WHA YU INDUSTRIAL CO., LTD. (HEAD OFFICE)
TAI HWA ELECTRONIC CO., LTD.(CHINA)
SHANGHAI HUA YU ELECTRONIC CO., LTD.(CHINA
AEON TECH CO., LTD. (CHINA)

SPECIFICATION FOR APPROVAL

CUSTOMER: *中磊科技股份有限公司*

PART NAME: ***WLAN Antenna Cable Assembly***

PART NO.: ***REVISION:***

W. Y. P/NO.: ***C147-510215-A*** ***REV.:*** ***X1***

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :	1.16	
DATE :		

WHA YU GROUP

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Wujiang City,Jiangsu Province,China
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Antenna Assembly

Specification

1. Electrical Properties：

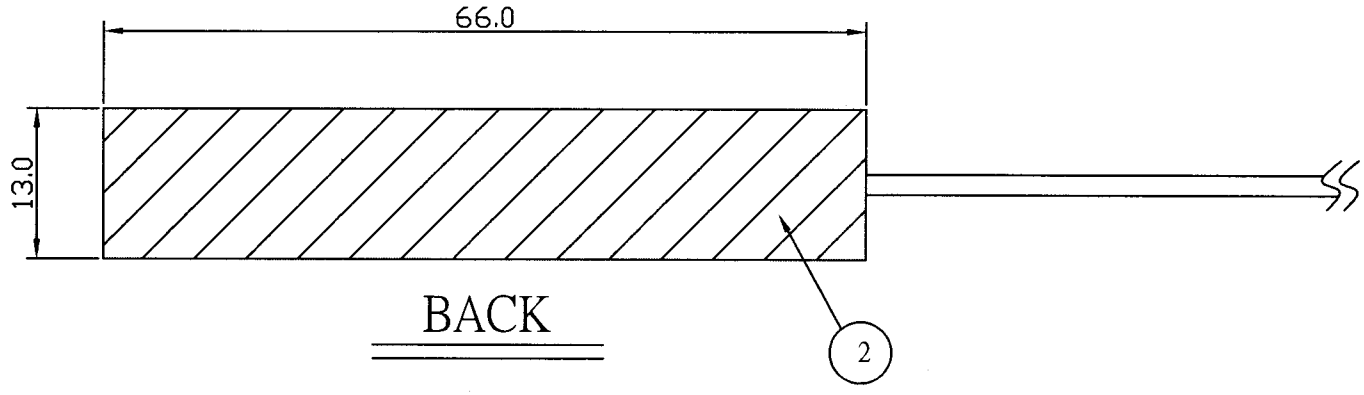
1.1 Frequency Range…….. 2.4~2.5GHz
1.2 Impedance…….. 50Ω
1.3 Return Loss…….. <-10dBi
1.4 VSWR…….. 1.92 Max.
1.5 Peak Gain…….. <2.0dBi@2.40~2.50GHz
1.6 Average Gain……..>-3.0dBi@2.40~2.50GHz
1.7 Admitted Power……..1W

2. Physical Properties：

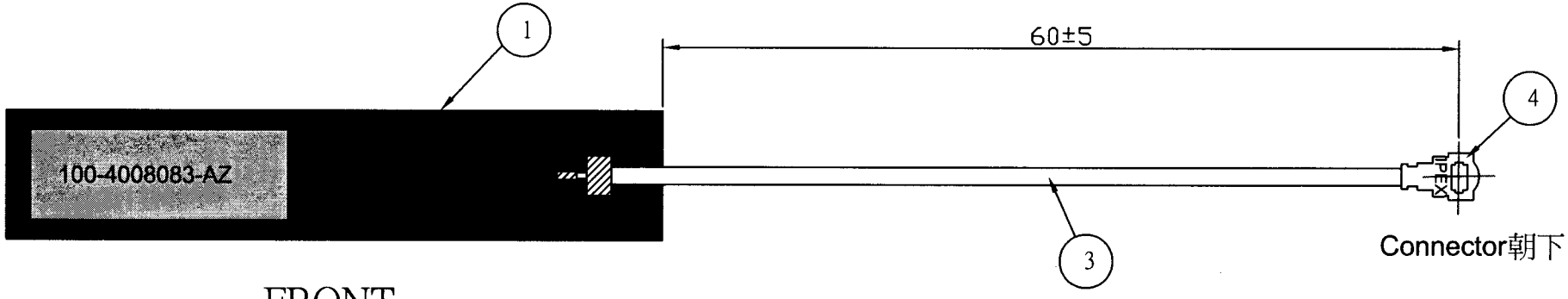
2.1 Operating Temp…….. -10℃ ~ +55℃
2.2 Storage Temp……..-30℃ ~ +75℃

CG-1184

REV	DATE	DESCRIPTION
A	2006-02-20	NEW

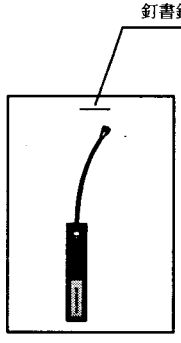


BACK



FRONT

NOTE :
1. Remove All Burrs.
2. All Angle Within 90°±3°.
3. All Corners Within R0.2~R0.5.
4. Diamter On Common Center And To Be Concentric Within 0.1mm.
5. [X...]Means Important Dimension.



Packing : 1set/bag
每10袋用釘書機訂起來
(以方便客戶點收)

CUSTOMER'S SINGATURE

NO	DESCRIPTION	QTY	REMARK
4	Connector: I-PEX	1	NA
3	Cable Assembly: ø1.13；L=70mm	1	Gray
2	Adhesive: 3M 467 adhesive	1	NA
1	WLAN Antenna: FR4(T=0.8mm)單面PCB板	1	NA

XX.	±5
X.	±3.0
.X	±1.0
.XX	±0.5
.XXX	±0.1

APPROVED
CHECKED 余慧輝
DRAWING 吳政樺

CUSTOMER: Sercomm
PART NO :
PARTNAME: WLAN Antenna
W.Y P/NO : C147-520215-A

REV	UNIT	FILE :
A	m/m	SHEET : 1/1

Wha Yu
INDUSTRIAL CO.,LTD.
譁裕實業股份有限公司

WHA YU INDUSTRIAL CO., LTD

NETGEAR Antenna Test Report

Measurement Time：2006/01/13

Measurement Instrument：

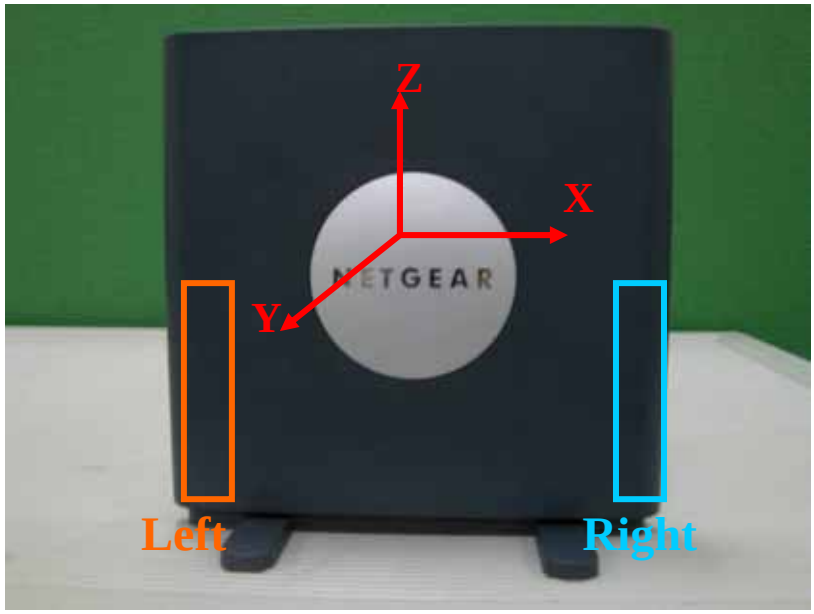
1、Agilent Technologies E5071A 300K~8.5GHz ENASeries Network Analyzer

