承　認　書

APPROVAL SHEET

客戶名稱
Customer : **Quanta Computer Inc.**

客戶料號
Customer P/N : **DD0ZP2TH102**

適用機種
Model No. : **ZP2**

送件日期
Submitted Date : **February 18, 2004**

承認日期
Approved Date :

瀚宇料號
HannStar P/N : **WA00111**

品　名
Description : **Antenna for ZP2 system**

APPROVED	承認編號
	承認人簽章

瀚宇電子股份有限公司

HannStar Electronics Corp.

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瀚宇電子股份有限公司

HannStar Electronics Corp.

承認書索引

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Customer P/N: DD0ZP2TH102

Model: ZP2

HSE P/N: WA00111

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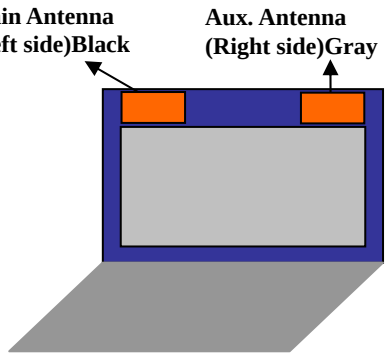
1. Introduction

Antennas for 802.11b and 802.11a system

Antenna (PIFA type)

1. Application: LCD top location
2. Cable length: 517mm for Black
   619mm for Gray
   (IPEX connector with φ1.13mm RF cable)



2. Revision History

Date	Version	Change Description
07/08/2003	A	New Release

(Test report compare on ZP1 organization , because only increase cable length.)

3. Product Spec.

3.1 Antenna Design Specification

Measure environment LCD angle 110 degree

3.1.1 VSWR

VSWR	2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Main antenna(Right)	≦2			≦2.5		

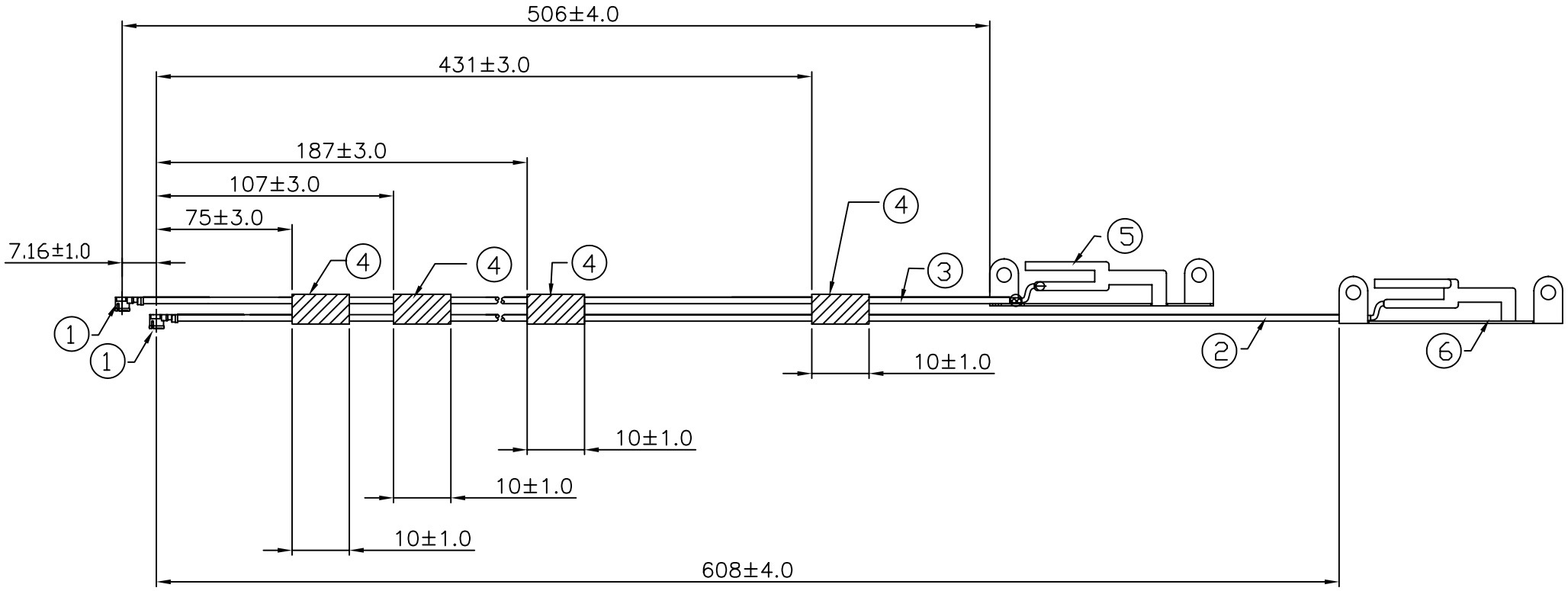
3.1.2 Average gain and peak gain

VSWR		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
		2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Main (Right)	Peak	≦3			≦6		
	Average	≧-5			≧-5		

3.2 Mechanical Spec.

See the attached drawing

REVISIONS				
REV.	ECN NO.	ECN BY.	DESCRIPTION	DATE
A	EP040088	Jack	New	Feb. 17' 04



ITEM NO.	QTY REQD	PART NUMBER	DESCRIPTION
1	2	U006-002-0010	I-PEX MHF Connector
2	1	U011-002-0007-21	HSE ø1.13x619mm Gray
3	1	U011-002-0009-13	HSE ø1.13x517mm Black
4	2	U014-006-0004-3	Heat Shrinkable Tube ø2.0x10mm
5	1	U010-007-0038	Metal Antenna Left Side
6	1	U010-007-0039	Metal Antenna Right Side

UNIT: mm
SCALE: NONE

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APPD: James 02/17'04	DRAWING NAME: ZP2-成品圖
CHKD: Leo 02/17'04	MATERIAL No.: WA00111
DR: Jack Wu 02/17'04	SHEET: 1 of 1 REV: A

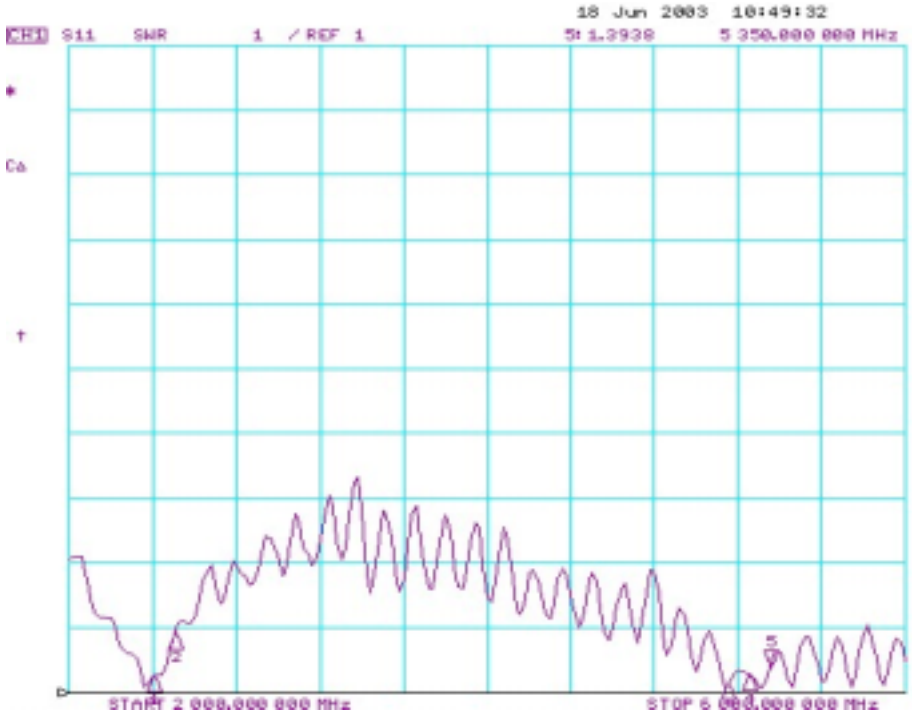
ED001-980729

3.3 Antenna BOM structure

NO.	Part NO.	Description	Q'ty
1	U011-002-0009	RG-178 Φ1.13 (black), 32AWG	1
2	U011-002-0007	RG-178 Φ1.13(gray),32AWG	1
3	U010-007-0038	Metal Antenna (Left)	1
4	U010-007-0039	Metal Antenna (Right)	1
5	U014-006-0004	Heat Shrinkable Tube Φ1.5	4
5	U006-002-0010	I-PEX Connector	2

