



版本变更记录				
变更日期	变更内容	版本	变更人	批准人
2018-11-09	初版	Ver. 1.0		
2024-07-12	1. 根据客户要求增加 铆 IPEX高度要求 :1.34~ 1.4mm， 更新图纸，更新样品。从 PO2230702725订单开始切换。 . 2. FPC丝 印由YYMMDD改成22 1 1 26 为设计 日期 （ 为固定丝印， 非生产周期 ）， 更新图纸， 实物不变。 3. 1~5页变更成最新格式。 4. 因欧智通logo变更， 更新页眉欧智通logo.	Ver.2.0	潘益林	邱建鹏

## 1. 承认书项目表 (Index)

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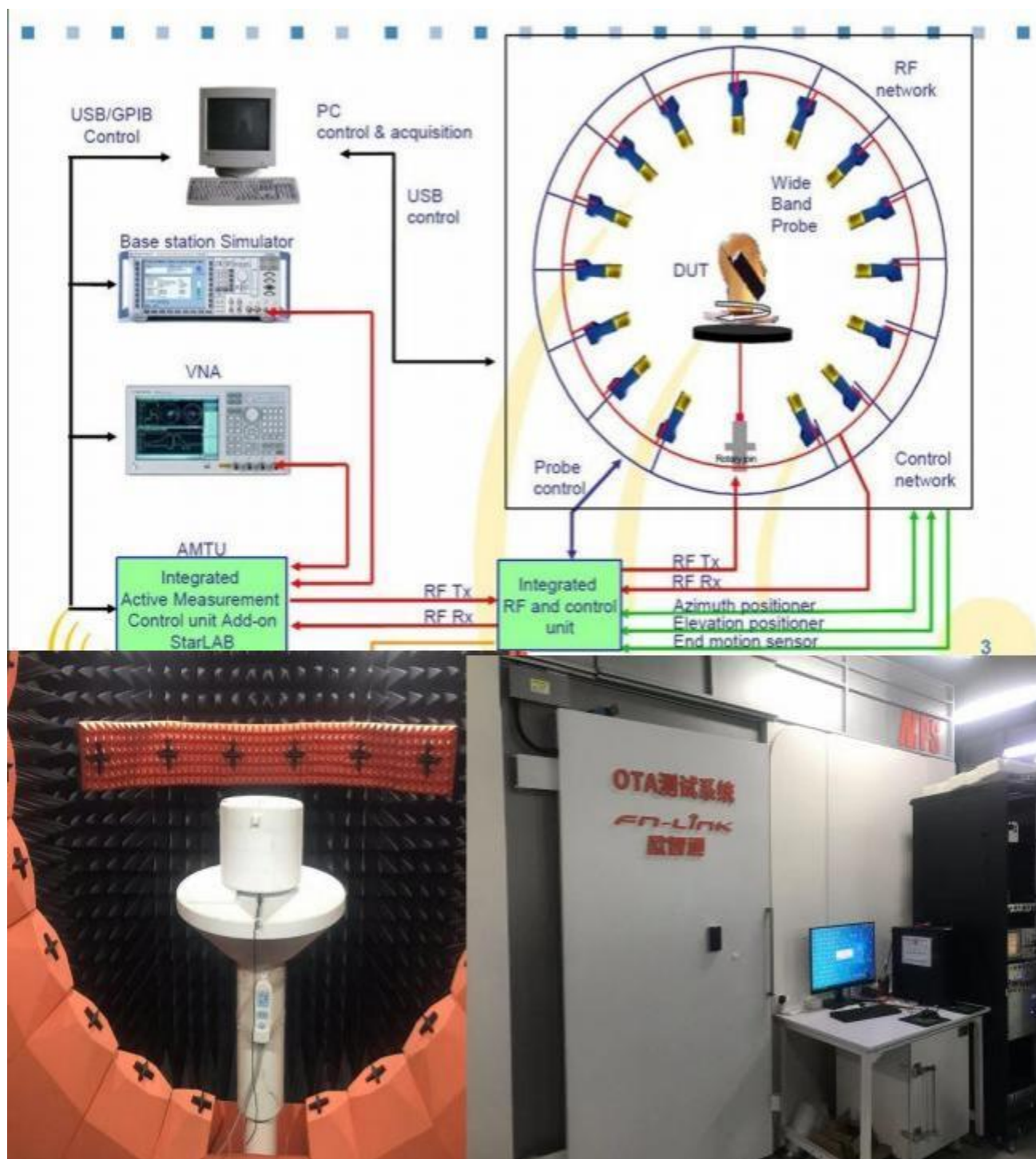
## 1. 试验设备和条件(Test Equipment & Conditions)

1.1 · Network Analyzers : KEYSIGHT P5002A

1.2 · Communications Test Set: R & S CMW 500

1.3 · 3D Chamber Test System: 24探头测试系统

### 1. 微波暗室的测试原理图



## 2. 说明。

这份报告总结了该项目天线的电气性能结果，包括天线的S11 参数, Gain和Efficiency.