2、Chamber：3.5m(W) * 3.25m(H) * 7.12m(L)

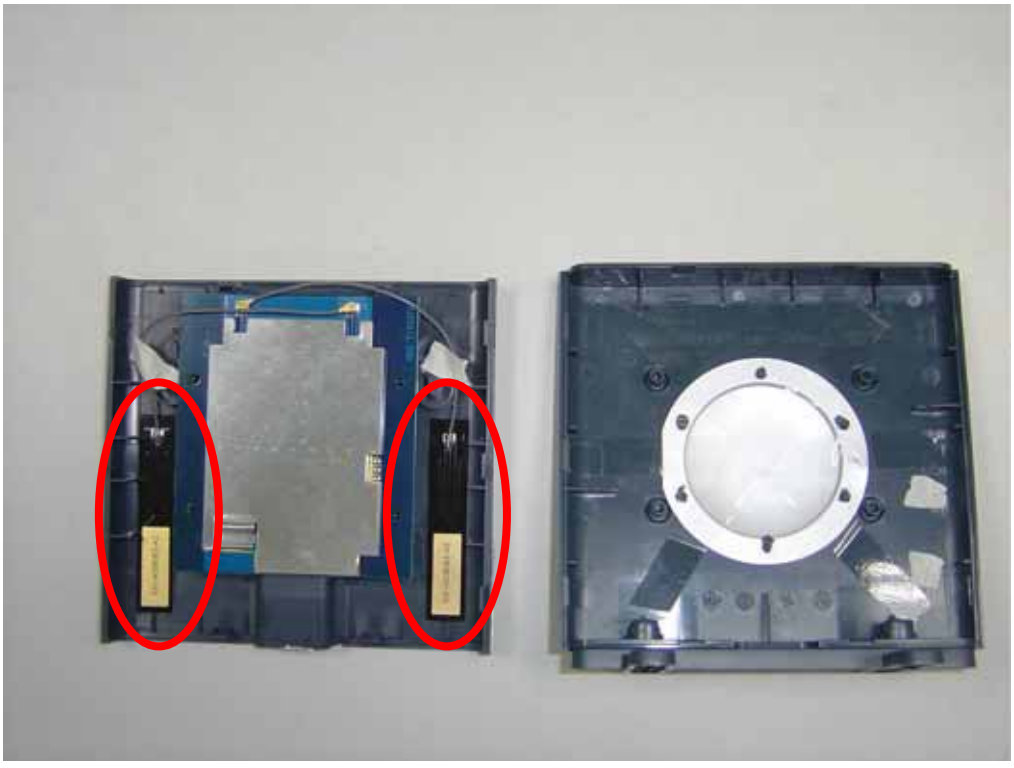
Gain Horn Antenna：SG-430 1.7~2.6GHz

Measurement Frequency：2.4 GHz ~ 2.5GHz

Photo

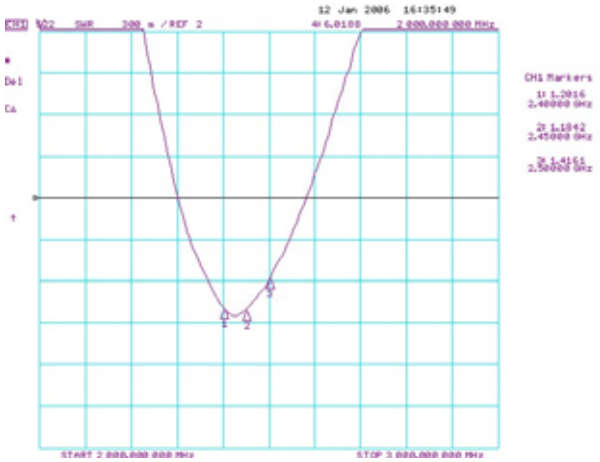


Antenna position

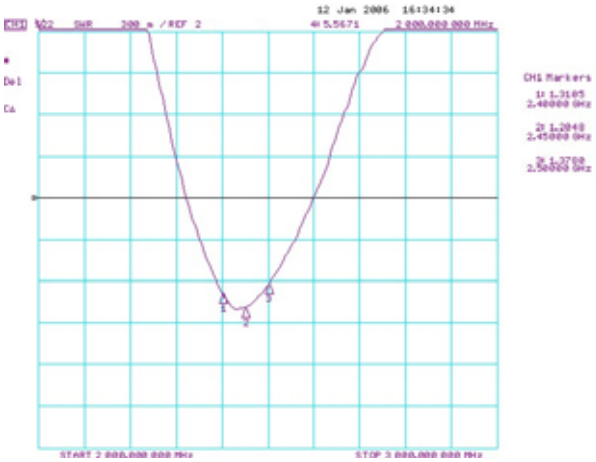


Antenna VSWR

Left Side



Right Side



Antenna	VSWR		
Frequency	2.4GHz	2.45GHz	2.5GHz
Left Side	1.20	1.18	1.41
Right Side	1.31	1.20	1.37

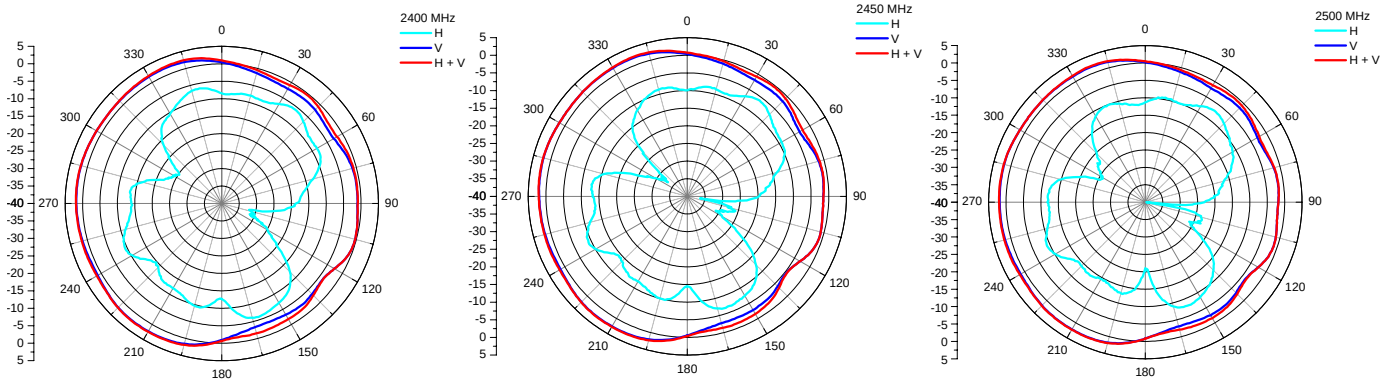
Antenna Peak Gain & Average Gain Test Result