3.4 Left Antenna Test Results

3.4.1 VSWR



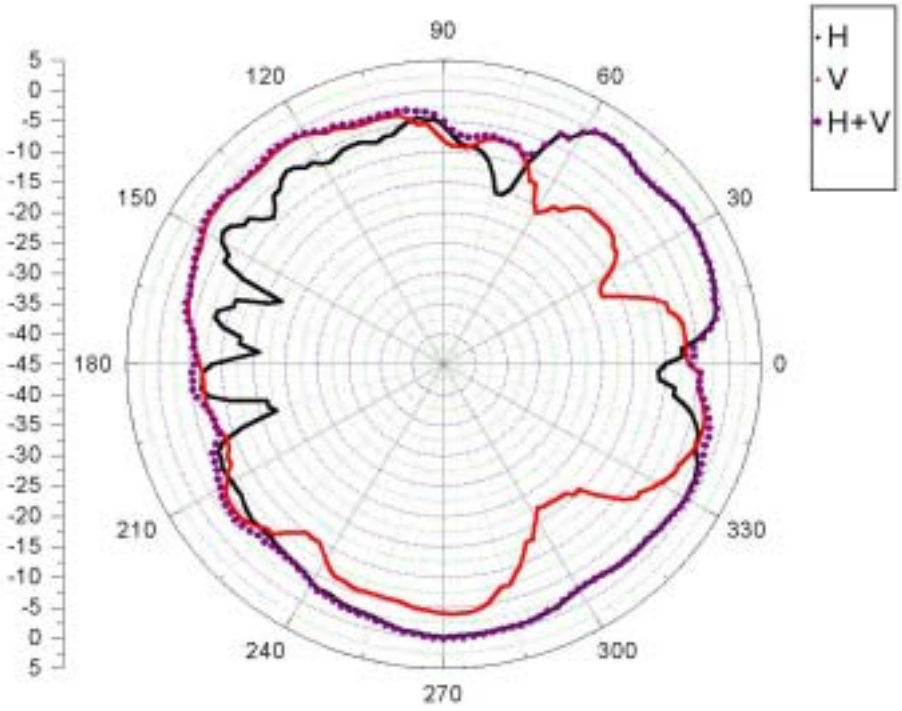
VSWR	2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Main antenna(Left)	1.25	1.53	1.90	1.12	1.26	1.39

3.4.2 Peak Gain and Average Gain

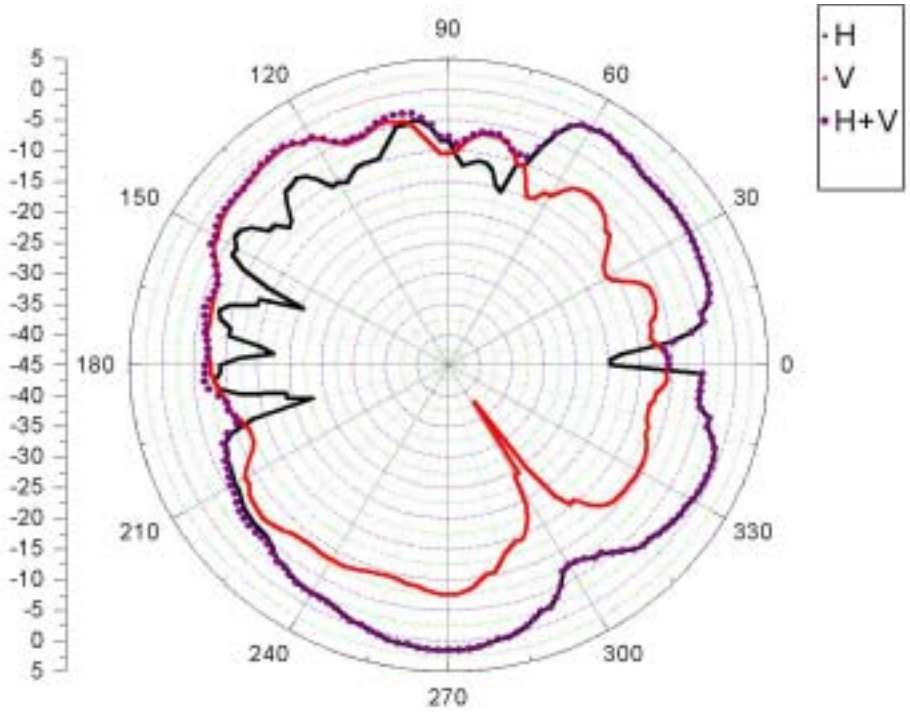
Gain(dBi)		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
		2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Main (Left)	Peak	-0.48	-0.25	-0.35	-0.47	-0.28	-0.38
	Average	-2.75	-2.88	-2.95	-2.94	-2.78	-2.89

3.4.3 Radiation Pattern

MAIN Antenna @- 2.40 GHz



MAIN Antenna @- 2.45 GHz



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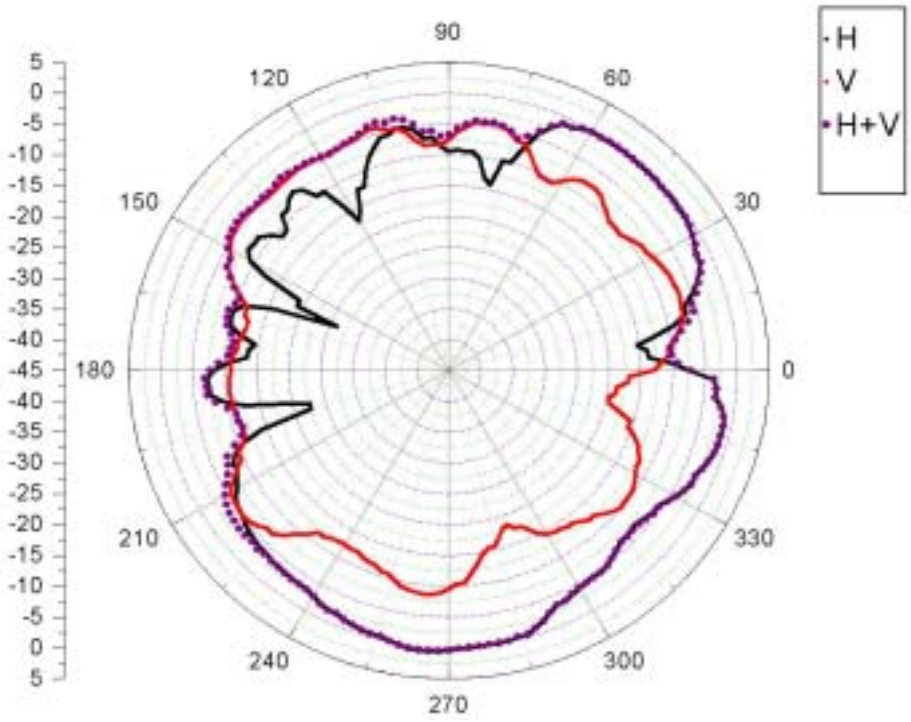
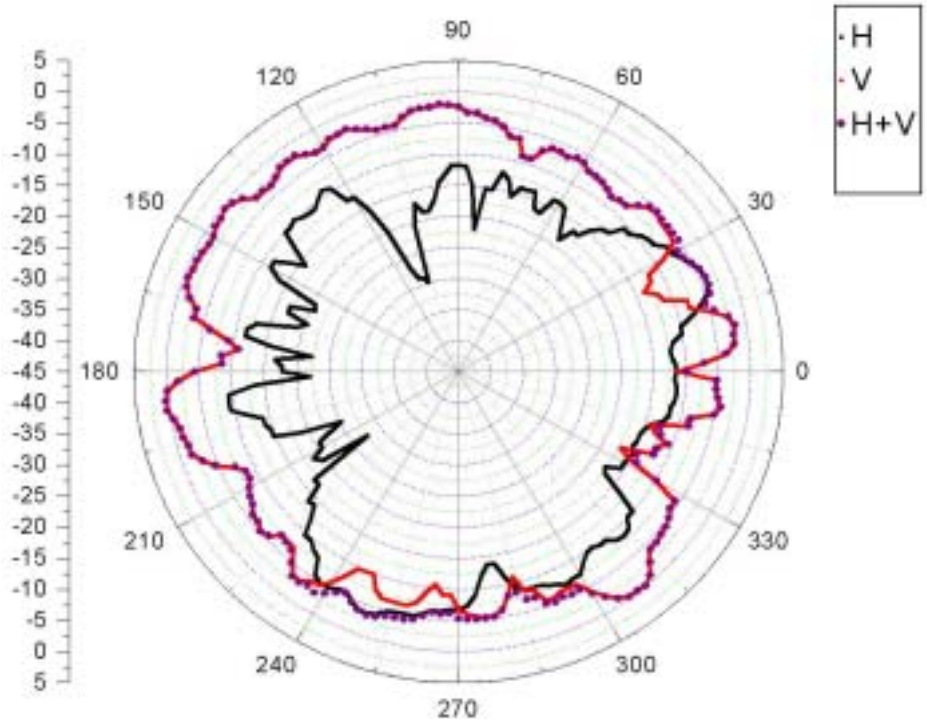
MAIN Antenna @- 2.483 GHz