## 产品实物图&规格

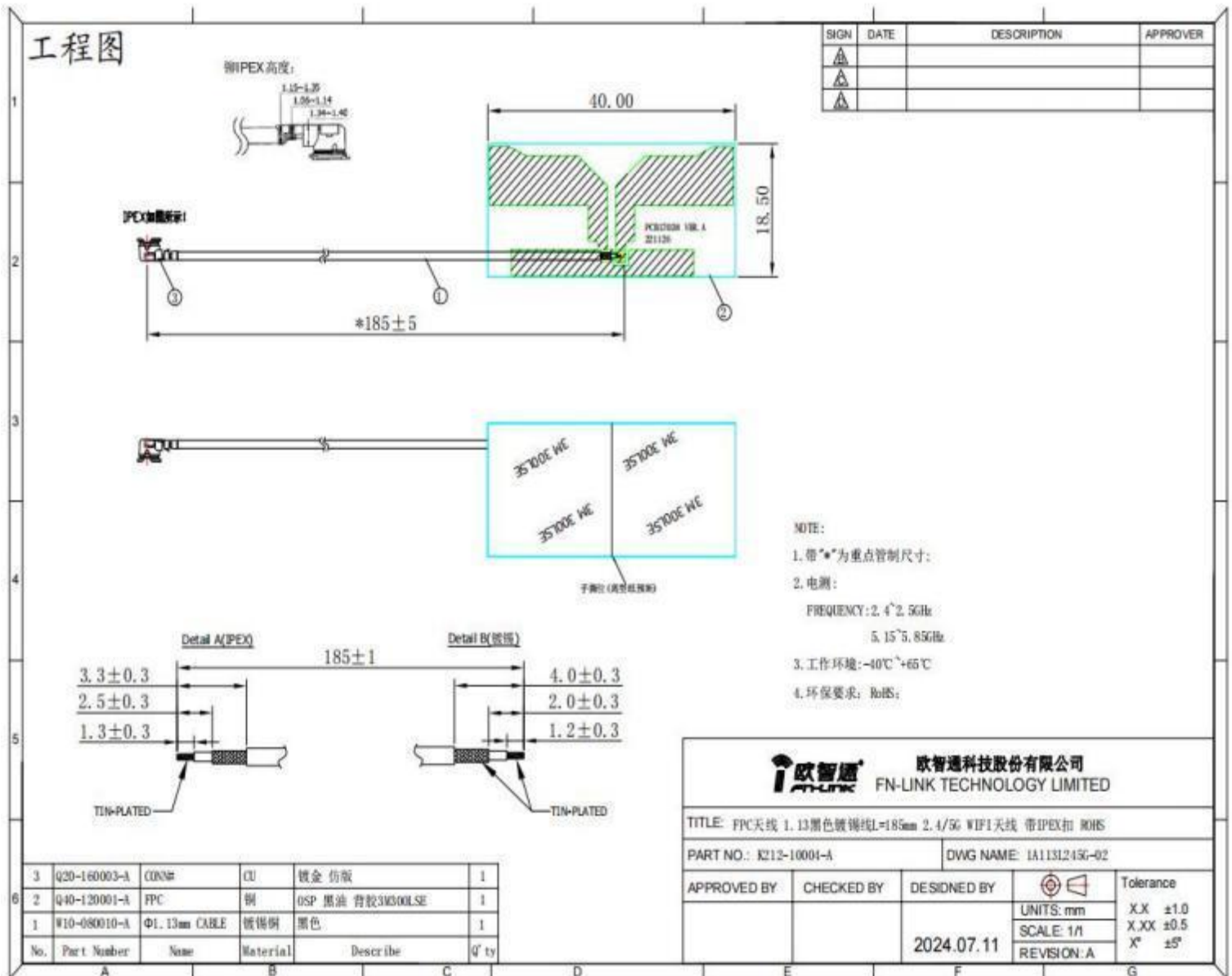
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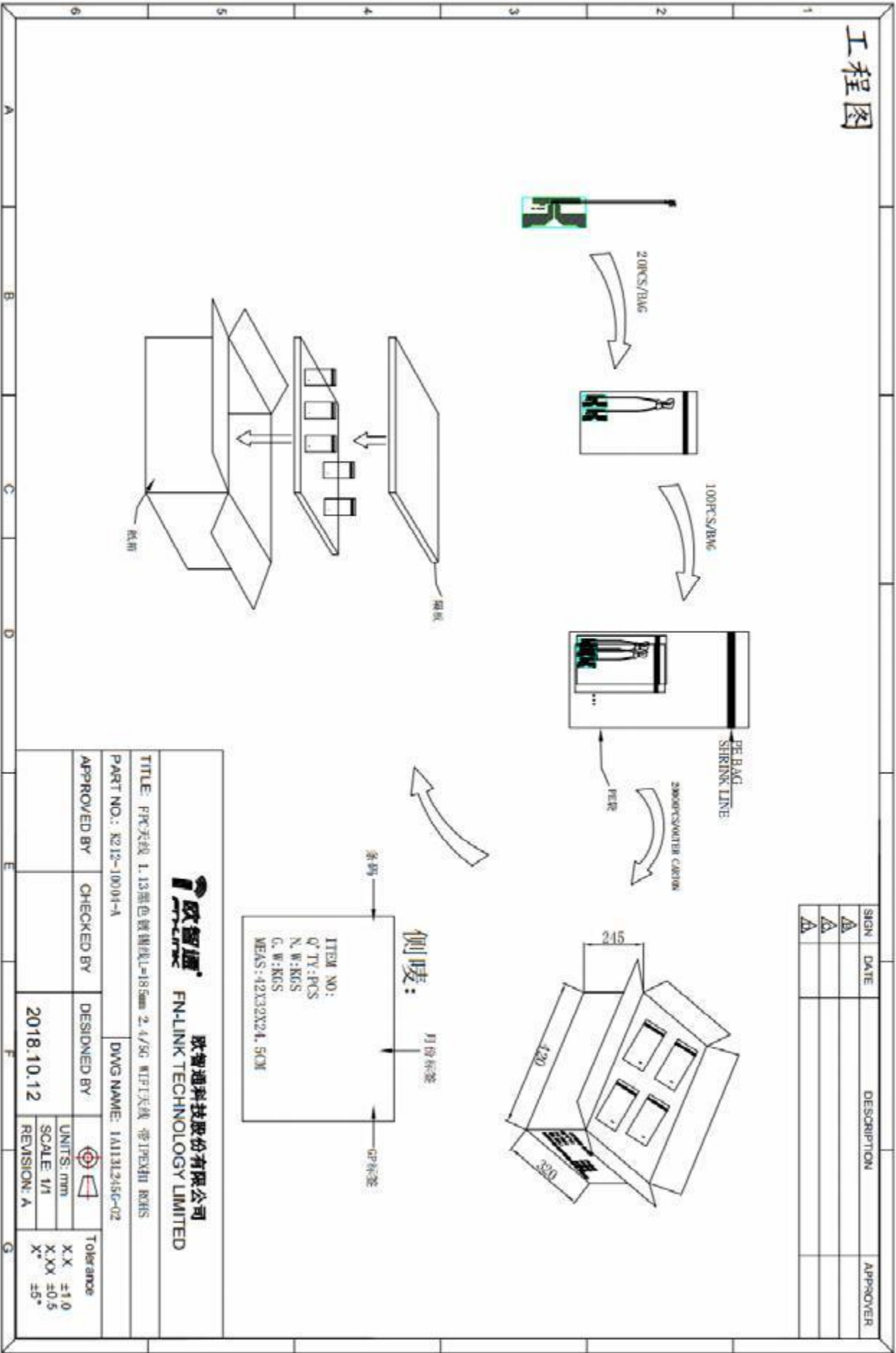
## 规格表Specification

<b>A.Electrical Properties</b>	
<b>Frequency Rang</b> 频段范围	2.4~2.5GHz5.15~5.85GHz
<b>Impedance</b> 特性阻抗	<b>50Ω Nominal</b>
<b>VSWR</b> 电压驻波比	2.0 Max. (带机壳)
<b>VSWR</b> 电压驻波比	4.0 4.5 (自由空间下)
<b>Gain( peak)</b> 增益 (峰值)	2.4~2.5GHz (2.77) 5.15~5.85Ghz (3.51)
Out of roundness不圆度	3.0 dBi ( <b>Max.</b> )
<b>Radiation</b> 辐射方式	<b>Omni- Directional/ 全向</b>
<b>Polarization</b> 极化方式	<b>Linear Vertical/ 垂直</b>
<b>B. Physical Properties</b>	
<b>ConnectorType</b> 连接方式	IPEX一代
<b>Cable</b> 线材	OD :1.13mm
<b>Antenna Body</b> 天线本体	FPC 电解铜
<b>C.Environmental</b>	
<b>Operating Temp</b> 工作环境	-40℃~+65℃
<b>Storage Temp</b> 存储环境	-40℃~+65℃