Antenna	Peak Gain (dBi)			Average Gain (dBi)		
Frequency	2.4GHz	2.45GHz	2.5GHz	2.4GHz	2.45GHz	2.5GHz
Left Side	1.93	1.90	1.92	-0.16	-0.40	-0.54
Right Side	1.94	1.89	1.96	0.04	-0.25	0.08

Antenna Pattern

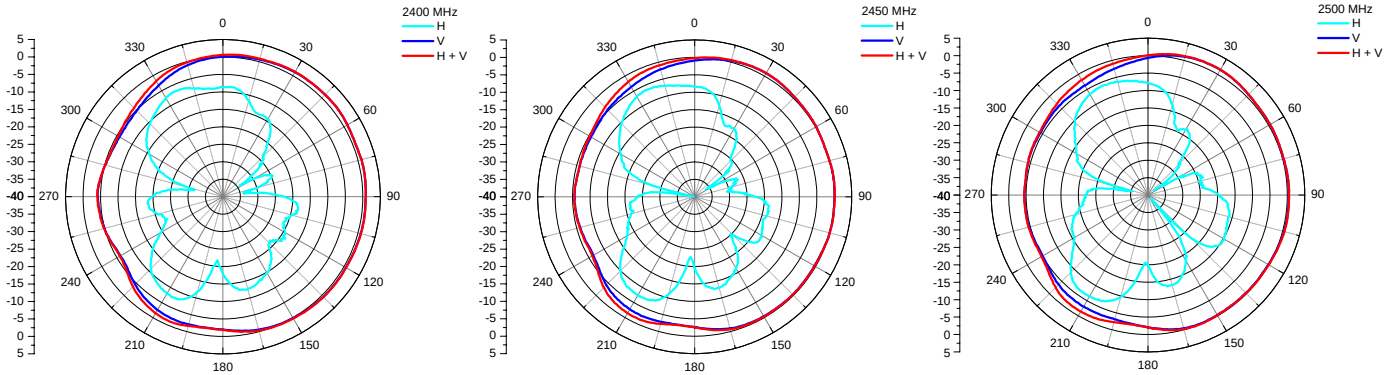
Left Side

2.4GHz~2.5GHz



Right Side

2.4GHz~2.5GHz



NP-150R

Glass cloth base epoxy resin flame retardant copper clad laminate

FEATURES

- High luminance of epoxy contrast with copper for laser type A.O.I.
- UV solder mask may be applied simultaneously to increase yiesIds.
- High performance epoxy blended to achieve higher resistance than that of FR-4-86
- Thickness 0.8mm capability
- Other properties are similartt to NP-140

PERFORMANCE LIST

Characteristics		Unit	Conditioning	Typical Values	SPEC
Volume resistivity		MΩcm	C-96/35/90	$5 \times 10^8 \sim 5 \times 10^9$	10^6 ↑
Surface resistivity		MΩ	C-96/35/90	$5 \times 10^6 \sim 5 \times 10^7$	10^4 ↑
Permittivity 1MHZ		-	C-24/23/50	4.2-4.8	5.4 ↓
Loss Tangent 1MHZ		-	D-24/23/50	0.010-0.016	0.035 ↓
Arc resistance		SEC	D-48/50+D-0.5/23	120 ↑	60 ↑
Dielectric breakdown		KV	D-48/50	60 ↑	40 ↑
Moisture absorption		%	D-24/23	0.05-0.10	0.35 ↓
Flammability		-	C-24/23/50+E-24/125	94V0	94V0
Peel strength 1oz		lb/in	288°C x 10" solder floating	10-14	8 ↑
Thermal stress		SEC	288°C solder dipping	200 ↑	10 ↑
Pressure cooker (2 atm 12°C)	1/2hr	SEC	288°C dipping	230	N/A
	1hr	SEC	288°C dipping	220	N/A
	2hr	SEC	288°C dipping	150	N/A
Flexural strength	LW	psi	A	70000-80000	60000 ↑
	CW	psi	A	60000-65000	50000 ↑
Dimensional stability X-Y axis		%	E-0.5/170	0.005-0.030	0.050 ↓
Coefficient of thermal expansion Z-axis before Tg Z-axis after Tg		in/in/°C in/in/°C	 TMA TMA	 5×10^{-5} 25×10^{-5}	N/A
Glass transition temp		°C	DSC	150 ±5	N/A

Data shown are nominal values for reference only.

NOTE:
The average value in the table refers to samples of .062" 1/1.

Adhesive Transfer Tapes with Adhesive 200

467 • 468 • 9567 • 9568

Technical Data **September, 2002**

Product Description

3M™ Adhesive Transfer Tapes with 3M™ Adhesive 200 are the industry choice for metal nameplates for the industrial or electronic applications because of excellent quality, consistency and durability. In addition, as a result of 3M's innovative, proprietary process, Adhesive 200 also offers the following performance characteristics:

- Excellent high temperature performance as well as excellent shear strength (that minimizes edge lifting and slippage of parts).
- Excellent resistance to harsh environments; this adhesive can withstand splashes of organic solvents, weak acids and bases and salt water. In addition, it performs well after exposures to humidity and hot/cold cycles.
- **Outstanding peel adhesion values are outstanding on metals and HSE plastics. Peel adhesion increases with increased adhesive thickness.**

Construction

	Adhesive Type/ Color	Adhesive Thickness[1] (mils, mm)	Liner Color, Type, Print	Liner Caliper/ Liner Release[2]
Tape 467	200	2.3 mils (0.06 mm)	62# Densified Kraft	3.8 mils 15 grams/inch
Tape 468	200	5.2 mils (0.13 mm)	62# Densified Kraft	3.8 mils 33 grams/inch
Tape 9567	200 Fibered	2.3 mils (0.06 mm)	62# Densified Kraft	3.8 mils 21 grams/inch
Tape 9568	200 Fibered	5.2 mils (0.13 mm)	62# Densified Kraft	3.8 mils 29 grams/inch

Note 1: The caliper listed is based on a calculation from manufacturing controlled adhesive coat weights using a density of 1.012 g/cc. While past data pages have listed nominal thicknesses of 2 and 5 mils, the coat weight (and theoretical caliper) has not changed.

Note 2: Typical liner release value, in grams/inch, tested at 90 ipm.

3M™ Adhesive Transfer Tapes with Adhesive 200

467 • 468 • 9567 • 9568

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

I. Adhesion to stainless steel

ASTM D3330 modified (90 degree peel, 2 mil aluminum foil backing)

Dwell	Tape 467/9567 ounces/inch	Tape 467/9567 N/100 mm	Tape 468/9568 ounces/inch	Tape 468/9568 N/100 mm
15 minute room temperature (RT)	66	72	90	98
72 hour RT	91	100	130	142
72 hour 158°C (70°C)	150	164	207	226

II. Adhesion to Other Surfaces

ASTM D3330 modified (90 degree peel, 2 mil aluminum foil backing)

Dwell	Tape 467/9567 ounces/inch	Tape 467/9567 N/100 mm	Tape 468/9568 ounces/inch	Tape 468/9568 N/100 mm
72 hour RT ABS	57	62	70	77
72 hour RT glass	82	90	113	124

III. Relative High Temperature Operating Ranges	
Short term (minutes/hours)	350°F (177°C)
Long term (days/weeks)	250°F (121°C)
IV. Shelf Life of Tape in Roll Form	24 months from the manufacturing date when stored at 70°F (21°C) and 50% relative humidity.