MAIN Antenna @- 5.15 GHz



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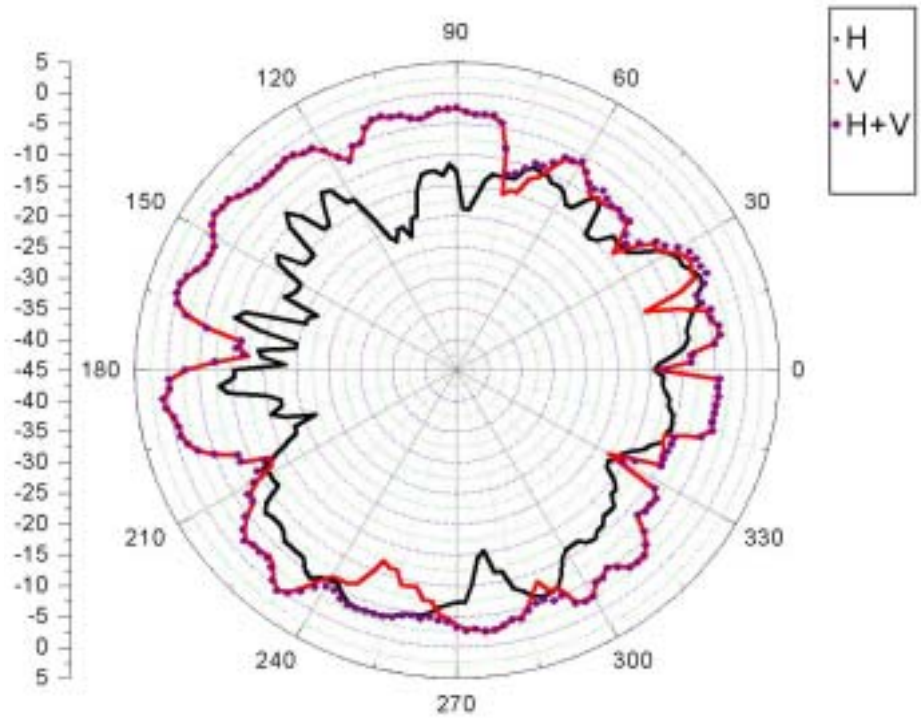
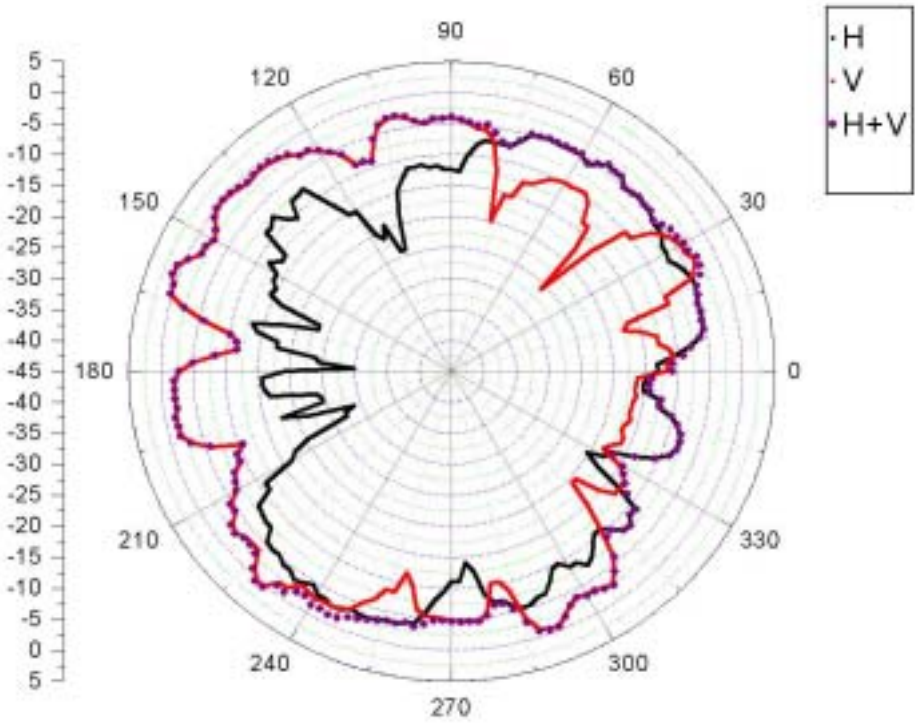
MAIN Antenna @- 5.25 GHz