# 天线成品图



天线包装图



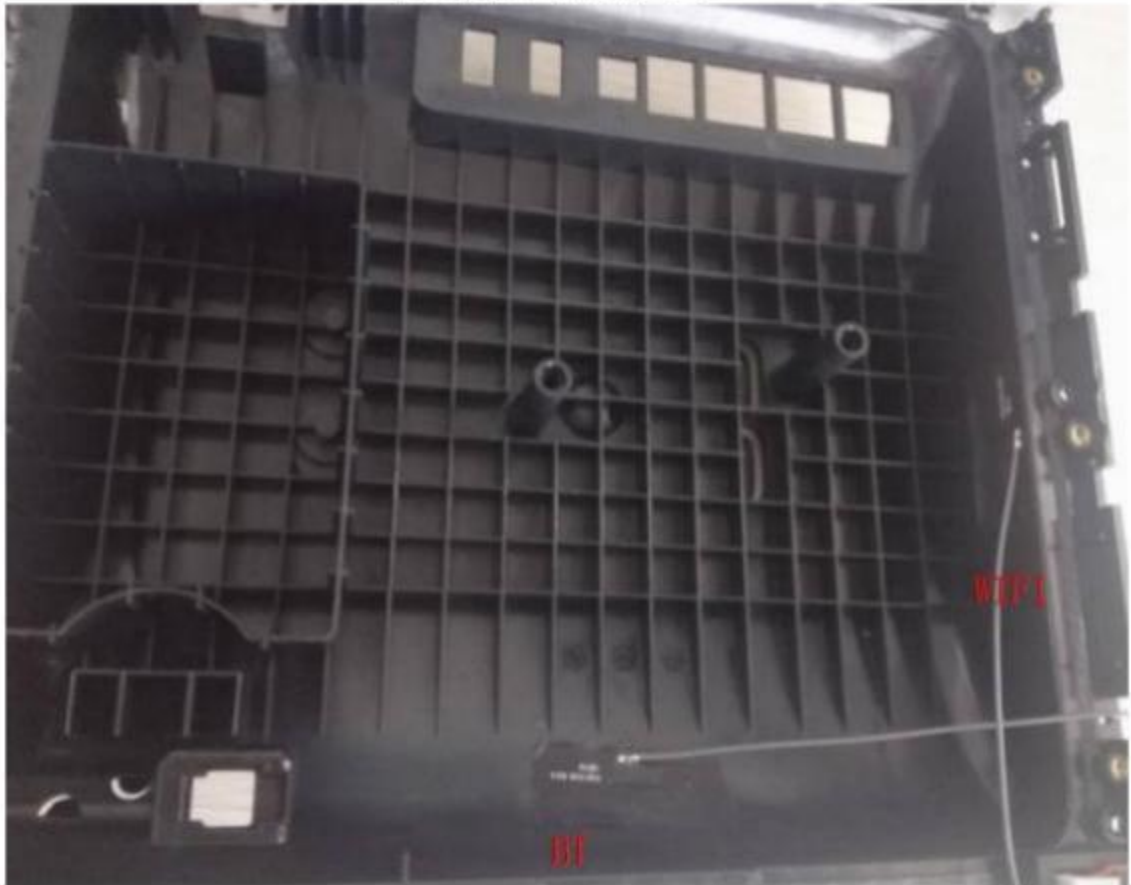




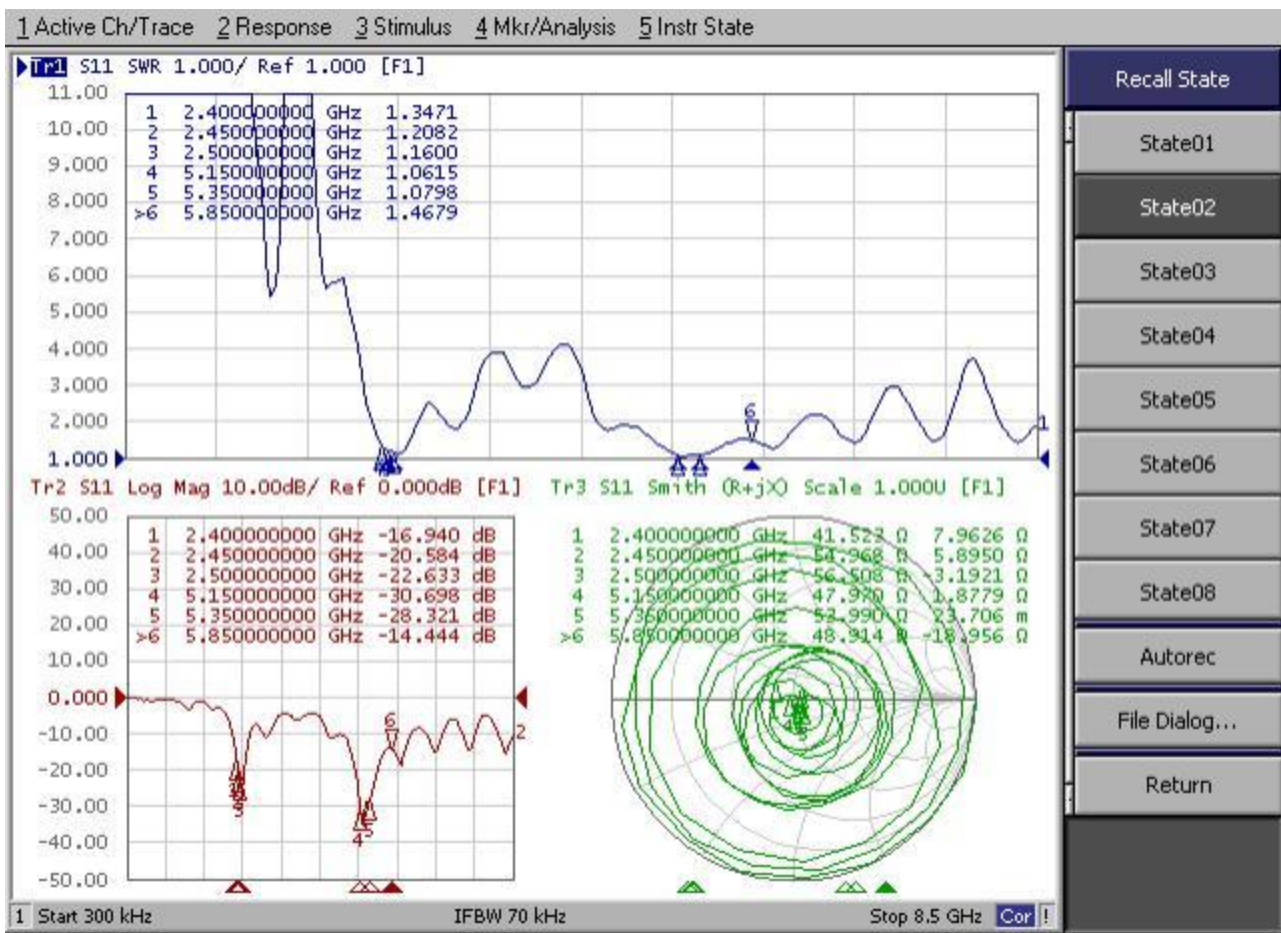


## 电性测试报告Electrical Test Report

天线实物与粘贴位置:



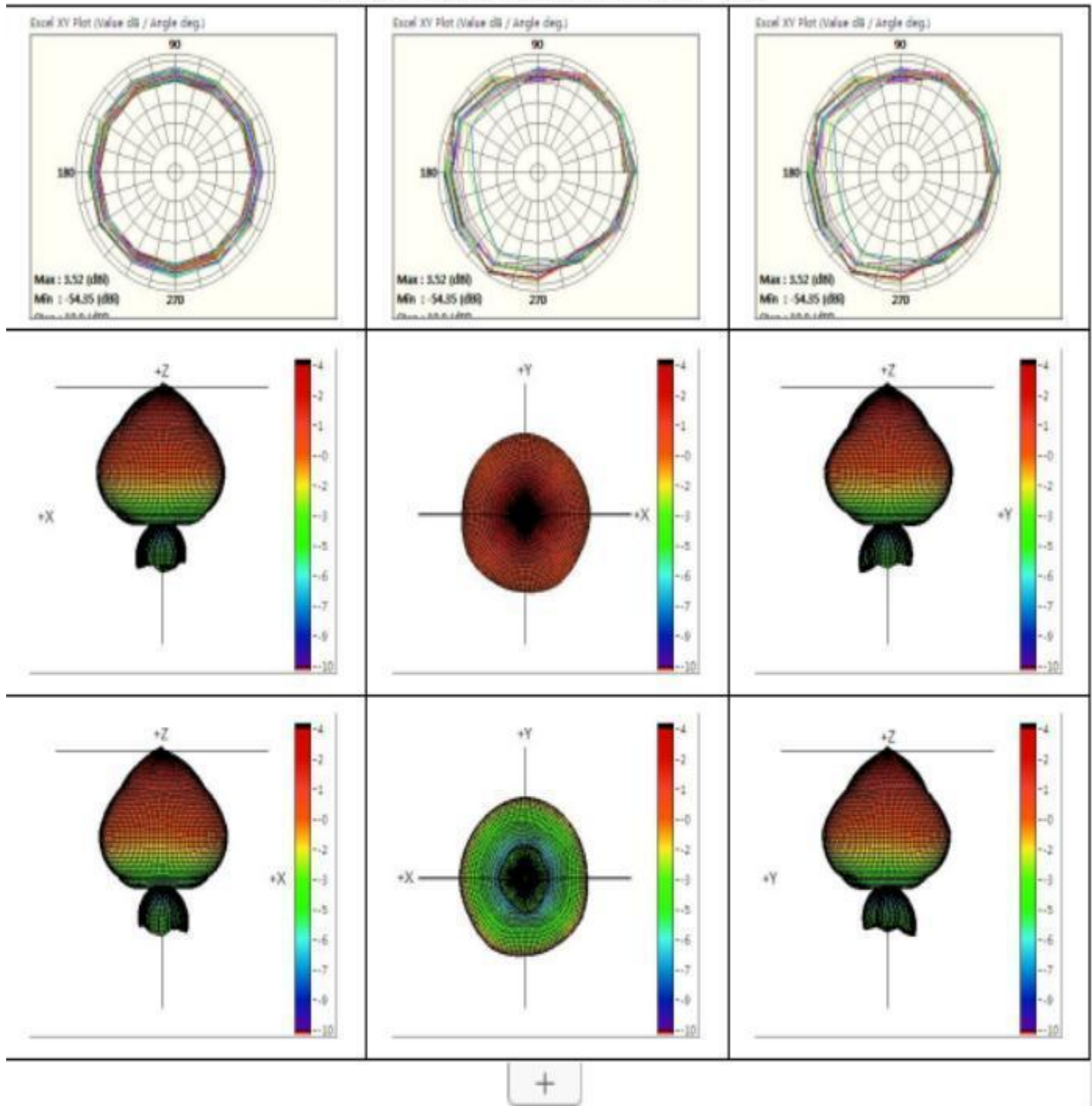
## WIFI2.4-5G天线S11(Black antenna S11)



BT2.4天线苹果图方向图

(Black antenna)3DPattern@2400-2500MHz

### 暗室2D、3DRadiation Pattern: (BT)



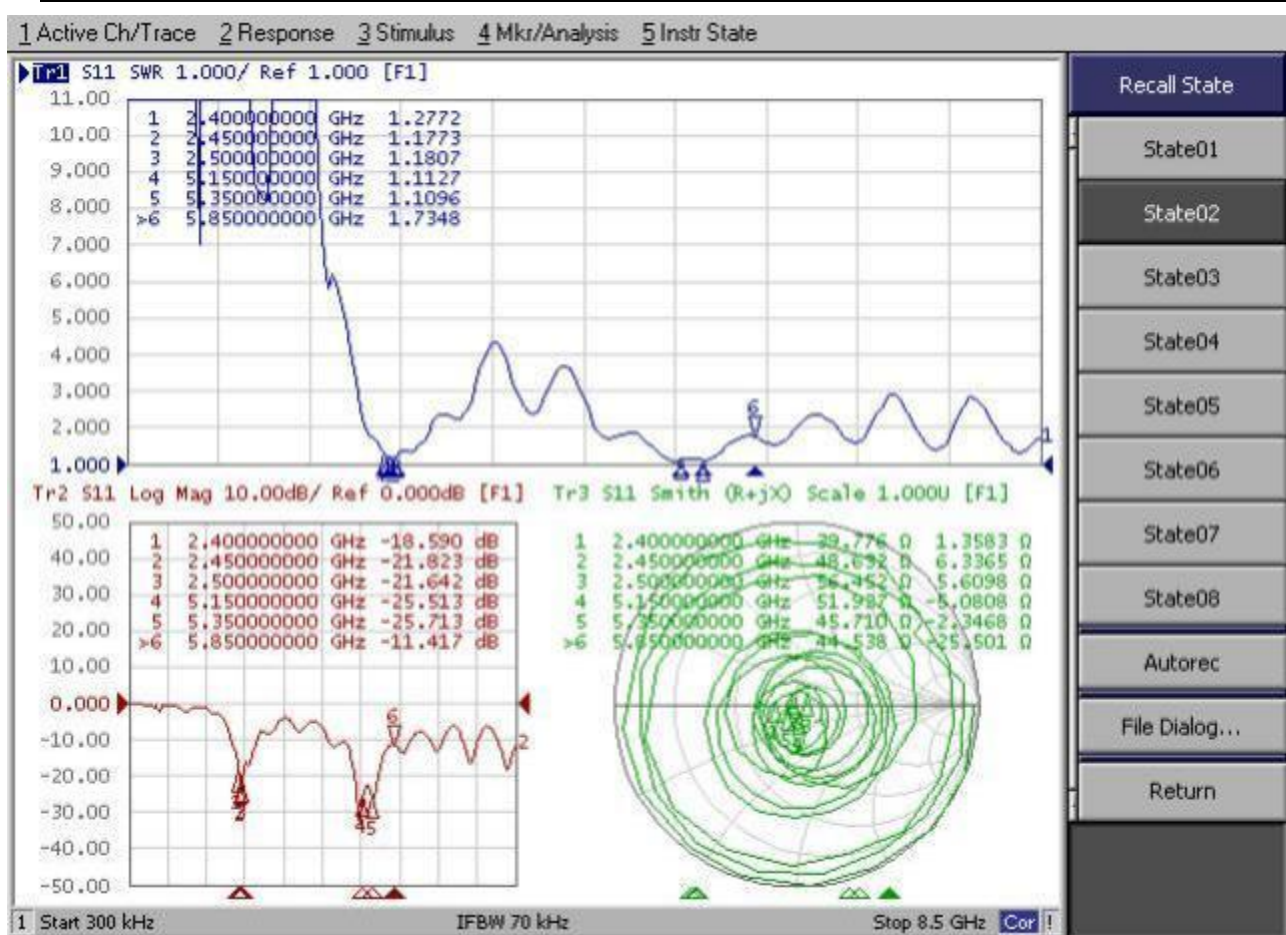
### 暗室无源测试数据:

Frequency	2.4G	2.41G	2.42G	2.43G	2.44G	2.45G	2.46G	2.47G	2.48G	2.49G	2.5G
Efficiency Total (%)	74.3	77.27	79.98	80.17	80.72	80.17	77.8	76.56	78.89	74.64	71.29
Gain Total (dBi)	2.11	2.3	2.44	2.25	2.3	2.31	2.08	2.23	2.63	2.55	2.62

Frequency	5.15G	5.25G	5.35G	5.45G	5.47G	5.5G	5.55G	5.6G	5.65G	5.7G	5.725G	5.75G	5.8G	5.825G	5.85G	5.9G
Efficiency Total (%)	50	52.24	63.97	66.53	71.12	77.45	63.68	68.39	57.68	57.15	53.95	47.97	47.64	42.27	47.1	52.72
Gain Total (dBi)	3.31	3.52	3.03	1.78	2.08	2.59	1.91	2.7	2.51	2.47	2.41	1.68	1.53	1.23	1.56	2.01