V. Environmental Performance

The properties defined are based on the attachment of impervious faceplate materials (such as aluminum) to an aluminum test surface.

Bond Build-up: The bond strength of 3M™ Adhesive 200 increases as a function of time and temperature.

Humidity Resistance: High humidity has a minimal effect on adhesive performance. Bond strengths are generally higher after exposure for 7 days at 90°F (32°C) and 90% relative humidity.

UV Resistance: When properly applied, nameplates and decorative trim parts are not adversely affected by outdoor exposure.

Water Resistance: Immersion in water has no appreciable effect on the bond strength. After 100 hours in room temperature water the bond actually shows an increase in strength.

Temperature Cycling Resistance: Bond strength generally increases after cycling four times through:
4 hours at 158°F (70°C)
4 hours at -20°F (-29°C)
16 hours at room temperature

Chemical Resistance: When properly applied, nameplate and decorative trim parts will hold securely after exposure to numerous chemicals including gasoline, MEK, oil, Freon™ TF, sodium chloride solution, mild acids and alkalis.

VI. Low Service Temperature

-40°F (-40°C)
Many applications survive below this temperature (factors affecting successful applications are: materials being bonded, dwell at RT before cold exposure and stress below the Tg [i.e., expansion/contraction stresses, impact]). Optimum conditions are: bonding HSE materials, longer time at RT before cold exposure and little or no stress below the Tg.

Note: Adhesive 200 is not recommended for low energy plastics (polypropylene, polyethylene, powder coated paints). For these surfaces please refer to 3M™ Adhesives 300, 350, 300LSE and the 300MP. The Adhesive 300LSE has been used more frequently as the bond areas in applications become smaller and smaller. It offers the smooth, high performance characteristics of the 3M™ Adhesive 200MP with higher adhesion to plastic. Adhesive 300LSE is ideal for bonding to polyethylene, polypropylene, powder coated paints and for applications where the bonded area is less than 1/4" wide.

3M™ Adhesive Transfer Tapes with Adhesive 200

467 • 468 • 9567 • 9568

Available Sizes

	Master Size	Slit Width (minimum)	Roll Length[8]	Core Size	Slit Tolerance
Tape 467	48"	1/2"	60-360 yards	3"	± 1/32"
Tape 468	48"	1/2"	60-360 yards	3"	± 1/32"
Tape 9567	48"	1/2"	1/2"-2 7/8" - 360 yards over 2 7/8"-48" - 540 yards	3"	± 1/32"
Tape 9568	48"	1/2"	1/2"-1" - 180 yards over 1"-48" - 360 yards	3"	± 1/32"

Note: Roll lengths vary by product slit width (the customer service department has more detailed information, 1-800-328-1681).

Application Techniques

For maximum bond strength (during installation of the final part) the surface should be thoroughly cleaned and dried. Typical cleaning solvents are heptane (for oily surfaces) or isopropyl alcohol for plastics. Use reagent grade solvents since common household materials like rubbing alcohol frequently contain oils to minimize the drying affect on skin. These oils can interfere with the performance of a pressure-sensitive adhesive. Consult solvent manufacturers MSDS for proper handling and storage instructions. Also, use disposable wipes, that do not contain oils, to remove the cleaning solvents.

It is necessary to provide pressure during lamination (1.5-20 pli recommended) and during final part installation (10-15 psi) to allow the adhesive to come into direct contact with the substrate. Using a hard edged plastic tool, which is the full width of the laminated part, helps to provide the necessary pressure at the point of lamination. Heat can increase bond strength when bonding to metal parts (generally this same increase is observed at room temperature over longer times, weeks). For plastic parts, the bond strength is not enhanced with the addition of heat.

The ideal adhesive application temperature range is 70°F (21°C) to 100°F (38°C). Application is not recommended if the surface temperature is below 50°F (10°C) because the adhesive becomes too firm to adhere readily. Once properly applied, at the recommended application temperature, low temperature holding is generally satisfactory (please refer to section VII of the Typical Physical Properties and Performance Characteristics).

When bonding a thin, smooth, flexible material to a smooth surface, it is generally acceptable to use 2 mils of adhesive. If a texture is visible on one or both surfaces, the 5 mil adhesive would be suggested. If both materials are rigid, it may be necessary to use a thicker adhesive to successfully bond the components. 3M™ VHB™ Acrylic Foam Tapes may be required (please refer to the data page 70-0709-3863-7).

Application Equipment

To apply adhesives in a wide web format, lamination equipment is required to ensure acceptable quality. To learn more about working with pressure-sensitive adhesives please refer to technical bulletin, Lamination Techniques for Converters of Laminating Adhesives (70-0704-1430-8).

For additional dispenser information, contact your local 3M sales representative, or the toll free 3M sales assistance number at 1-800-362-3550.

3M™ Adhesive Transfer Tapes with Adhesive 200

467 • 468 • 9567 • 9568

Application Ideas

- Metal nameplates for the appliance or electronic markets.
- Excellent general purpose bonding in the industrial market.
- Used for nameplates and decorative plates produced on roll to roll rotary die cutting process. 3M™ Adhesive Transfer Tapes 9567 and 9568 are stabilized adhesive for narrow rolls.

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-223-7427 or visit www.3M.com/converter. Address correspondence to: 3M Engineered Adhesives Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

Certification/ Recognition

TSCA: These products are defined as articles under the Toxic Substances Control Act and therefore, are exempt from inventory listing requirements.

MSDS: These products are not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, the products should not present a health and safety hazard. However, use or processing of the products in a manner not in accordance with the directions for use may affect their performance and present potential health and safety hazards.

UL: Many of these products have been recognized by Underwriters Laboratories Inc. under Standard, UL 969, Marking and Labeling Systems Materials Component. For more information on the UL Certification, please visit the 3M website at http://www.3m.com/converter.

Important Notice

3M MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of those materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Limitation of Remedies and Liability

If the 3M product is proved to be defective, THE EXCLUSIVE REMEDY, AT 3M'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE 3M PRODUCT. 3M shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including, but not limited to, contract, negligence, warranty, or strict liability.

ISO 9002

This Engineered Adhesives Division product was manufactured under a 3M quality system registered to ISO 9002 standards.

3M

Converter Markets
Engineered Adhesives Division
3M Center, Building 551-1W-02
St. Paul, MN 55144-1000

Recycled Paper
40% pre-consumer
10% post-consumer

Printed in U.S.A.
 70-0707-1117-4 (9/02)

Date : 2005/07/25

Our Spec. No. WS05-M111

MESSRS.

SPECIFICATION

FOR

HIGH FREQUENCY COAXIAL CABLE

" KHCX - 32AWG - SB – SA" BLACK

SHOWA ELECTRIC WIRE & CABLE CO., LTD.

TORANOMON

TOKYO JAPAN

T. Mori

T. Mori
Manager, Engineering Section
Engineering Dept.
Electronic Wire Business Unit

1．適用(SCOPE)

本仕様書は電子機器などの内部配線に使用される細径同軸“KHCX-32AWG-SB-SA”の構造と特性について定める。

This specification covers the construction and characteristics of coaxial cable “KHCX-32AWG-SB-SA” for internal wiring of electronic equipment.