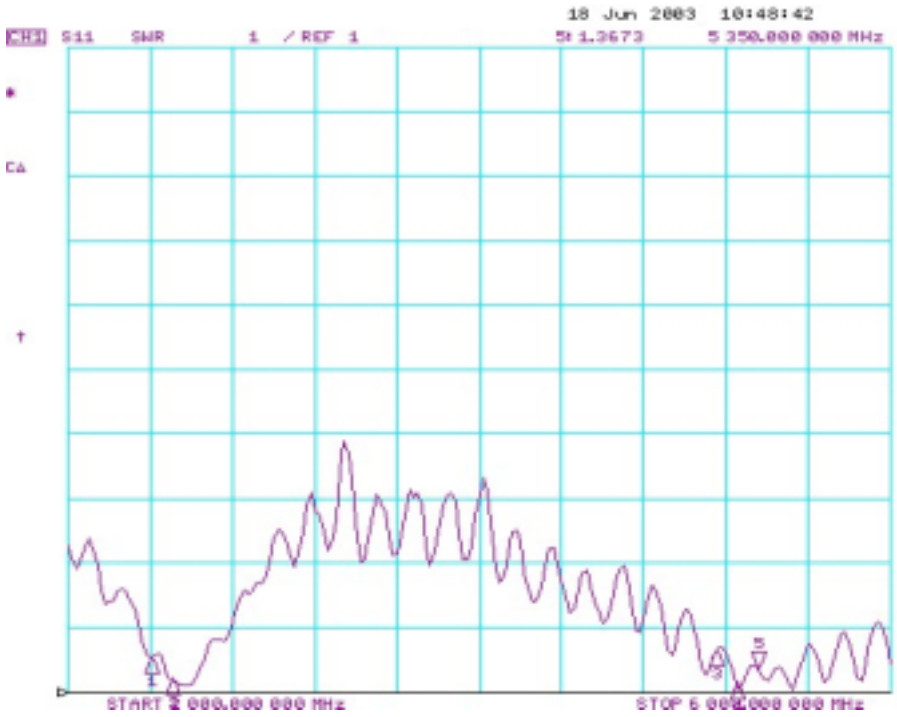


MAIN Antenna @- 5.35 GHz



3.5 Right Antenna Test Results

3.5.1 VSWR



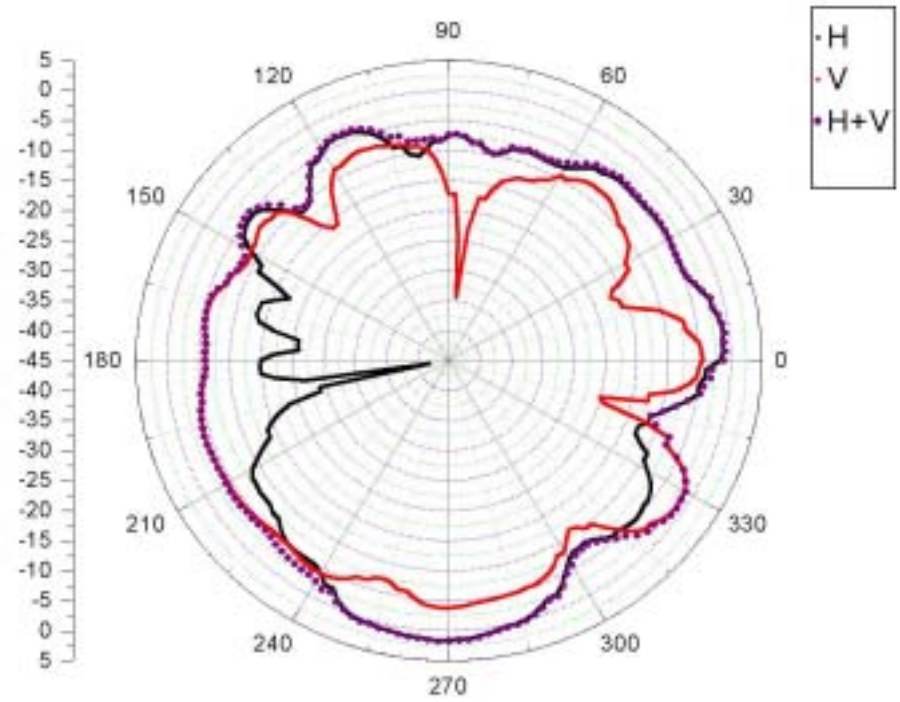
VSWR	2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Aux. antenna(Right)	1.53	1.53	1.18	1.64	1.12	1.36

3.5.2 Peak Gain and Average Gain

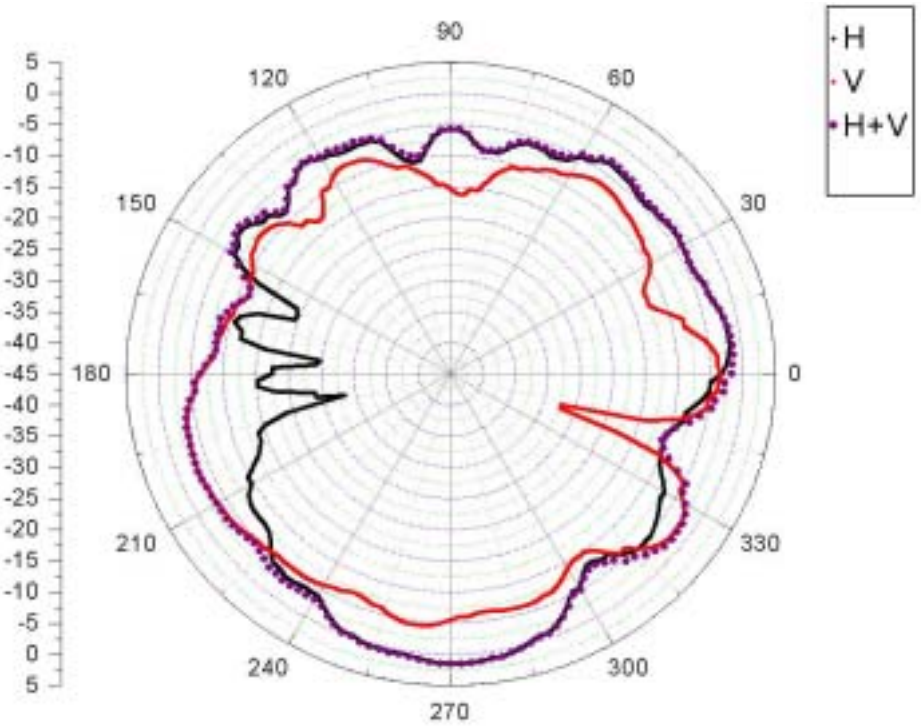
Gain(dBi)		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
		2.40GHz	2.45GHz	2.50GHz	5.15GHz	5.25GHz	5.35GHz
Main (Left)	Peak	-0.51	-0.64	-0.80	-0.75	-0.44	-0.85
	Average	-2.80	-2.82	-2.85	-2.81	-2.96	-2.58

3.5.3 Radiation Pattern

AUX. Antenna @- 2.40 GHz



AUX. Antenna @- 2.45 GHz



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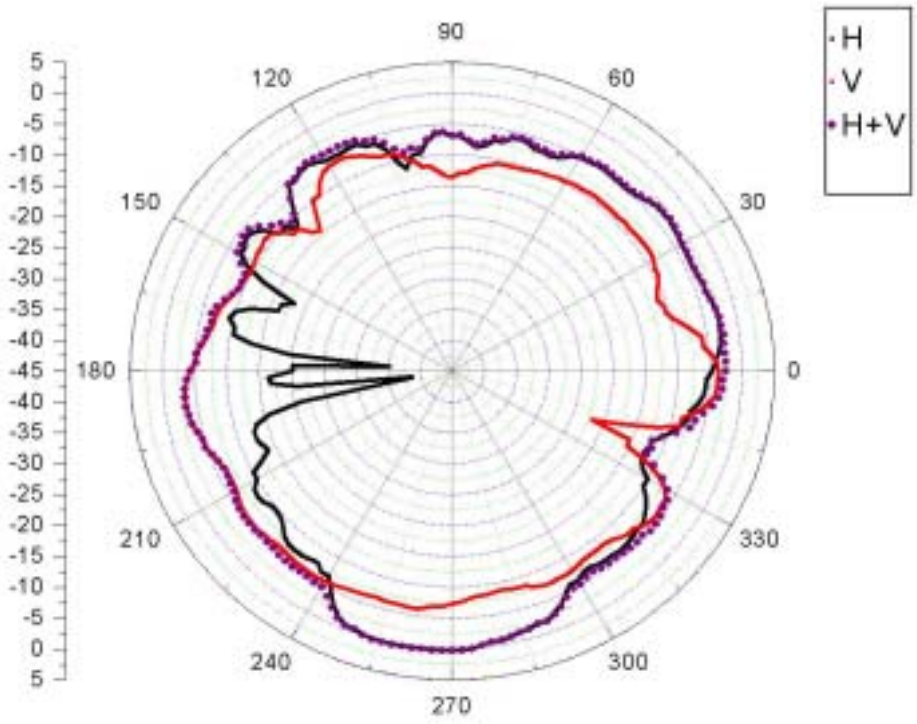
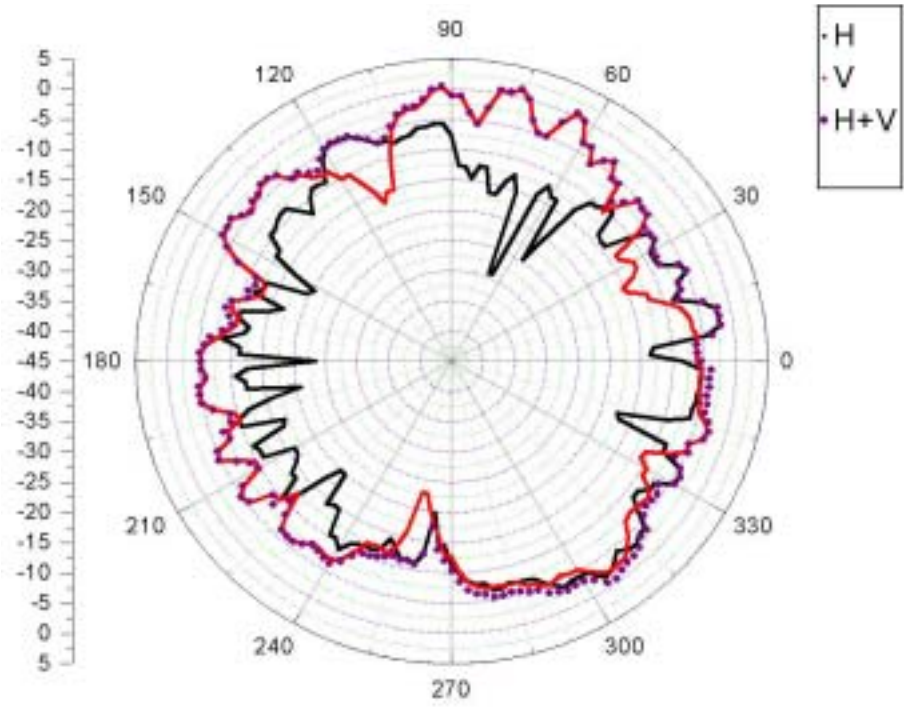
AUX. Antenna @- 2.483 GHz