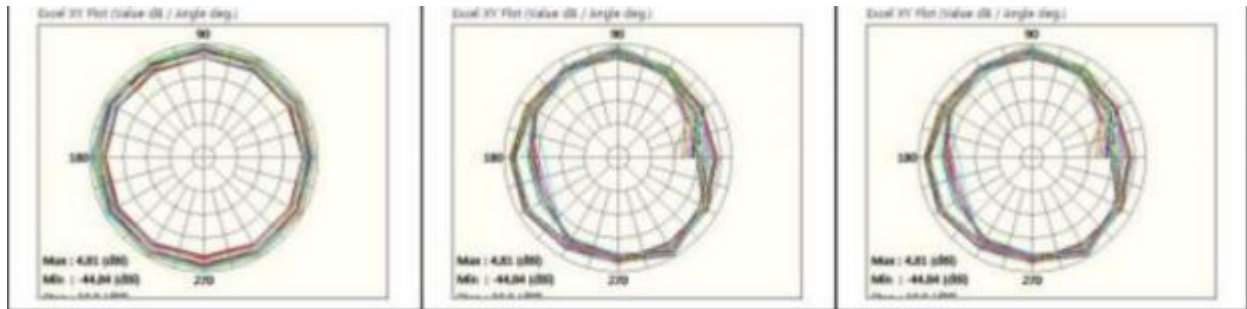
## BT2.4-5G天线S11(Black antenna S11)





# WIFI2.4-5G天线苹果图方向图

(Black antenna)3DPattern@2400-2500MHz 5150-5850MHz



		暗室无源测试数据:														
Frequency	2.4G	2.41G	2.42G	2.43G	2.44G	2.45G	2.46G	2.47G	2.48G	2.49G	2.5G					
Efficiency Total (%)	86.7	91.62	93.33	93.97	92.68	92.47	91.83	93.54	98.17	99.31	98.4					
Gain Total (dBi)	1.29	1.56	1.76	2.24	2.3	2.51	2.52	2.42	2.64	2.61	2.7					
Frequency	5.15G	5.25G	5.35G	5.45G	5.47G	5.5G	5.55G	5.6G	5.65G	5.7G	5.725G	5.75G	5.8G	5.825G	5.85G	5.9G
Efficiency Total (%)	65.06	73.04	76.41	75.08	77.22	78.23	73.99	79.14	63.54	63.37	60.72	59.5	57.76	51.09	59.02	64.92
Gain Total (dBi)	1.78	2.3	3.19	3.25	3.45	3.51	3.09	2.99	3.23	2.61	2.31	1.74	1.97	1.39	2.07	3.37

# 环境与可靠性实验 Environmental and reliability experiment

Test Items 测试项目	Test Condition and Procedure测试方法	Requirements要求	Test equipment 试验设备
Vibration震动	GB / T2423.48-2008Amplitude: 0.03 inch (1.5mm); Freq: 20 to 80 to 20 Hz3 directions; 2 hours for each direction振幅 1.5 mm; 频率 20~80~20 Hz; 3个方向各2H	1. No Visual Damage2. Frequency Tol. ≤ 5 % 无明显外观不良;频率偏移 ≤ 5%	NA
Random Drop跌落	GB / T2423.8-1995Single: Height: 1.0 Meter; 3 directions; 1 time for each direction 单支天线, 高1m; 3个方向各1次	1. No parts separated、fracture2. Frequency Tol. ≤ 5% 产品无脱落、断裂;频率偏移 ≤ 5%	NA
	Packing: Height: 0.76 Meter; 1 corner, 3 edges, 6 surface 包装: 高0.76m, 一角、三棱、六面各一次		
	Antenna+Machine: Height: 0.76 Meter; 1 corner, 3 edges, 6 surface. 整机: 高0.76m, 一角、三棱、六面各一次		
Solderability可焊性	GB / T2423.28-2005Temp: 260±5°C; Duration: 5 seconds 温度260±5°C; 持续5秒	Tin evenly on full上锡均匀饱满	NA
Pull Test拉力	Holding with individual specification; force applied to axis of terminal . 单独定义产品端子拉力	1. Directive DUT specification2. Frequency Tol. ≤ 5 % 符合待测物规范;频率偏移 ≤ 5%	拉力计
Torque Test扭力	Holding with individual specification; applied clockwise and counterclockwise to the axis of terminal 单独定义产品端子之顺时针及逆时针扭力	1. Directive DUT specification2. Frequency Tol. ≤ 5 % 符合待测物规范;频率偏移 ≤ 5%	扭力计
Salt Spray盐雾	GB / T 2423 . 17-2008Temp: 35°C; RH: ≥ 95%; NaCl solution: ≥ 5%; Time: 8H 温度35°C; 湿度≥95%; 盐水浓度≥5%; 测试48H	1. No Visual Damage2. Frequency Tol. ≤ 5 % 无明显外观不良;频率偏移 ≤ 5%	盐雾试验机
Temperature and Humidity Chamber恒温恒湿	GB / T 2423 . 3-2006Temp: 80°C / 12 H; -40°C / 12H RH: ≥ 90%; Time: 24H 温度80°C 测试12H转-40°C测试12H; 湿度≥ 90%; 时间24H	After 2 Hours Recovery1. No Visual Damage2. Frequency Tol. ≤ 5 % 恢复2H后, 无明显外观不良; 频率偏移 ≤ 5%	恒温恒湿试验机

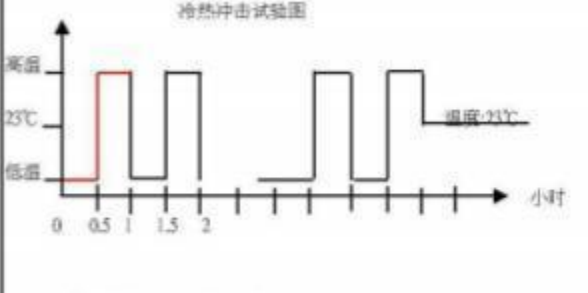


Temperature and Humidity Chamber 恒温恒湿	GB / T 2423.3-2006Temp: 80°C / 12 H; - 40°C / 12H RH: ≥ 90%; Time: 24H温度80°C 测试12H转-40°C测试12H; 湿度≥ 90% ; 时间24H	After 2 Hours Recovery1 . No Visual Damage2 . Frequency Tol. ≤ 5 % 恢复2H后, 无明显外观不良; 频率偏移 ≤ 5%	恒温恒湿试验机
Thermal Shock 冷热冲击	GB / T 2423.22 - 2008- 40°C (30 minutes) to + 80°C (30 minutes); Cycles: 24- 40°C测试30分转80°C测试30分为一个周期; 共24周期	After 2 Hours Recovery1 . No Visual Damage2 . Frequency Tol. ≤ 5 % 恢复2H后, 无明显外观不良; 频率偏移 ≤ 5%	冷热冲击试验机
Aging test 老化	GB / T 2423.2 - 2008Temp: 80°C; Time: 24 hours温度50°C , 测试8H	After 2 Hours Recovery1 . No Visual Damage2 . Frequency Tol. ≤ 5 % 恢复2H后, 无明显外观不良; 频率偏移 ≤ 5%	老化试验机

## 盐雾试验报告

客户/供应商		试验时间	2021. 11. 28~2021. 11. 30			
品名规格	内置FPC天线	料 号				
试验报告: ■新产品开发试验 。设计变更试验 。量产追踪试验 。其他特殊需求试验 参考标准: ASTMG85-98, ASTMB117-97, GB/T10125-1997,GB/T9798-1997.		设备名称: 盐务实验试验机 试验条件: 1、5%浓度盐水 2、实验箱温度45℃ 3、压力桶温度47℃ 4、时间: 48H				
试验判定标准:	试验后外观有无影响					
一.试验结果:						
料号	规格	数量	开始日期	结束日期	不良数	判定
	内置FPC天线 (FPC+CABLE+ IPEX)	2PCS	2021.11.28	2021.11.30	0	OK
二. 结果描述与判定:						
1. 经48小时测试后, 无氧化、生锈等现象。 判定: ■合格。不合格						
备注:						