2．ケーブル型名の説明（EXPLANATION OF CABLE TYPE）

KHCX－32AWG－SB－SA
（1）　（2）　（3）

（1）ケーブル略称（Cable Abbreviation）
（2）導体サイズ（Conductor Size）
（3）外部導体タイプ（Outer Conductor Type）

3．構造(CONSTRUCTION)

項目 Item		要求特性 Requirement
内部導体 Inner conductor	材質 Material	銀めっき軟銅線 Silver coated annealed copper wire
	構成 Stranding	7/0.08mm
	外径 Diameter	標準 0.24mm Nom. 0.24mm
絶縁体 Insulation	材質 Material	Modified FEP
	色別 Color	自然色 Natural
	厚さ Thickness	標準 0.22mm Nom. 0.22mm
	外径 Diameter	0.70 +0.04/ -0.04mm
外部導体 Outer conductor	材質 Material	銀めっき軟銅線編組 Silver coated annealed copper wire braid shield
	構成 Stranding	16/4/0.05 mm
	編組密度 Coverage	Approx. 90%
シース Sheath	材質 Material	Modified FEP
	色別 Color	灰・白・黒 Gray・White・Black
	厚さ Thickness	標準 0.10mm Nom. 0.10mm
仕上外径 Overall diameter		1.13mm +0.08/ -0.05mm
概算質量 Approximate mass		3 kg/km

4．特性（CHARACTERISTICS）

項目 Item	単位 Unit	要求特性 Requirements
導体抵抗 Conductor Resistance	Ω/km	597 以下　(20℃) Max. 597　(at 20℃)
絶縁抵抗 Insulation Resistance	MΩkm	1,500 以上（DC 500V 1 分間充電後,20℃） Min. 1,500 (After charge DC 500V for 1 min. at 20℃)
耐電圧 Dielectric Strength	-	内部導体-外部導体間：AC.500V/ 1 分間 No breakdown at AC.500V for 1 min between inner conductor and outer conductor.
静電容量 Capacitance	pF/m	標準 98 (at 1kHz) Nom. 98 (at 1kHz)
特性インピーダンス Characteristic Impedance	Ω	50±2 (at TDR)
減衰量 Attenuation	dB/m	2.0GHz : 2.9 以下　Max.2.9 2.4GHz : 3.2 以下　Max.3.2 3.0GHz : 3.7 以下　Max.3.7 4.0GHz : 4.3 以下　Max.4.3 5.0GHz : 4.8 以下　Max.4.8 6.0GHz : 5.3 以下　Max.5.3
VSWR	--	2.4～2.5GHz : 1.20 以下　Max.1.20 4.8～6.0GHz: 1.40 以下　Max.1.40

5．梱包及び荷札の表示（PACKING AND MARKING ON TAG）

完成品は運送中及び保管中に損傷を生じぬ荷造りをする。
また、荷札の表示は以下の通りとする。

The completed cables shall be coiled and packed in such a manner as to be adequately protected from the damage during packing, shipping, and normal handling.
The following items shall be marked on the Tag which is attached to the products.

1) 品名（Type of Cable）
2) 導体サイズ（Conductor size）
3) 条長（Length）
4) 製造者名または略称（Manufacturer's name or trade mark）
5) 製造年月（manufactured year & month）

なお、完成品にはジョイントを有する場合がある。その場合は条長明細を記載する。
Note：The joints may be contained in the spool. In that case, the detail of length is indicated.

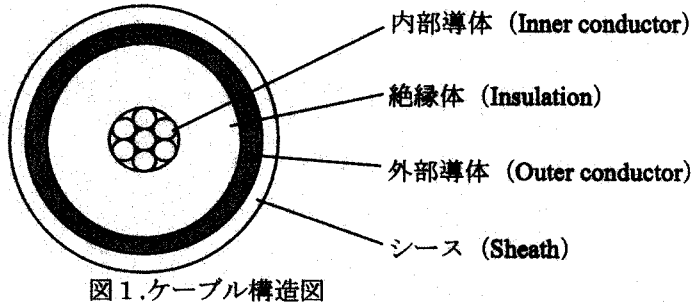


図１.ケーブル構造図
Fig.1. Cable Cross-Section

PRODUCT SPECIFICATION
製 品 規 格

No. PRS-1176

MHF series micro coaxial connector

Qualification Test Report No. TR-1021

REV.	ECN	BY	DATE	APP.
2	S2031	K.O	May/17/ 02	K.K
1	S1053	K.O	Nov/14/ 01	K.K
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REVISION RECORD				

Prepared by	Reviewed by	Approved by
K.Ohbayashi JUN / 25 / 01	E,Kawabe Jun / 25 / 01	K.Katabuchi Jun / 29 / 01

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1. Scope ／ 序言

MHF series micro coaxial connector is a wire to board connector for AWG#36,32,30 coaxial cable .
MHF series micro coaxial connector は、AWG＃36,32,30同軸ケーブルの基板対ワイヤーコネクタである。

2. Objectives ／ 目的

This specification covers the requirements for product performance and test methods of MHF series microcoaxial connector
本規格は、MHF series micro coaxial connector の性能と試験条件について規定する。

3. Part No. , construction , material and finish ／ 構成、材料及び仕上げ

(1) Part No. Plug : 20278-＊＊＊R-08,-13,-18 , Receptacle : 20279-001E-01
(2) Construction, material and finish of the connector are covered as each drawings.
構成、材料及び仕上げは、各図面に指定されている通りとする。

4. Applicable cable ／ 適合ケーブル

4-1 Part No. 20278-001R-08, 20278-011R-08

(1) Description

Inner conductor : AWG#36(7/0.05)
Silver plating annealed copper wire or silver plating tin-copper alloy
Dielectric core : Fluoro-plastics ,diameter 0.4(+0.04,-0.02)mm , nominal thickness 0.125mm
Outer conductor : 8/5/0.05 , nominal diameter 0.65mm , silver plating annealed copper wire
Jacket : Fluoro-plastics , diameter 0.81(+0.04,-0.02)mm , nominal thickness 0.08mm

(2) Requirements

Characteristic impedance : 50(+3,-3)ohm by TDR method (raise time 40ps)
Nominal capacitance: 96 pF/m
Conductor resistance of inner conductor at 293K (20℃) : 1400 ohm/km MAX.
Insulation resistance : 1000 mega-ohm.km MIN.
Dielectric withstand voltage : no breakdown at AC1000V for 1 minutes.