AUX. Antenna @- 5.15 GHz



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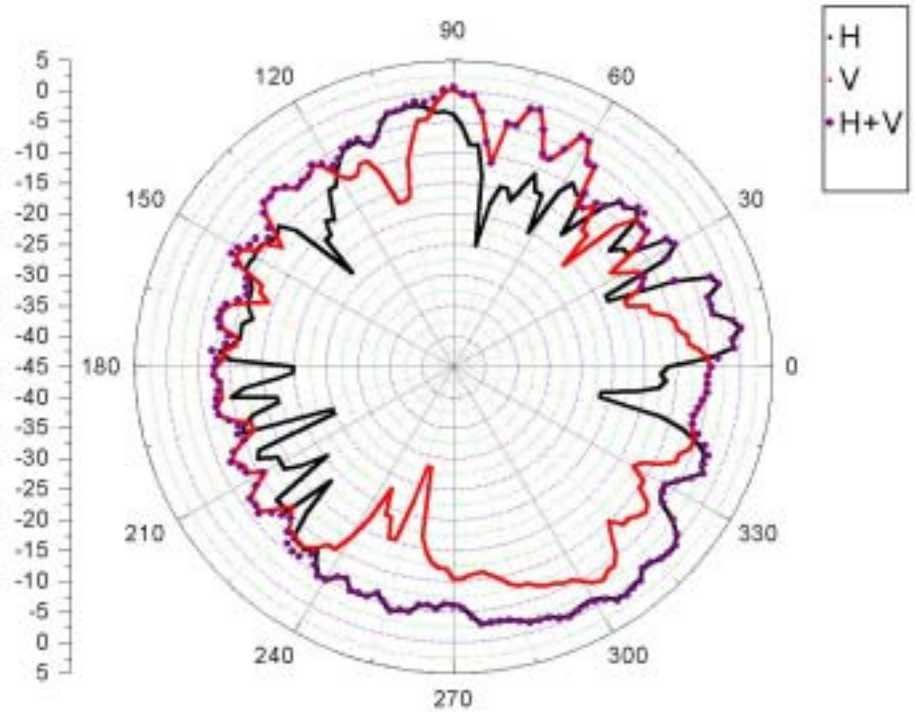
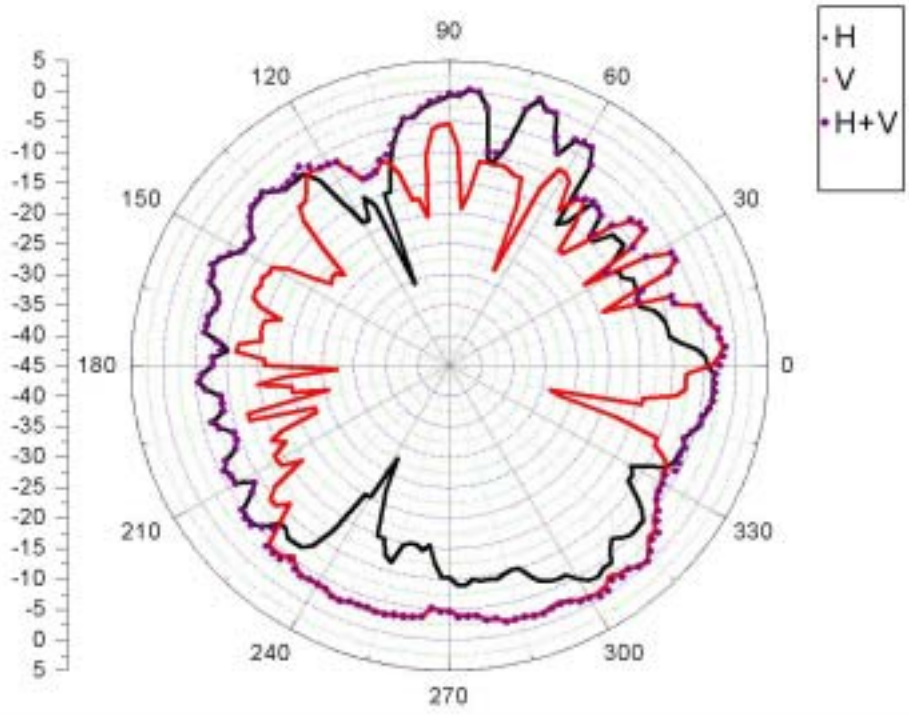
AUX. Antenna @- 5.25 GHz



AUX. Antenna @- 5.35 GHz



4. Environment Performance Test

4.1 Introduction

This EQT (Environment Qualification Test) report is used to describe the final status of PIFA type Antenna about the EQT test results.

4.2 Test Items and Results

4.2.1 the following table is used to show the final status of PIFA Antenna.

Test Item	Specification	Test Result	Tested By	Remark
Thermal Shock	Temperature range:-20°C~80°C Hold Time:30 min Total cycle:20 cycles	Pass	HSE	
Vibration (Need NB)	Frequency 5 to 500Hz Overall rms level : 0.6G P-P~2.0G P-P Duration of test : 1 Hr/cycle Number of axes : X,Y,Z 1 cycle/axis	Pass	HSE	
Salt Spray	Chamber temperature : 35°C Salt : 5% Hold time : 48 Hr	Pass	HSE	
Contact Engagement & Separation Forces	Speed : 22 mm/mint Inspection Item : Soldering Pull strength Soldering pull strength > 1 kgw	Pass	HSE	

VSWR		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	S/N	2.40GHz	2.45GHz	2.50GHz	5.15Ghz	5.25Ghz	5.35Ghz
After Thermal Shock Test (Left)	01	1.66	1.34	1.67	1.76	1.09	1.51
	02	1.52	1.23	1.65	1.68	1.12	1.63
	03	1.54	1.35	1.70	1.54	1.15	1.68
After Thermal Shock Test (Right)	01	1.32	1.35	1.72	1.54	1.22	1.45
	02	1.63	1.32	1.67	1.45	1.32	1.25
	03	1.65	1.45	1.56	1.19	1.30	1.23

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VSWR		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	S/N	2.40GHz	2.45GHz	2.50GHz	5.15Ghz	5.25Ghz	5.35Ghz
After Vibration Test (Left)	01	1.45	1.21	1.56	1.62	1.11	1.54
	02	1.48	1.25	1.58	1.64	1.09	1.70
	03	1.51	1.28	1.60	1.63	1.18	1.68
After Vibration Test (Right)	01	1.54	1.30	1.75	1.63	1.32	1.54
	02	1.62	1.36	1.69	1.55	1.22	1.69
	03	1.70	1.44	1.73	1.68	1.25	1.76

VSWR		2G4 ISM (2.40GHz-2.483GHz)			U-NII(5.150GHz-5.350GHz)		
	S/N	2.40GHz	2.45GHz	2.50GHz	5.15Ghz	5.25Ghz	5.35Ghz
After Salt Spray Test (Left)	01	1.40	1.26	1.81	1.62	1.12	1.54
	02	1.33	1.28	1.63	1.64	1.23	1.70
	03	1.41	1.28	1.53	1.63	1.22	1.68
After Salt Spray Test (Right)	01	1.68	1.45	1.88	1.78	1.43	1.68
	02	1.56	1.50	1.75	1.75	1.35	1.77
	03	1.70	1.55	1.69	1.68	1.40	1.76

Antenna (Left)						
Number	1	2	3	Max	Min	Avg
Soldering Pull strength (Unit:kg)	4.361	4.456	4.665	4.665	4.361	4.494

Antenna (Right)						
Number	1	2	3	Max	Min	Avg
Soldering Pull strength (Unit:kg)	4.475	4.678	4.353	4.678	4.353	4.502

No. ; SP01-23-47235 Rev.1

Date ; Nov. 16, 2001

SPECIFICATION

FOR

UL RECOGNIZED FEP INSULATED HIGH FREQUENCY COAXIAL CABLE

[P/N ;UL1745]

Quantity

Your Ref. No.