### 高低温试验报告

客户	欧智通	试验时间	2018. 09. 22~2018. 09. 24			
品名	FPC天线	料号	K212-10004-A			
试验报告: <input checked="" type="checkbox"/> 新产品开发试验 <input type="checkbox"/> 设计变更试验 <input type="checkbox"/> 量产追踪试验 <input type="checkbox"/> 其他特殊需求试验 设备名称: 冷热冲击试验机 试验条件: 高温: 70 °C、低温: -40 °C 相对湿度为95%RH 试验时间: 48 Hrs ~ 48 循环		<div style="text-align: center;">  <p>冷热冲击试验图</p> <p>注: * 表示一个cycle曲线</p> </div>				
试验判定标准:	试验后外观及功能测试无影响 泡棉双面胶是否脱落塑胶壳及天线					
试验前图片		试验后图片				
一. 试验结果:						
料号	规格	数量	开始日期	结束日期	不良数	判定
1A113L245G-02	FPC天线 1.13黑色镀锡线L=185mm 2.4/5G WIFI天线 带IPEX扣 ROHS	2PCS	2018.09.22	2018.09.24	0	OK
二. 结果描述与判定: 1. 经48小时测试后, 外观及功能测试均OK。 2. 泡棉双面胶无脱落现象。 <div style="text-align: center; margin-top: 20px;">判定OK!</div>						

核准: DRAGON

审核: JOHN

制表: 张超超

送检数量		5PCS	合格数量		5PCS			
检验项目		检验标准及说明	检验结果					判定
			No. 1	No.2	No.3	No.4	No.5	
外观	FPC	无脏污、无破损，无刮伤	OK	OK	OK	OK	OK	■OK □NG
	CABLE	对比无色差、无脏污、无破损，无刮伤	OK	OK	OK	OK	OK	■OK □NG
	IPEX	对比无脏污、无破损，无刮伤	OK	OK	OK	OK	OK	■OK □NG
	焊锡	饱满，光滑	OK	OK	OK	OK	OK	■OK □NG
主要尺寸	1	185±5mm	185	185	185	185	185	■OK □NG
	2	40±0.3mm	40.21	40.21	40.22	40.23	40.21	■OK □NG
	3	18.5±0.2mm	18.56	18.57	18.56	18.58	18.55	■OK □NG
电气及功能测试								
	Frequency Rang	2.4~2.5GHz5.15~5.85 GHz						
	VSWR	<5.0	pass	pass	pass	pass	pass	■OK □NG
机械性能	Cable与IPEX拉力	大于1.5kg	1.73	1.68	1.72	1.65	1.78	■OK □NG
备注								
最终判定		■ 合格						

# 零件规格&材质证明Part spec. & Material certificate

## 1. 适用范围:

### Scope

本规格书制定了 50 Ω FEP 绝缘射频电缆 YD113 系列的结构和电气特性.

This specification covers the construction and the electrical properties of YD113 series of 50 Ω FEP Insulation Coaxial Cable.

## 2. 结构/Construction:

单位/Unit:mm

项目/Item		详细资料/Details
导体/Conductor	材料/Material	镀锡铜线/Tinned Copper Wire
	构成(根/mm) Composition(No. /mm)	7/0.083
	标称直径/NOM. O. D	0.24±0.03
绝缘层 /Insulation	材料/Material	聚全氟乙丙烯 (自然色) /FEP(Natural)
	标称绝缘厚度 /Nom. Thick. (mm)	0.23
	标称外径/NOM. O. D	0.695±0.03
屏蔽层/Shield	材料/Material	镀锡铜线/Tinned annealed copper wire
	构成/Composition	0.05 单线编织/Single Braid of 0.05
护套/Jacket	材料/Material	聚全氟乙丙烯/FEP
	标称护套厚度 / Nom. Thick (mm)	0.10
	标称外径/Nom. O. D (mm)	1.13±0.05
	颜色/Color	按与客户确认的颜色/According to corresponding have approved by the suppliers and customers

## 3. 电气特性(20℃时)/Electrical Properties(at 20℃)

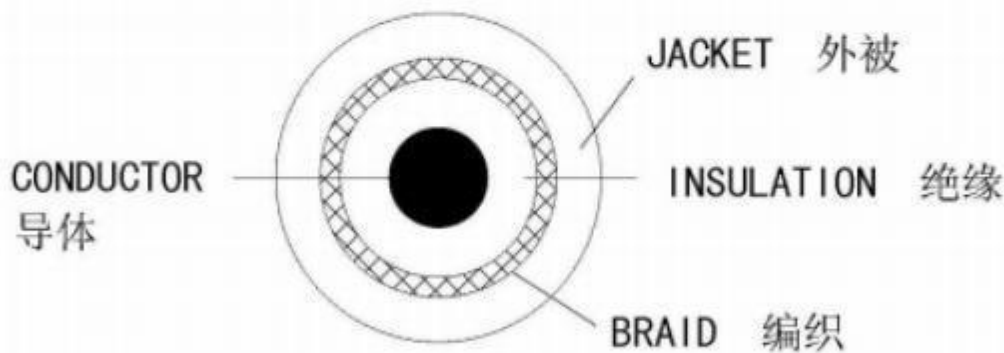
项目/Item	单位/Unit	详细资料/Details
导体电阻/Conductor Resistance	Ω/km	Max. 560
绝缘电阻/Insulation Resistance	MΩ. km	Min. 200
耐压强度/Dielectric Strength	V(AC)/min	1000
静电容/Capacitance	pF/m	98
特性阻抗 /Characteristic Impedance	Ω	50±2.0

衰减/Attenuation	dB/m	1GHz	2.20
		2GHz	3.15
		3GHz	3.90
		4GHz	4.60
		5GHz	5.20
		6GHz	5.70
驻波比/Standing wave(0-6GHz)	/	≤1.35	

#### 4. 包装 Packing

标准单位包装长度为 1000 米/盘, 每盘最多允许 5 个接头, 接头最短长度 20 米, 在搬运过程中不能损坏包装。

Standard unit length of finished cable shall be 1000m on reel, frequency of joint max.5/reel, the mini length is 20m. The finished cable shall be packed not be damaged during transportation



\*\*\*\*\*

本产品有时不适合车载用途的情况也有, 所以使用前请先和本公司业务部门进行商谈。

This product is not suitable for automobile application in some cases. Please contact with our sales department before you use this product.

\*\*\*\*\*





## AVLV2.E349435 Appliance Wiring Material - Component

[Page Bottom](#)

### Appliance Wiring Material - Component

[See General Information for Appliance Wiring Material - Component](#)
**JIANGYIN KAIBO COMMUNICATION TECHNOLOGY CO LTD**

E349435

391 Meiyuan St

Chengjiang Town

Jiangyin, Jiangsu 214400 CHINA

Table of Recognized Styles						
Single-conductor, thermoplastic insulation.						
<a href="#">1007</a>	<a href="#">1061</a>	<a href="#">1569</a>	<a href="#">10064</a>	<a href="#">10368</a>	<a href="#">11149</a>	
<a href="#">1015</a>	<a href="#">1354</a>	<a href="#">1571</a>	<a href="#">10248</a>	<a href="#">10369</a>		
Single-conductor, thermoset insulation.						
<a href="#">3302</a>	<a href="#">3385</a>	<a href="#">3386</a>	<a href="#">3619</a>			

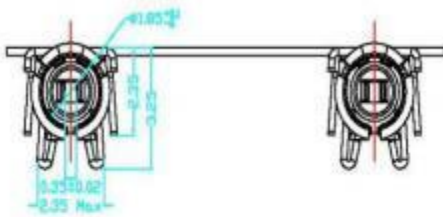
Marking: Company name, voltage rating, temperature rating, conductor size, conductor material if other than copper, and use.