(1) 構成

中心導体 ： AWG＃36(7／0. 05),銀メッキ軟銅線または銀メッキすず入り銅線
誘電体 ： フッ素樹脂,外径0. 4(＋0. 04,－0. 02),標準厚さ0. 125mm
外部導体 ： 8／5／0. 05,標準外径0. 65mm, 銀メッキ軟銅線
ジャケット ： フッ素樹脂,外径0. 81(＋0. 04,－0. 02)mm, 標準厚さ0. 08mm

(2) 仕様

特性インピーダンス ： 50±3Ω (TDR,ライズタイム40ps)
標準静電容量 ： 96pF／m
293K(20℃)時の中心導体導体抵抗 ： 1400Ω ／km以下
絶縁抵抗 ： 1000MΩ ・km以上
耐電圧 ： AC1000V・1分間にて絶縁破壊の無い事

4-2 Part No. 20278-101R-13, 20278-111R-13

(1) Description

Inner conductor : AWG#32(7/0.08)
Silver plating annealed copper wire or silver plating tin-copper alloy
Dielectric core : Fluoro-plastics , diameter 0.68(+0.04,-0.02)mm , nominal thickness 0.22mm
Outer conductor : 16/4/0.05 , nominal diameter 0.93mm , silver plating annealed copper wire
Jacket : Fluoro-plastics , diameter 1.13(+0.08,-0.05)mm , nominal thickness 0.1mm

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(2) Requirements
Characteristic impedance : 50(+2,-2)ohm by TDR method (raise time 40ps)
Nominal capacitance: 97 pF/m
Conductor resistance of inner conductor at 293K (20℃) : 520 ohm/km MAX.
Insulation resistance : 1500 mega-ohm.km MIN.
Dielectric withstand voltage : no breakdown at AC1000V for 1 minutes.

(1) 構成
中心導体 ： AWG＃32(7／0. 08),銀メッキ軟銅線または銀メッキすず入り銅線
誘電体 ： フッ素樹脂,外径0. 68(＋0. 04,－0. 02),標準厚さ0. 22mm
外部導体 ： 16／4／0. 05,標準外径0. 93mm, 銀メッキ軟銅線
ジャケット ： フッ素樹脂,外径1. 13(＋0. 08,－0. 05)mm, 標準厚さ0. 1mm

(2) 仕様
特性インピーダンス ： 50±2Ω (TDR,ライズタイム40ps)
標準静電容量 ： 97pF／m
293K(20℃)時の中心導体導体抵抗 ： 520Ω ／km以下
絶縁抵抗 ： 1500MΩ ・km以上
耐電圧 ： AC1000V・1分間にて絶縁破壊の無い事

4-3 Part No. 20278-001R-32, 20278-011R-32

(1) Description
Inner conductor : AWG#32(7/0.08)
Silver plating annealed copper wire or silver plating tin-copper alloy
Dielectric core : Fluoro-plastics , diameter 0.66(+0.05,-0.05)mm , nominal thickness 0.21mm
First outer conductor : 16/5/0.05, tin plating annealed copper wire
Second outer conductor :16/6/0.05, nominal diameter 1.12mm , tin plating annealed copper wire
Jacket : Fluoro-plastics , diameter 1.32(+0.1,-0.1)mm , nominal thickness 0.1mm

(2) Requirements
Characteristic impedance : 50(+2,-2)ohm by TDR method (raise time 40ps)
Nominal capacitance: 95 pF/m
Conductor resistance of inner conductor at 293K (20℃) : 520 ohm/km MAX.
Insulation resistance : 1500 mega-ohm.km MIN.
Dielectric withstand voltage : no breakdown at AC1000V for 1 minutes.

(1) 構成
中心導体 ： AWG＃32(7／0. 08),銀メッキ軟銅線または銀メッキすず入り銅線
誘電体 ： フッ素樹脂,外径0. 66(＋0. 05,－0. 05),標準厚さ0. 21mm
外部導体(内側) ： 16／5／0. 05,すずメッキ軟銅線
外部導体(外側) ： 16／6／0. 05,標準外径1. 12mm, すずメッキ軟銅線
ジャケット ： フッ素樹脂,外径1. 32(＋0. 1,－0. 1)mm, 標準厚さ0. 1mm

(2) 仕様
特性インピーダンス ： 50±2Ω (TDR,ライズタイム40ps)
標準静電容量 ： 95pF／m
293K(20℃)時の中心導体導体抵抗 ： 520Ω ／km以下
絶縁抵抗 ： 1500MΩ ・km以上
耐電圧 ： AC1000V・1分間にて絶縁破壊の無い事

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4-4 Part No. 20278-001R-18, 20278-011R-18
RG178 B/U
(1) Description
Inner conductor : AWG#30(7/0.102) , silver plating copper clad steel wire
Dielectric core : Fluoro-plastics , diameter 0.84(+0.03,-0.03)mm , nominal thickness 0.268mm
Outer conductor : 16/3/0.1 , nominal diameter 1.35mm , silver plating copper wire
Jacket : Fluoro-plastics , diameter 1.8(+0.1,-0.1)mm , nominal thickness 0.23mm
(2) Requirements
Characteristic impedance : 50(+2,-2)ohm by TDR method (raise time 40ps)
Nominal capacitance: 95 pF/m
Conductor resistance of inner conductor at 293K (20℃) : 805 ohm/km MAX.
Insulation resistance : 1500 mega-ohm.km MIN.
Dielectric withstand voltage : no breakdown at AC2000V for 1 minutes.
(1) 構成
中心導体 : AWG＃30(7／0. 102),銀メッキ銅被鋼線
誘電体 : フッ素樹脂,外径0. 84(±0. 03),標準厚さ0. 268mm
外部導体 : 16／3／0. 1,標準外径1. 35mm, 銀メッキ軟銅線
ジャケット : フッ素樹脂,外径1. 8(±0. 1)mm, 標準厚さ0. 23mm
(2) 仕様
特性インピーダンス : 50±2Ω (TDR,ライズタイム40ps)
標準静電容量 : 95pF／m
293K(20℃)時の中心導体導体抵抗 : 805Ω ／km以下
絶縁抵抗 : 1500MΩ ・km以上
耐電圧 : AC2000V・1分間にて絶縁破壊の無い事

5. Ratings ／ 定格
(1) Rated voltage / 電圧 : AC60Vrms
(2) Nominal characteristic impedance／公称特性インピーダンス : 50Ω
(3) Frequency / 周波数 : DC～3GHz
(4) VSWR : 1. 3 MAX.
(5) Service Temperature / 使用温度範囲 : 233～363K(－40～＋90℃)

6. Test methods and performance ／ 試験及び性能

6-1 Test condition / 試験条件
Unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202
全ての測定と試験は、MIL-STD-202 に基づき以下の条件で行う。.
Temperature / 温度 : 288～308K (15～35℃)
Humidity / 湿度 : 45～75%RH

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6-2 Sample quantity / 試料数

(1) Insulation resistance / 絶縁抵抗 : 10pcs.
(2) Dielectric withstanding voltage / 耐電圧 : 10pcs.
(3) VSWR : 5pcs.
(4) Unmating force / 抜去力 : 10pcs
(5) Durability / 耐久性 : 10pcs.
(6) Cable retention force / ケーブル保持力 : 10pcs.
(7) Vibration / 振動 : 10pcs.
(8) Shock / 衝撃 : 10pcs.
(9) Thermal shock / 温度サイクル : 10pcs.
(10) Humidity / 湿度 : 10pcs.
(11) Salt water spray / 塩水噴霧 : 10pcs.
(12) Solderability / 半田付け性 : 10pcs.
(13) Reflow soldering heat resistance / 半田耐熱性 : 10pcs.