Our Ref. No.

Signed by F. Shimizu

Fumio Shimizu

Manager

Electronic Wire & Cable design department
Hitaka works, Electronic Supplies Group

Hitachi Cable, Ltd.

Issue and revision record

Rev. No.	Issue date	Item	Prepared by	Reviewed by	Approved by
—	Nov. 8, 2001	Initial issue	H. Tanaka	H.Ito	F. Shimizu
1	Nov. 16, 2001	Revised Point 【UL1745-SB CX-50 1×32AWG(7/0.08)D=1.13】 ・Change Diameter of Insulation 0.66 → 0.68 ・Outer conductor material is Changed tinned annealed copper wire ↓ Silver planted annealed copper wire ・Construction of Outer conductor 5×16 → 4×16 ・Change Diameter of Jacket $1.13\pm0.1 \rightarrow 1.13^{+0.08}_{-0.05}$ ・Nominal attenuation is changed 【UL1745-SB CX-50 1×32AWG(7/0.08)D=1.32】 ・Change Diameter of Insulation 0.66 → 0.68 ・Construction of Outer conductor 5×16 → 4×16 ・Nominal attenuation is changed	N. Ono	H.Ito	F. Shimizu

1. Scope

This specification covers UL recognized Fluoroethylene-propylene insulated high frequency coaxial cable.
[UL1745 : 90℃、30V]
Use : Internal wiring of Class 2 Circuits of Electronic Equipment.

2. Construction and Properties

HCL P/N	HCLI-TPE P/N	Construction and Properties
UL1745-SB CX-50 1×30AWG(1/0.26)D=1.25	RFX50-SS30-125	Table 1
UL1745-SB CX-50 1×30AWG(7/0.102)D=1.48	RFX50-SS30-148	
UL1745-SB CX-50 1×32AWG(7/0.08)D=1.13	RFX50-SS32-113	Table 2
UL1745-SB CX-50 1×32AWG(7/0.08)D=1.32	RFX50-SS32-132	
UL1745-DSB CX-50 1×32AWG(7/0.08)D=1.32	RFX50-DS32-132	
UL1745-SB CX-50 1×34AWG(7/0.064)D=0.98	RFX50-SS34-098	Table 3
UL1745-SB CX-50 1×36AWG(7/0.05)D=0.81	RFX50-SS36-081	

3.Marking

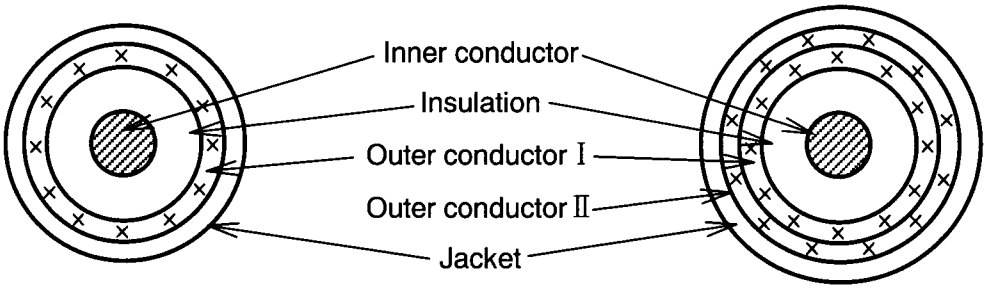
3.1 Marking on the wire

No marking on the wires.

3.2 Marking on the tag attached to reel

Each reel shall be tagged to show the following information with UL stamp.

(1) UL Style
(2) Conductor size
(3) No. of conductor
(4) Color
(5) Lot No.
(6) Length
(7) Use
(8) File No.
(9) Rating temperature
(10) Rating voltage
(11) Date of manufacture
(12) Insulation thickness
(13) Name of manufacture



Single braid TYPE　　Double braid TYPE

Fig.1 Cross-section of cable

Table 1 Construction and Properties (30AWG)

Item		Unit	Specified Value	
HCL P/N		—	UL1745-SB CX-50 1×30AWG(1/0.26)D=1.25	UL1745-SB CX-50 1×30AWG(7/0.102)D=1.48
HCLI-TPE P/N		—	RFX50-SS30-125	RFX50-SS30-148
Inner Conductor	Material	—	silver plated copper clad steel wire	
	AWG size	—	30	
	Stranding	No./mm	1/0.26	7/0.102
	Diameter	mm	0.26±0.008	0.30±0.03
	Number	—	1	
Insulation	Material	—	Fluoroethylene-propylene(FEP)	
	Thickness	mm	Nom. 0.27	Nom. 0.27
	Diameter	mm	0.80±0.05	0.84±0.06
	Color	—	natural	
Outer Conductor I	Material	—	Tinned annealed copper wire	silver plated annealed copper wire
	Form	—	braid	
	Strand	mm	0.05	0.08
	Construction	—	6×16	3×16
	Coverage	%	Min. 90	
	Diameter	mm	Nom. 1.05	1.24±0.07
Jacket	Material	—	Fluoroethylene-propylene(FEP)	Ethylene-tetrafluoroethylene(ETFE)
	Thickness	mm	Nom. 0.10	0.12
	Diameter	mm	1.25±0.13	1.48±0.08
	Color	—	Black, White, Red, Green, Yellow, Brown, Blue, Orange, Gray, Violet	
Unit length		m	305	100
Package		—	paper reel	paper reel
Approx. mass		kg/km	4.0	5.1
Inner Conductor resistance at 20℃		Ω/km	Max. 844	Max. 832
Dielectric strength*		—	A.C. 1000V for 1minute	
Insulation resistance* at 20℃		MΩ-km	Min. 1000	
Characteristic impedance by TDR		Ω	50±2	
Capacitance * at 1kHz		pF/m	Nom. 100	95±10
Nominal attenuation	at 1GHz	dB/m	1.56	1.8
	at 2GHz	dB/m	2.3	2.5
	at 3GHz	dB/m	2.9	3.1
	at 4GHz	dB/m	3.5	4.1
	at 5GHz	dB/m	4.5	4.6
	at 6GHz	dB/m	5.2	5.3

* Between inner conductor and outer conductor

Table 2 Construction and Properties (32AWG)

Item		Unit	Specified Value		
HCL P/N		—	UL1745-SB CX-50 1×32AWG(7/0.08)D=1.13	UL1745-SB CX-50 1×32AWG(7/0.08)D=1.32	UL1745-DSB CX-50 1×32AWG(7/0.08)D=1.32
HCLI-TPE P/N		—	RFX50-SS32-113	RFX50-SS32-132	RFX50-DS32-132
Inner Conductor	Material	—	silver plated annealed copper wire		
	AWG size	—	32		
	Stranding	No./mm	7/0.08		
	Diameter	mm	0.24		
	Number	—	1		
Insulation	Material	—	Fluoroethylene-propylene(FEP)		
	Thickness	mm	Nom. 0.21		
	Diameter	mm	$0.68^{+0.04}_{-0.02}$		
	Color	—	Natural		
Outer Conductor Ⅰ	Material	—	Silver plated annealed copper wire		Tinned annealed copper wire
	Form	—	Braid		
	Strand	mm	0.05		
	Construction	—	4×16		
	Coverage	%	Min. 90		
	Diameter	mm	Nom. 0.88		
Outer Conductor Ⅱ	Material	—	—		Tinned annealed copper wire
	Form	—	—		braid
	Strand	mm	—		0.05
	Construction	—	—		6×16
	Coverage	%	—		Min. 90
	Diameter	mm	—		Nom. 1.12
Jacket	Material	—	Fluoroethylene-propylene(FEP)		
	Thickness	mm	Nom. 0.125	Nom. 0.22	Nom. 0.10
	Diameter	mm	$1.13^{+0.08}_{-0.05}$	1.32 (Max. 1.45)	1.32±0.1
	Color	—	Black, White, Red, Green, Yellow, Brown, Blue, Orange, Gray, Violet		
Unit length		m	305		200
Package		—	paper reel		Coil
Approx. mass		kg/km	4.0		5.0
Inner Conductor resistance at 20℃		Ω/km	Max. 597		
Dielectric strength*		—	A.C. 500V for 1minute		
Insulation resistance* at 20℃		MΩ-km	Min. 1000		
Characteristic impedance by TDR		Ω	50±2		
Capacitance * at 1kHz		pF/m	Nom. 95		
Nominal attenuation	at 1GHz	dB/m	2.0		
	at 2GHz	dB/m	2.9		
	at 3GHz	dB/m	3.6		
	at 4GHz	dB/m	4.2		
	at 5GHz	dB/m	4.7		
	at 6GHz	dB/m	5.2		