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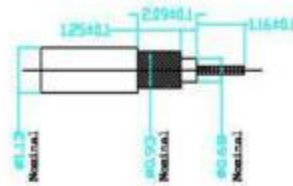
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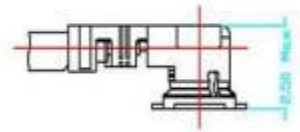
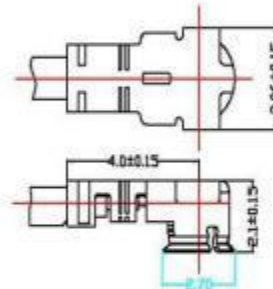
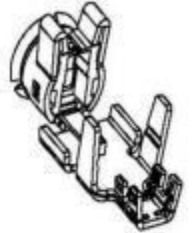
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Mark Position



Applicable Cable Nominal Dimension



**NOTE:**

**1. MATERIAL:**

Housing: THERMOPLASTIC, Color: Black, UL 94V-0

Contact: Copper Alloy, T=0.1MM

0.127~0.20um Gold Plating on Contact area Over Nickel Plated;

Shell: Copper Alloy, T=0.2mm

0.0508~0.127um Gold Plating on Contact area Over Nickel Plated;

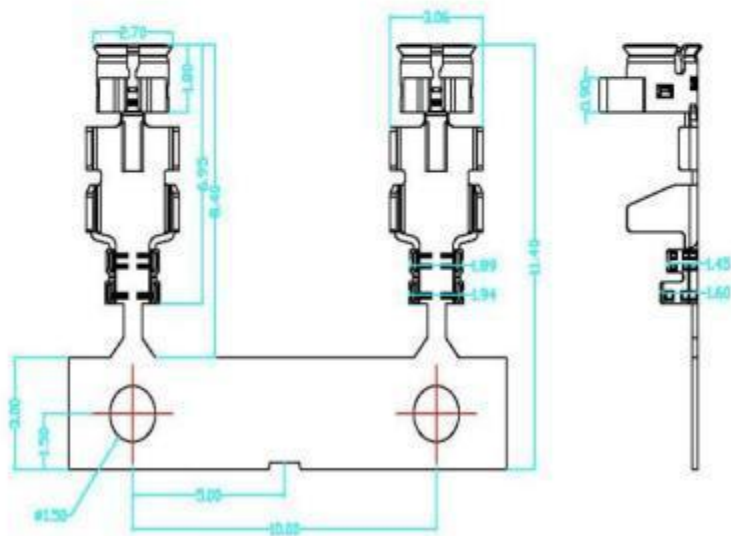
**2. PRODUCT PERFORMANCE:**

Termination Resistance: 20MΩ Max

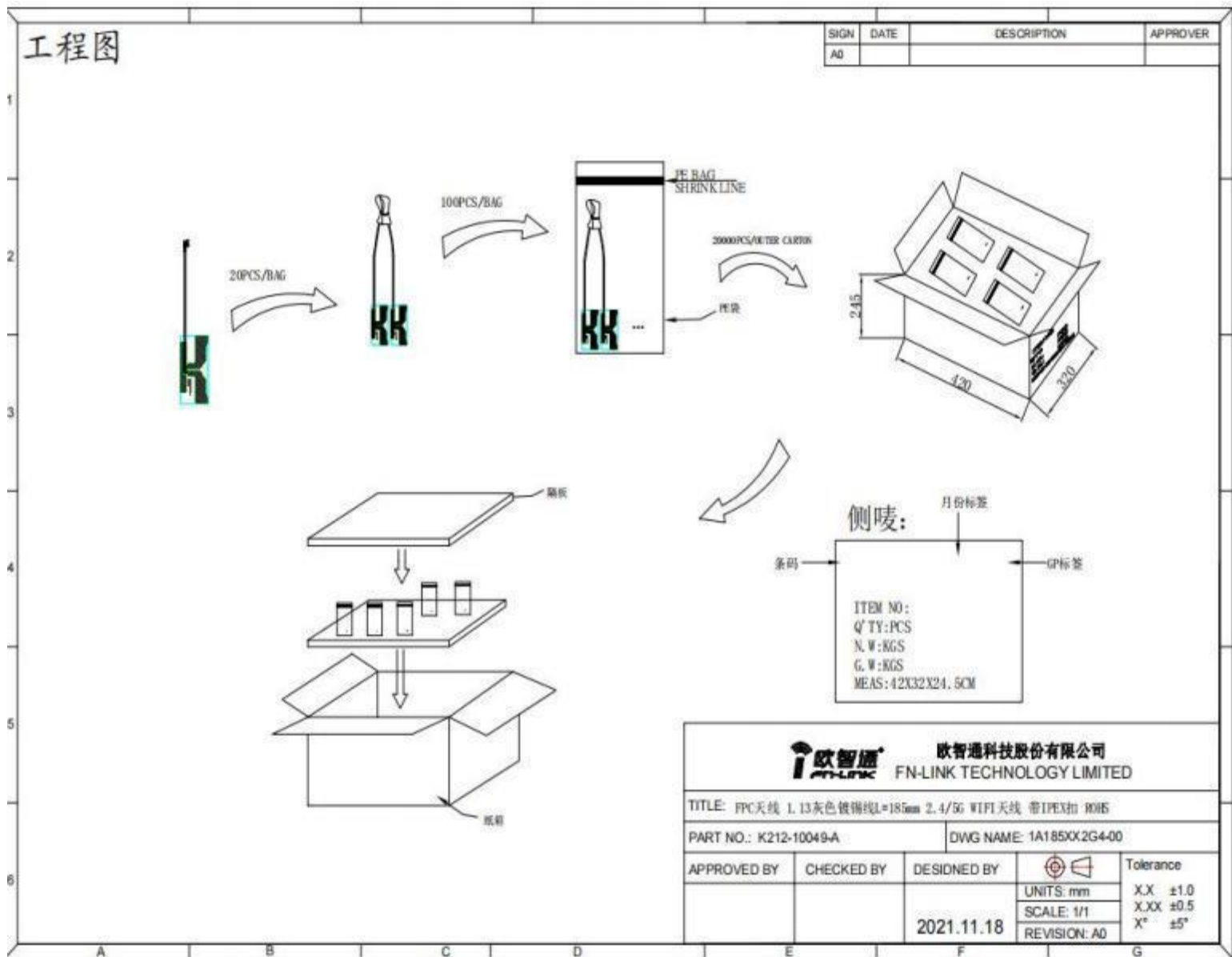
Dielectric Withstanding Voltage: 200V AC, 1 Minute

Insulation Resistance: 500MΩ Min

Durability: 30 Cycles Min



# 包装图



**MATERIAL SAFETY DATA SHEET 3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LEU, 9653LE, 9671LE, 9672LE and 9698LE 03/27/13**



## Material Safety Data Sheet

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This material safety data sheet (MSDS) is provided as a courtesy in response to a customer request. This product is not regulated under, and a MSDS is not required for this product by the OSHA Hazard Communication Standard (29 CFR 1910.1200) because, when used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** 3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LEU, 9653LE, 9671LE, 9672LE and 9698LE  
**MANUFACTURER:** 3M  
**DIVISION:** Industrial Adhesives and Tapes Division  
**ADDRESS:** 3M Center, St. Paul, MN 55144-1000

**EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)**

**Issue Date:** 03/27/13  
**Supersedes Date:** 12/03/09

**Document Group:** 07-7168-3

#### Product Use:

**Specific Use:** Bonding & Attachment  
**Intended Use:** Industrial use

### SECTION 2: INGREDIENTS

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>% by Wt</u>
Paper or Film Liner	Mixture	Not Applicable
Acrylic Polymer Adhesive	Trade Secret	100

### SECTION 3: HAZARDS IDENTIFICATION

#### 3.1 EMERGENCY OVERVIEW

**Specific Physical Form:** Roll of Tape

**Odor, Color, Grade:** Translucent adhesive, slight acrylate odor, paper or film quick release liner

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**General Physical Form:** Solid

**Immediate health, physical, and environmental hazards:** This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

### 3.2 POTENTIAL HEALTH EFFECTS

**Eye Contact:**

No health effects are expected.

