



權億科技股份有限公司
Master Wave Technology Co., Ltd.

承認書

APPROVAL SHEET

Customers: 系統電子工業股份有限公司

Customer Model No.: 354-0201020-031

Master Wave Model No.: 98MA2PIPF000

Product Description: FPCB Antenna

Issue Date: 2022. 08. 05

REV.: 00

客戶承認用印 Customer Approved		權億承認用印 Confirmation Signature	
			
核准 Approve	主管 Chief	承辦 Responsible	
Tony	Pierce	Alice	

MASTER WAVE TECHNOLOGY CO., LTD.

權億科技股份有限公司

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Suzhou Shengyih Electronics Plastic Co. Ltd (Shou Zhou)

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Shengyih Electronic Co. Ltd (Dongguan)

聲億電子有限公司 (東莞廠)

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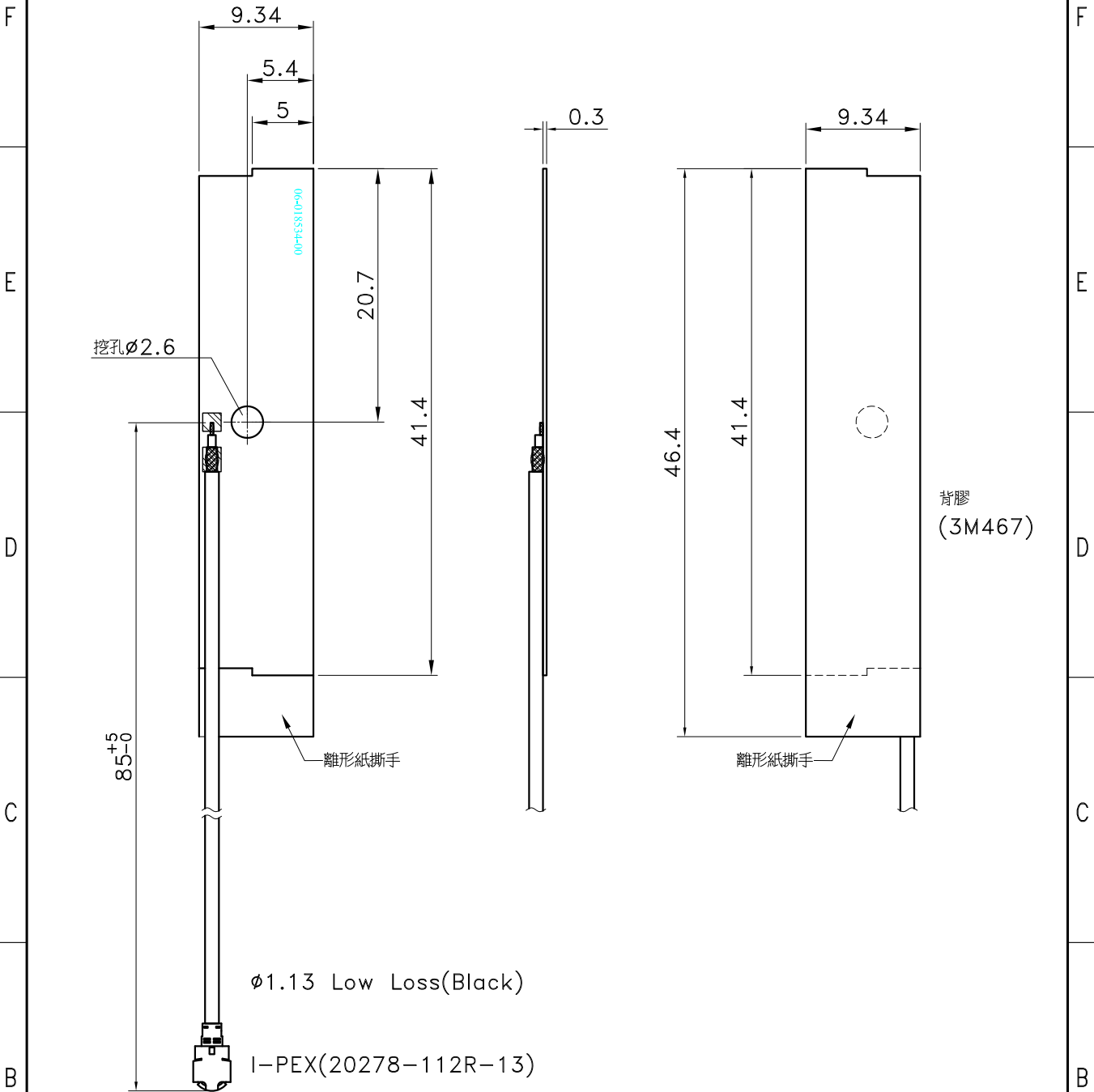
-Connector