* Between inner conductor and outer conductor

Table 3 Construction and Properties (34AWG, 36AWG)

Item		Unit	Specified Value	
HCL P/N		—	UL1745-SB CX-50 1×34AWG(7/0.064)D=0.98	UL1745-SB CX-50 1×36AWG(7/0.05)D=0.81
HCLI-TPE P/N		—	RFX50-SS34-098	RFX50-SS36-081
Inner Conductor	Material	—	silver plated annealed copper wire	
	AWG size	—	34	36
	Stranding	No./mm	7/0.064	7./0.05
	Diameter	mm	0.192	0.15
	Number	—	1	
Insulation	Material	—	Fluoroethylene-propylene(FEP)	
	Thickness	mm	Nom. 0.169	Nom. 0.125
	Diameter	mm	0.53	$0.4^{+0.04}_{-0.02}$
	Color	—	natural	
Outer Conductor I	Material	—	Tinned annealed copper wire	silver plated annealed copper wire
	Form	—	braid	
	Strand	mm	0.05	
	Construction	—	4×16	3×16
	Coverage	%	Min. 90	
	Diameter	mm	Nom. 0.78	Nom. 0.65
Jacket	Material	—	Fluoroethylene-propylene(FEP)	Perfluoroalkoxy(PFA)
	Thickness	mm	Nom. 0.10	Nom. 0.08
	Diameter	mm	0.98 (Max. 1.1)	$0.81^{+0.04}_{-0.02}$
	Color	—	Black, White, Red, Green, Yellow, Brown, Blue, Orange, Gray, Violet	
Unit length		m	305	305
Package		—	paper reel	paper reel
Approx. mass		kg/km	2.4	1.6
Inner Conductor resistance at 20℃		Ω/km	Max. 868	Max. 1400
Dielectric strength*		—	A.C. 500V for 1minute	A.C. 1000V for 1minute
Insulation resistance* at 20℃		MΩ-km	Min. 1500	Min. 1000
Characteristic impedance by TDR		Ω	50±5	50±3
Capacitance * at 1kHz		pF/m	Nom. 100	Nom. 100
Nominal attenuation	at 1GHz	dB/m	2.6	3.1
	at 2GHz	dB/m	3.9	4.7
	at 3GHz	dB/m	5.0	5.8
	at 4GHz	dB/m	6.1	6.9
	at 5GHz	dB/m	7.0	8.2
	at 6GHz	dB/m	7.9	9.4

* Between inner conductor and outer conductor

PRODUCT SPECIFICATION
製 品 規 格

No. PRS-1180

MHF series micro coaxial connector
(at 6GHz)

Qualification Test Report No. TR-1037

REV.	ECN	BY	DATE	APP.	Prepared by	Reviewed by	Approved by
2	S2031	K.O	May/17/'02	K.K	K.Ohbayashi Nov/16/'01	E.Kawabe Nov/20/'01	K.Katabuchi Nov/21/'01
1	S1063	K.O	Dec/25/'01	K.K			
0	S1055	K.O	Nov/16/'01				
REVISION RECORD							

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1. Scope ／ 序言

MHF series micro coaxial connector is a wire to board connector for AWG#32 coaxial cable .
MHF series micro coaxial connector は、AWG＃32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 : 20278-101R-13, 20278-111R-13 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. 20278-101R-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

(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

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～6GHz
(4) VSWR ： 1．3 MAX. DC～3GHz, 1．5 MAX. 3～6GHz
(5) Service Temperature / 使用温度範囲 ： 233～363K(－40～＋90℃)

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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

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>

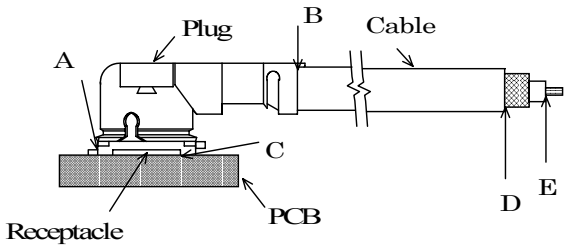

Fig.1

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.

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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

(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~6GHz

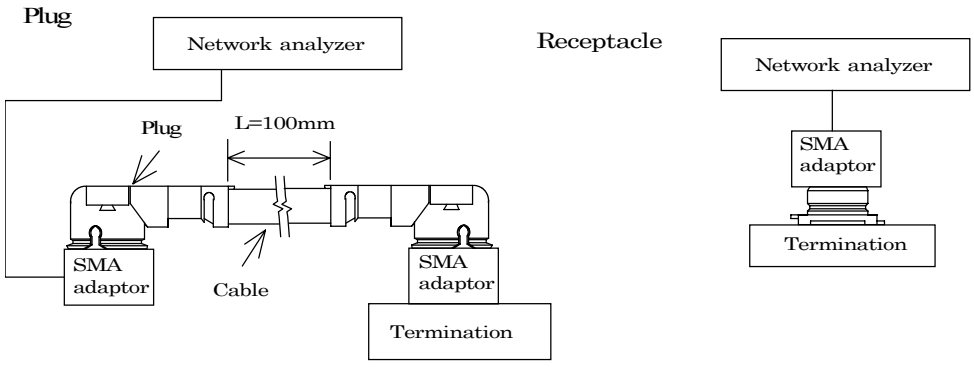

Fig.3

B.Requirements : Plug1.3 MAX at 0.1~3GHz, . 1.5 MAX at 3~6GHz
Receptacle 1.3 MAX at 0.1~3GHz, . 1.4 MAX at 3~6GHz
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～6GHz
B.必要条件: Plug 1．3以下 0．1～3GHz 1．5以下 3～6GHz
Receptacle 1．3以下 0．1～3GHz 1．4以下 3～6GHz

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(5) Insertion loss / インサーションロス

A. Testing : Measure the insertion loss as shown in Fig.5 by the network analyzer.
Frequency :100M~6GHz

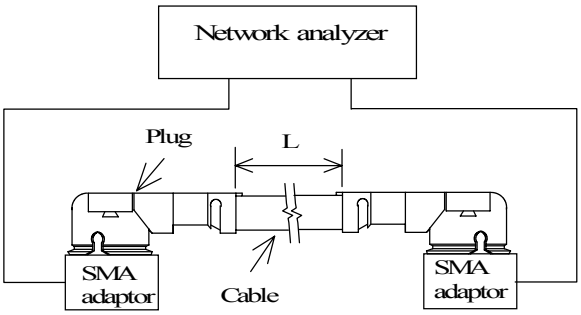

Fig.5

B.Requirements At 0.1~3GHz L=100mm : –1.0dB MIN. L=200mm : –1.4dB MIN.
L=300mm : –1.8dB MIN. L=400mm : –2.1 dB MIN. L=500mm : –2.4 dB MIN.
At 3~6GHz L=100mm : –1.6dB MIN. L=200mm : –2.1dB MIN.
L=300mm : –2.6dB MIN. L=400mm : –3.0 dB MIN. L=500mm : –3.4 dB MIN.

A.試験法: ネットワークアナライザーにて Fig.5のようにインサーションロスを測定する。
周波数 : 100M～6GHz

B.必要条件: 周波数100M～3GHz L=100mm : –1.0dB MIN. L=200mm : –1.4dB MIN.
L=300mm : –1.8dB MIN. L=400mm : –2.1 dB MIN. L=500mm : –2.4 dB MIN.
周波数3～6GHz L=100mm : –1.6dB MIN. L=200mm : –2.1dB MIN.
L=300mm : –2.6dB MIN. L=400mm : –3.0 dB MIN. L=500mm : –3.4 dB MIN.