**Skin Contact:**

No health effects are expected.

**Inhalation:**

No health effects are expected. This product may have a characteristic odor; however, no adverse health effects are anticipated.

**Ingestion:**

No health effects are expected.

## SECTION 4: FIRST AID MEASURES

### 4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

**Eye Contact:** No need for first aid is anticipated.  
**Skin Contact:** No need for first aid is anticipated.  
**Inhalation:** No need for first aid is anticipated.  
**If Swallowed:** No need for first aid is anticipated.

## SECTION 5: FIRE FIGHTING MEASURES

### 5.1 FLAMMABLE PROPERTIES

Autoignition temperature	<i>Not Applicable</i>
Flash Point	<i>Not Applicable</i>
Flammable Limits(LEL)	<i>Not Applicable</i>
Flammable Limits(UEL)	<i>Not Applicable</i>

### 5.2 EXTINGUISHING MEDIA

Use fire extinguishers with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

### 5.3 PROTECTION OF FIRE FIGHTERS

**Special Fire Fighting Procedures:** Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

**Unusual Fire and Explosion Hazards:** No unusual fire or explosion hazards are anticipated.



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Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

Not applicable.

### 6.2. Environmental precautions

Not applicable.

### Clean-up methods

Not applicable.

## SECTION 7: HANDLING AND STORAGE

### 7.1 HANDLING

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

### 7.2 STORAGE

Not applicable.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 ENGINEERING CONTROLS

Not applicable.

### 8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

#### 8.2.1 Eye/Face Protection

Avoid eye contact.

#### 8.2.2 Skin Protection

Avoid prolonged or repeated skin contact. Gloves not normally required.

#### 8.2.3 Respiratory Protection

Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.

#### 8.2.4 Prevention of Swallowing

Not an expected route of exposure.

### 8.3 EXPOSURE GUIDELINES

None Established

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES



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<b>Specific Physical Form:</b>	Roll of Tape
<b>Odor, Color, Grade:</b>	Translucent adhesive, slight acrylate odor, paper or film quick release liner
<b>General Physical Form:</b>	Solid
<b>Autoignition temperature</b>	<i>Not Applicable</i>
<b>Flash Point</b>	<i>Not Applicable</i>
<b>Flammable Limits(LEL)</b>	<i>Not Applicable</i>
<b>Flammable Limits(UEL)</b>	<i>Not Applicable</i>
<b>Boiling Point</b>	<i>Not Applicable</i>
<b>Density</b>	<i>Not Applicable</i>
<b>Vapor Density</b>	<i>Not Applicable</i>
<b>Vapor Pressure</b>	<i>Not Applicable</i>
<b>Specific Gravity</b>	<i>Not Applicable</i>
<b>pH</b>	<i>Not Applicable</i>
<b>Melting point</b>	<i>No Data Available</i>
<b>Solubility in Water</b>	Nil
<b>Evaporation rate</b>	<i>Not Applicable</i>
<b>Volatile Organic Compounds</b>	<i>Not Applicable</i>
<b>Percent volatile</b>	<i>Not Applicable</i>
<b>VOC Less H<sub>2</sub>O &amp; Exempt Solvents</b>	<i>Not Applicable</i>
<b>Viscosity</b>	<i>Not Applicable</i>

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable.

**Materials and Conditions to Avoid:**

**10.1 Conditions to avoid**

None known

**10.2 Materials to avoid**

None known

**Hazardous Polymerization:** Hazardous polymerization will not occur.

**Hazardous Decomposition or By-Products**

<u>Substance</u>	<u>Condition</u>
Hydrocarbons	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion

**Hazardous Decomposition:** Under recommended usage conditions, hazardous decomposition products are not expected. Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

**SECTION 11: TOXICOLOGICAL INFORMATION**

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Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

## SECTION 12: ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL INFORMATION

Not determined.

### CHEMICAL FATE INFORMATION

Not determined.

## SECTION 13: DISPOSAL CONSIDERATIONS

**Waste Disposal Method:** Reclaim if feasible. If product can't be reclaimed, dispose of waste product in a sanitary landfill. Alternatively, incinerate the waste product in an industrial, commercial, or municipal incinerator.

Since regulations vary, consult applicable regulations or authorities before disposal.

## SECTION 14: TRANSPORT INFORMATION

Not regulated per U.S. DOT, IATA or IMO.

*These transportation classifications are provided as a customer service. As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. 3M transportation classifications are based on product formulation, packaging, 3M policies and 3M understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and not the packaging, labeling, or marking requirements. The original 3M package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

## SECTION 15: REGULATORY INFORMATION

### US FEDERAL REGULATIONS

Contact 3M for more information.

#### 311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

### STATE REGULATIONS

Contact 3M for more information.

### CHEMICAL INVENTORIES

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

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Contact 3M for more information.

## INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

## SECTION 16: OTHER INFORMATION

### NFPA Hazard Classification

Health: 0 Flammability: 1 Reactivity: 0 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

**Reason for Reissue:** The MSDS has been revised because 3M has adopted the 16-section ANSI/ISO format. The potential hazards of the product have not changed. We encourage you to reread the MSDS and review the information.

### Revision Changes:

Section 1: Product name was modified.  
Section 1: Product use information was modified.  
Section 16: Disclaimer (second paragraph) was modified.  
Section 10: Hazardous decomposition or by-products table was modified.  
Section 14: Transportation legal text was modified.  
Page Heading: Product name was modified.  
Section 9: Density information was modified.  
Section 9: Vapor density value was modified.  
Section 9: Vapor pressure value was modified.  
Section 9: Boiling point information was modified.  
Section 5: Flammable limits (UE) information was modified.  
Section 5: Flammable limits (LEL) information was modified.  
Section 5: Autoignition temperature information was modified.  
Section 5: Flash point information was modified.  
Section 9: Property description for optional properties was modified.  
Section 9: Specific gravity information was modified.  
Section 9: pH information was modified.  
Section 9: Melting point information was modified.  
Section 9: Solubility in water text was modified.  
Section 9: Flash point information was modified.  
Section 9: Flammable limits (LEL) information was modified.  
Section 9: Flammable limits (UEL) information was modified.  
Section 9: Autoignition temperature information was modified.  
Section 2: Ingredient table was modified.  
Section 10: Materials to avoid physical property was modified.  
Section 10: Conditions to avoid physical property was modified.  
Section 6: 6.2. Environmental precautions heading was added.  
Section 6: 6.1. Personal precautions, protective equipment and emergency procedures heading was added.  
Section 16: Web address was added.  
Section 6: Personal precautions information was added.  
Section 6: Methods for cleaning up information was added.  
Section 8: Hand protection information was added.  
Section 1: Address was added.

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Copyright was added.  
Company logo was added.  
Section 6: Clean-up methods heading was added.  
Telephone header was added.  
Company Telephone was added.  
Section 1: Emergency phone information was added.  
Section 1: Emergency phone information was deleted.  
Company Logo was deleted.  
Copyright was deleted.  
Section 16: Web address heading was deleted.  
Section 6: Release measures heading was deleted.  
Section 9: Property description for required properties was deleted.  
Section 1: Address line 1 was deleted.  
Section 1: Address line 2 was deleted.

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