6-3-1 Electrical / 電気的性能
(1) Contact Resistance / 接触抵抗

A.Testing:Solder 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-202, Method 307.
Open circuit voltage : 20mV MAX
Circuit current : 10mA MAX. (DC or AC1kHz)
Contact resistance of inner contact : <resistance of A-E> - <resistance of B-E>
Contact resistance of ground contact : <resistance of A-D> - <resistance of B-D>

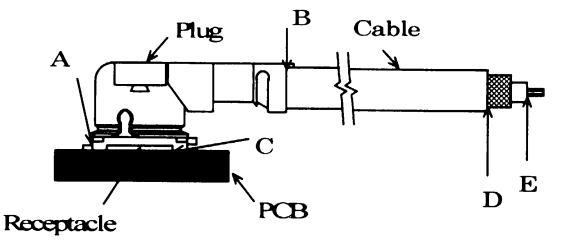

Fig.1

B.Requirements :
Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.
Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

A.試験法:テスト基板にリセプタクルコネクタを半田付けし、プラグコネクタと嵌合させ、Fig. 1のように4端子法にて下記の条件で測定する。 MIL-STD-202 試験法 307 に準拠。
開回路電圧: 20mV以下
試験電流 : 10mA(DCもしくはAC1kHz)
中心導体 : ＜A－E間の電気抵抗＞－＜B－E間の電気抵抗＞
外部導体 : ＜A－D間の電気抵抗＞－＜B－D間の電気抵抗＞
B.必要条件: 中心導体 初期 20mΩ 以下, 試験後 25mΩ 以下
外部導体 初期 10mΩ 以下, 試験後 15mΩ 以下

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(2) Insulation resistance / 絶縁抵抗

A. Testing : Mate the plug and receptacle connector together, then apply DC 100 V between the inner contact and the ground contact in accordance with MIL-STD-202, Method 302.

B.Requirements : Initial 500 Mohm MIN. after testing 100 Mohm MIN.

A.試験法: リセプタクル及びプラグコネクタを互いに嵌合させ、中心導体と外部導体の間に DC 100Vを印加し、測定する。MIL-STD-202 試験法 302 に準拠。

B.必要条件: 初期 500MΩ 以上 試験後 100MΩ 以上

(3) Dielectric withstanding voltage / 耐電圧

A. Testing : Mate the receptacle and plug connector together, then apply AC 200 Vrms between the inner contact and the ground contact for a minute in accordance with MIL-STD-202, Method 301.

B.Requirements : No creeping discharge, flashover, nor insulator breakdown shall occur.

A.試験法: リセプタクル及びプラグコネクタを互いに嵌合させ、中心導体と外部導体の間にAC200V(実効値)を一分間印加する。 MIL-STD-202 試験法 301 に準拠。

B.必要条件: 沿面放電、空中放電、絶縁破壊等の異常のないこと。

(4) VSWR

A. Testing : Measure the VSWR as shown in Fig.3 by the network analyzer.

Frequency :100M~3GHz

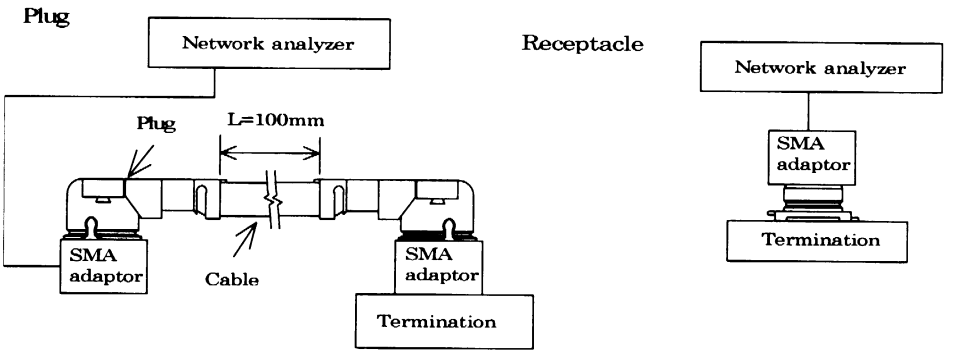

Fig.3

B.Requirements : 1.3 MAX.

A.試験法: ネットワークアナライザーにて Fig.3 のようにVSWRを測定する。
周波数 : 100M～3GHz

B.必要条件: 1．3以下

6-3-2 Mechanical / 機械的性能

(1) Unmating force / 抜去力

A. Testing : Unmate the receptacle connector (soldered to the test board) and plug at a speed 25±3mm/minutes along the mating by the push-on/pull-off machine .

B.Requirements :

Total unmating force : Initial 5N MIN. after 30 cycles 3N MIN.

Unmating force of inner contact : Initial 0.15N MIN. after 30 cycles 0.1N MIN

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A.試験法:挿抜試験機を用いて、基板に半田付けしたリセプタクルとプラグを嵌合軸と平行に毎分25±3mmの速度で挿抜する。

B.必要条件:

総合抜去力:初回抜去力 5N以上 ,30回後抜去力 3N以上

中心導体 :初回抜去力 0. 15N以上 ,30回後抜去力 0. 1N以上

(2) Durability / 耐久性

A. Testing : Mate and umate the receptacle connector (soldered to the test board) and plug 30 cycles at a speed 25±3mm/minutes along the mating by the push-on/pull-off machine .

B.Requirements :

Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.

Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

A.試験法:挿抜試験機を用いて、基板に半田付けしたリセプタクルとプラグを嵌合軸と平行に毎分25±3mmの速度で30回挿抜する。

B.必要条件 中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下

外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

(3) Cable retention force / ケーブル保持力

A. Testing : Apply force on the cable as shown in Fig.2.

During the testing, run 100mA DC to check electrical discontinuity.

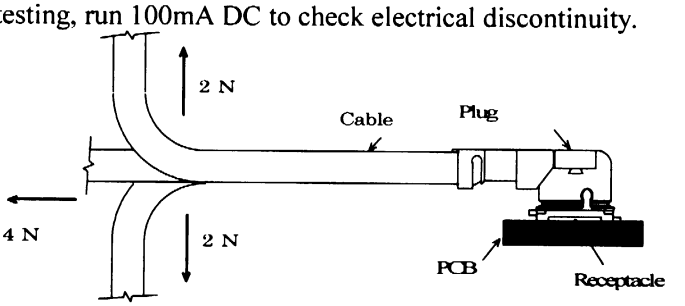

Fig.2

B.Requirements

Appearance : Looseness between the parts, chipping, breakage or other abnormality shall not occur.

Electrical discontinuity : No electrical discontinuity grater than 1 micro-sec. shall occur.

Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.

Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

A.試験法:Fig. 2のようにケーブルに力を加える。尚、試験中にDC100mAの電流を流して電気的瞬断を確認する。

B.必要条件 外観 : 部品のゆるみ、欠け、割れ、その他外観上の異常の無いこと。

電流瞬断 : 試験中、1 マイクロ秒を超える電気的瞬断の無いこと。

中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下

外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

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(4) Vibration / 振動

A. Testing : Apply the following vibration to the mating connector .
During the testing, run 100mA DC to check electrical discontinuity.
Frequency : 10Hz → 100Hz → 10Hz / approx 15 minutes.
Half amplitude ,Peak value of acceleration: 1.5mm or 59m/s^2 (6G)
Directions , cycle : 3 mutually perpendicular direction ,
5 cycles(approx 75min)about each direction

B.Requirements
Appearance : Looseness between the parts, chipping, breakage or other abnormality shall not occur.
Electrical discontinuity : No electrical discontinuity grater than 1micro-sec. shall occur.
Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.
Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

A.試験法:嵌合状態のコネクタを、下記の振動を加える。尚、試験中にDC100mAの電流を流して電気的瞬断を確認する。
周波数 :10Hz→100Hz→10Hz ／ 約15分間
片振幅,加速度:1. 5mm or 59m／s^2 (6G)
方向,サイクル:3 つの互いに直角な方向について各5サイクル(約75分)実施

B.必要条件 外観 : 部品のゆるみ、欠け、割れ、その他外観上の異常の無いこと。
電流瞬断 : 試験中、1 マイクロ秒を超える電気的瞬断の無いこと。
中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下
外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

(5) Shock / 衝撃

A. Testing : 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: 735m/s^2 (75G)
Duration : 11msec
Wave Form : half sinusoidal
Directions , cycle : 6 mutually perpendicular direction , 3 cycles about each direction

B.Requirements
Appearance : Looseness between the parts, chipping, breakage or other abnormality shall not occur.
Electrical discontinuity : No electrical discontinuity grater than 1 micro-sec. shall occur.
Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.
Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

A.試験法:嵌合状態のコネクタを、衝撃試験機に取り付け、下記の衝撃を加える。尚、試験中にDC100mAの電流を流して電気的瞬断を確認する。MIN-STD-202 試験法 213 試験条件 B に準拠。
最大加速度:735m／s^2(75G)
標準持続時間:11msec.
波形: 半波正弦波
方向:直交する6方向、各3回

B.必要条件 外観 : 部品のゆるみ、欠け、割れ、その他外観上の異常の無いこと。
電流瞬断 : 試験中、1 マイクロ秒を超える電気的瞬断の無いこと。
中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下
外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

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6-3-3 Environmental / 耐環境性

(1) Thermal shock/ 温度サイクル

A. Testing : Apply the following environment to the mating connector .

Temperature ,duration

:233K/30minutes→278~308K/5minutes MAX.→363K/30minutes→278~308K/5minutes MAX.

(-40℃) (5~35℃) (90℃) (5~35℃)

No. of cycles : 5 cycles

B.Requirements

Appearance : Looseness between the parts, chipping, breakage or other abnormality shall not occur.

Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.

Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

Insulation resistance : initial 500 mega-ohm MIN. after testing 100 mega-ohm MIN.

A.試験法:嵌合状態のコネクタを、下記の雰囲気に放置する。

1サイクルの条件

:233K／30分→278～308K／5分以下→363K／30分→278～308K／5分以下

（－40℃） (5～35℃) (90℃) (5～35℃)

実施サイクル :5サイクル

B.必要条件 外観 : 部品のゆるみ、欠け、割れ、その他外観上の異常の無いこと。

中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下

外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

絶縁抵抗 : 初期 500MΩ 以上 試験後 100MΩ 以上

(2) Humidity / 湿度

A. Testing : Apply the following environment to the mating connector in accordance with MIL-STD-202, Method 103, Condition B .

Temperature : 313±2 K (40±2℃)

Humidity : 90～95%RH

Duration : 96 hours

B.Requirements

Appearance : Looseness between the parts, chipping, breakage or other abnormality shall not occur.

Contact resistance of inner contact initial 20 milli-ohm MAX. after testing 25milli-ohm MAX.

Contact resistance of ground contact initial 10 milli-ohm MAX. after testing 15milli-ohm MAX.

Insulation resistance : initial 500 mega-ohm MIN. after testing 100 mega-ohm MIN.

A.試験法:嵌合状態のコネクタを、下記の雰囲気に放置する。MIL-STD-202 試験法 103 条件 B に準拠。

温度:313±2K（40±2℃）

湿度:90～95%RH

時間:96時間

B.必要条件 外観 : 部品のゆるみ、欠け、割れ、その他外観上の異常の無いこと。

中心導体接触抵抗 : 初期 20mΩ 以下, 試験後 25mΩ 以下

外部導体接触抵抗 : 初期 10mΩ 以下, 試験後 15mΩ 以下

絶縁抵抗 : 初期 500MΩ 以上 試験後 100MΩ 以上

(3) Salt water spray / 塩水噴霧

A. Testing : Apply the following environment to the mating connector in accordance with MIL-STD-202, Method 101, Condition B.

Temperature : 308±2 K (35±2℃)

Salt water density by weight : 5±1%

Duration : 48 hours

B.Requirements : Appearance no abnormality adversely affecting the performance shall occur.

B.Requirements : Appearance no abnormality adversely affecting the performance shall occur.

DOCUMENT CLASSIFICATION	TITLE	No.
Product Specification 製品規格	MHF series micro coaxial connector	PRS-1176

A.試験法:嵌合状態のコネクタを、下記の雰囲気に放置する。
温度 :308±2K (35±2℃)
塩水濃度:5±1%(重量比)
時間 :48時間
B.必要条件 : 外観 著しい腐食の無い事。

6-3-4 Solder / 半田付け関連

(1) Solderability / 半田付け性
A. Testing : Dip the solder tine of the contact in the solder bath at 518±5(245±5℃) for 5±0.5 sec. After immersing the tine in the flux of RMA or R type for 5 to 10 seconds in accordance with MIL-STD-202, Method 208.
B.Requirements : More than 95% of the dipped surface shall be evenly wet.
A.試験法:コンタクトの半田付け部を518±5K(245±5℃)の半田漕内に5±0. 5秒浸す。フラックスは、RMA又はR型を使用し5～10秒間浸すものとする。MIL-STD-202, 試験法208に準拠。
B.必要条件:浸した面積の95%以上に半田がむらなく付着すること。

(2) Reflow soldering heat resistance / 半田耐熱性
A. Testing : Put on the receptacle connector to PCB , apply the heat 2 cycles as shown in Fig. 4

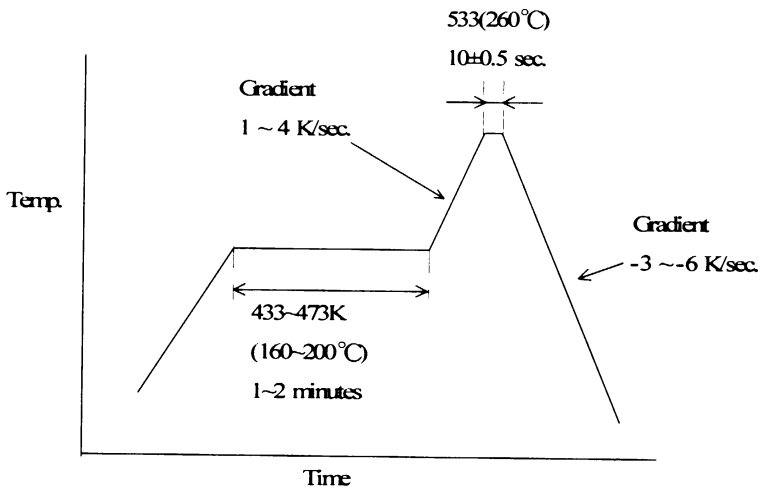

Fig.4

B.Requirements : Appearance no abnormality adversely affecting the performance shall occur.
A.試験法:基板にリセプタクルコネクタを置き、Fig. 4の条件で2回リフローを行う。
B.必要条件:機能を損なう変形及び欠陥の無い事。