6-3-2 Mechanical / 機械的性能

(1)Unmating force / 挿抜力

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

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:
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

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(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

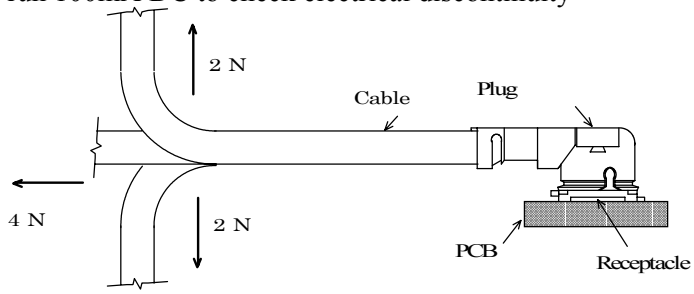

Fig.2

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

(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

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(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

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

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(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.

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

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。

DOCUMENT CLASSIFICATION	TITLE	No.
Product Specification 製品規格	MHF series micro coaxial connector	PRS-1180

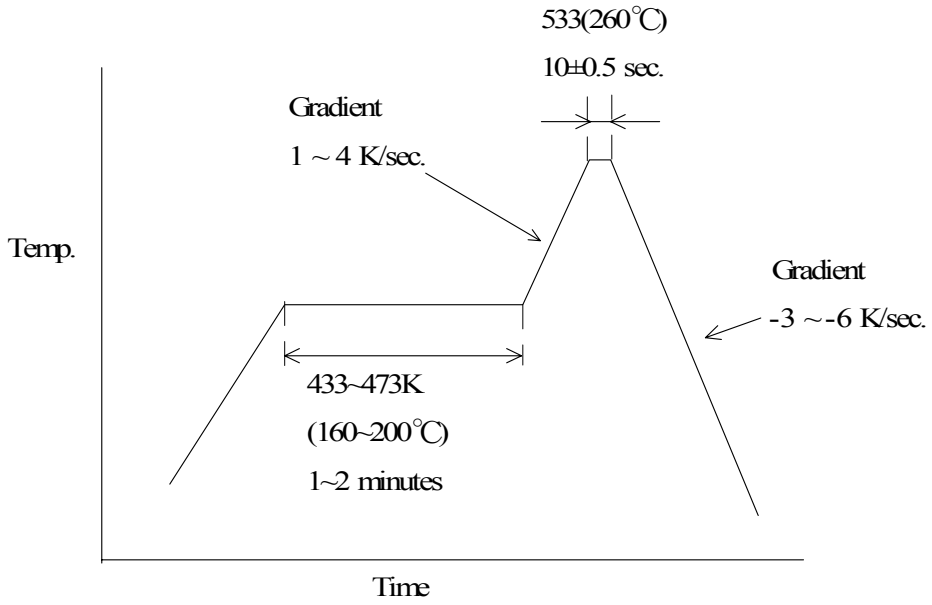

Fig.4

DUOYNG We can !

多盈 線纜傳輸

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承認書編號： 020410
日 期： 92.4.16

規 格 承 認 書

品名： 熱 收 縮 套 管
形式： LHSB . LHSC

權責代表： 多盈線纜傳輸
簡 俊 龍

DUOYNG We can ！

多盈 線纜傳輸

熱 收 縮 套 管

HEAT - SHRINKAGE TUBING

型式

LHSB . LHSC

認證

UL File No. : E 56118
CSA File No. : LR38712

用途

1. 包覆於電氣器具配線之裸露處 , 當絕緣用
2. 包覆於接線端子處 , 當絕緣與保護用
3. 包覆於電氣零件外 , 當絕緣與保護用

顏色

標準顏色是黑色 , 其他顏色可依客戶顏色 . 色相要求訂製

規格

形式	耐電壓	溫度等級	收縮比
LHSB	600V	125 ℃	2 : 1
LHSC	300V	125 ℃	2 : 1

標準特性

品質要求	試驗條件	單 位	規格值	
			LHSB	LHSC
抗張強度	---------	Mpa	> 10.4	> 10.4
伸長率	---------	%	> 200	> 200
老化抗張殘餘率	158°C * 168HRS	%	> 70% of original	> 70% of original
老化伸長殘餘率	158°C * 168HRS	%	> 70% of original	> 70% of original
熱變形率	125°C * 1HR	%	< 50 %	< 50 %
高溫熱衝擊性	136°C * 1HR		No crack	No crack
低溫彎曲性	-10°C * 1Hr		No crack	No crack
破壞電壓	AC 2.5 KV * 60 SEC.		No breakdown	No breakdown
體積固有電阻		Ω-cm	$> 10^{14}$	$> 10^{14}$
導體腐蝕性	158°C * 168HRS		Pass	Pass
銅安定性	158°C * 168HRS		> 100%	> 100%
耐燃性	VW-1		Pass	Pass

標準尺寸

LHSC

尺寸	收縮前規格值		收縮後規格值		標準包裝
mm	內徑 mm	厚度 mm	內徑 mm	厚度 mm	m / 捲
1.0 * 0.10	1.40±0.20	0.10±0.06	0.50	0.20	200
1.5 * 0.10	1.90±0.20	0.10±0.06	0.75	0.20	200
2.0 * 0.10	2.40±0.20	0.10±0.06	1.00	0.20	200
2.5 * 0.15	2.90±0.20	0.15±0.08	1.25	0.25	200
3.0 * 0.15	3.40±0.30	0.15±0.08	1.50	0.25	200
3.5 * 0.15	3.90±0.30	0.15±0.08	1.75	0.25	200
4.0 * 0.15	4.40±0.30	0.15±0.08	2.00	0.25	200
5.0 * 0.15	5.40±0.30	0.15±0.08	2.50	0.25	100
6.0 * 0.15	6.50±0.40	0.15±0.08	3.00	0.28	100
7.0 * 0.15	7.50±0.40	0.15±0.08	3.50	0.28	100
8.0 * 0.15	8.50±0.40	0.15±0.08	4.00	0.28	100
9.0 * 0.15	9.50±0.40	0.15±0.08	4.50	0.28	100
10.0 * 0.15	10.50±0.50	0.15±0.08	5.00	0.28	100

標準尺寸
LHSB .

尺寸	收縮前規格值		收縮後規格值		標準包裝
mm	內徑 mm	厚度 mm	內徑 mm	厚度 mm	m / 捲
1.0 * 0.20	1.50±0.20	0.20±0.08	0.50	0.33	200
1.5 * 0.20	2.10±0.20	0.20±0.08	0.75	0.36	200
2.0 * 0.20	2.70±0.20	0.25±0.09	1.00	0.44	200
2.5 * 0.20	3.20±0.20	0.25±0.09	1.25	0.44	200
3.0 * 0.25	3.50±0.30	0.25±0.09	1.50	0.44	200
3.5 * 0.25	4.20±0.30	0.25±0.09	1.75	0.44	200
4.0 * 0.25	4.70±0.30	0.25±0.09	2.00	0.44	200
5.0 * 0.25	5.70±0.30	0.28±0.10	2.50	0.56	100
6.0 * 0.25	6.70±0.40	0.28±0.10	3.00	0.56	100
7.0 * 0.25	7.70±0.40	0.27±0.10	3.50	0.56	100
8.0 * 0.25	8.70±0.40	0.27±0.10	4.00	0.56	100
9.0 * 0.25	9.70±0.40	0.27±0.10	4.50	0.56	100
10.0 * 0.25	10.70±0.50	0.27±0.10	5.00	0.56	100
11.0 * 0.25	11.70±0.30	0.27±0.10	5.50	0.56	100
12.0 * 0.25	12.70±0.30	0.27±0.10	6.00	0.56	100
13.0 * 0.30	13.70±0.40	0.33±0.12	6.50	0.69	50
14.0 * 0.30	14.70±0.40	0.33±0.12	7.00	0.69	50
15.0 * 0.30	15.70±0.50	0.33±0.12	7.50	0.69	50
16.0 * 0.30	16.70±0.50	0.33±0.12	8.00	0.69	50
18.0 * 0.35	18.70±0.50	0.37±0.13	9.00	0.77	50
20.0 * 0.35	20.70±0.60	0.37±0.13	10.00	0.77	50
22.0 * 0.40	22.70±0.60	0.37±0.13	11.00	0.77	50
25.0 * 0.40	25.80±0.80	0.42±0.14	12.00	0.87	50

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