 ［Insulation Resistance］ Shall meet 6-1-2
2	Humidity (Steady State)	Apply the following environment to the mating connector in accordance with MIL-STD-202G,Method 103, Condition B. Temperature ： 313±2K (40±2℃) Humidity ： 90～95%RH Duration ： 96 hours	［Appearance］ Looseness between the parts，chipping，breakage or other abnormality shall not occur. ［Contact Resistance］ Shall meet 6-1-1 ［Insulation Resistance］ Shall meet 6-1-2.
3	Salt Water Spray	Apply the following environment to the mating connector in accordance with MIL-STD-202G,Method 101E, Condition B. Temperature ： 308±2K (35±2℃) Salt water density ： 5±1%(by weight) Duration ： 48 hours	［Appearance］No abnormality Adversely affecting the performance shall occur.
4	High Temperature Life	Apply the following environment to the mating connector Temperature ： 363±2K (90±2℃) Duration ： 96 hours	［Appearance］ Looseness between the parts，chipping，breakage or other abnormality shall not occur. ［Contact Resistance］ Shall meet 6-1-1

Table Ⅱ: Test Sequence and Sample Quantity

Test: Measurement or Examination	A	B	C	D	E	F	G	H	I	J	K	L	M
1.Contact Resistance				1,3	1,3	1,3	1,3	1,5	1,5	1,3	1,3	1,3	
2.Insulation Resistance								2,6	2,6				
3.Dielectric Withstanding Voltage								3,7	3,7				
4.VSWR	1												
5.Un-mating force		1											
6.Crimp strength			1										
7.Durability				2									
8.Contact resistance with force on the cable					2								
9.Vibration						2							
10.Shock							2						
11. Thermal Shock								4					
12. Humidity									4				
13. Salt Water Spray										2			
14. High Temperature Life											2		
15. Solder ability												2	
16.Soldering Heat Resistance													1
Sample QTY.	10	10	10	10	10	10	10	10	10	10	10	10	10