-Cable

Modification History:

REV.	Date	Content
00	2022.08.05	

REV	ZONE	DESCRIPTION	ENG	APPROVED	DATE
00		New Release	Jie	Tony	2022/8/5



ϕ 1.13 Low Loss(Black)

I-PEX(20278-112R-13)

Electrical Properties	
Frequency Range	2.4~2.5 GHz
Impedance	50 Ω
V.S.W.R.	\leq 2.5
Gain	3.25 dBi
Mechanical Properties	
Whip	FPC
Connector	Brass

- NOTES:
- 為表面OSP處理
 - 為白色文字層

A	UNLESS OTHERWISE SPECIFIED TOLERANCES ON : \pm 0.5		DATE: 2022/8/5	MAT'L:	權億科技股份有限公司 Master Wave Technology Co., Ltd.	TITLE : FPCB Antenna
	UNIT: mm		THIRD ANGLE PROJECTION	FINISH:		
	SCALE: 2/1					
APPROVED BY:	CHECKED BY:	DESIGNED BY:	DRAWN BY:	WEIGHT:	MODEL NO. : 98MA2PIPF000	REV
Tony	Pierce	Jie	Alice	0.6g	PART NO. : 8MA2PIPF000	00

THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO MASTER WAVE AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION.

4

3

2

1

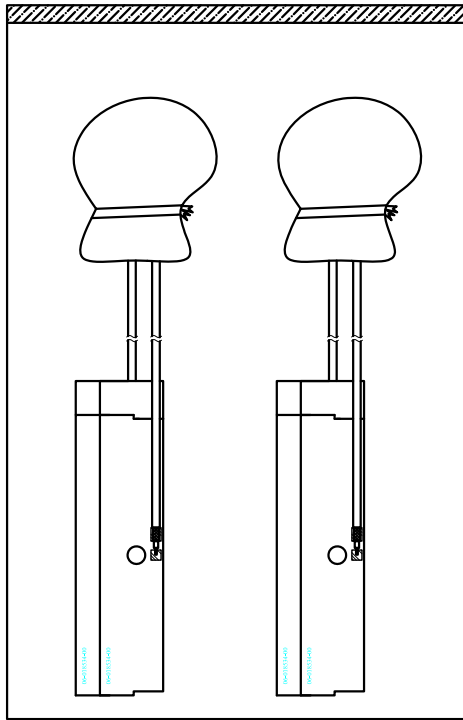
REV	ZONE	DESCRIPTION	ENG	APPROVED	DATE

F

F

E

E



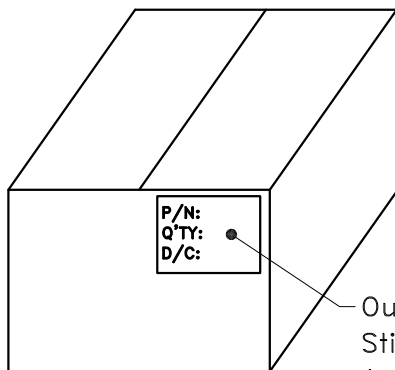
25PCS Antenna A Bundle
 50PCS Antenna Per bag and seal
 (25支天線綁一束, 每包50支天線並封口)

D

D

C

C



Outside the carton:
 Stick the label on the side mark
 (將標籤黏貼於外箱側麥)

B

B

A

A

DATE: 2022/8/5	MAT'L:
UNIT: mm	FINISH:
THIRD ANGLE PROJECTION	SCALE: -



權億科技股份有限公司
 Master Wave Technology Co., Ltd.

TITLE : FPCB Antenna Packing

APPROVED BY: Tony	CHECKED BY: Pierce	DESIGNED BY: Jie	DRAWN BY: Alice	WEIGHT:	MODEL NO. : 98MA2PIPF000	REV 00
					PART NO. : 8MA2PIPF000	

THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO MASTER WAVE AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION.

4

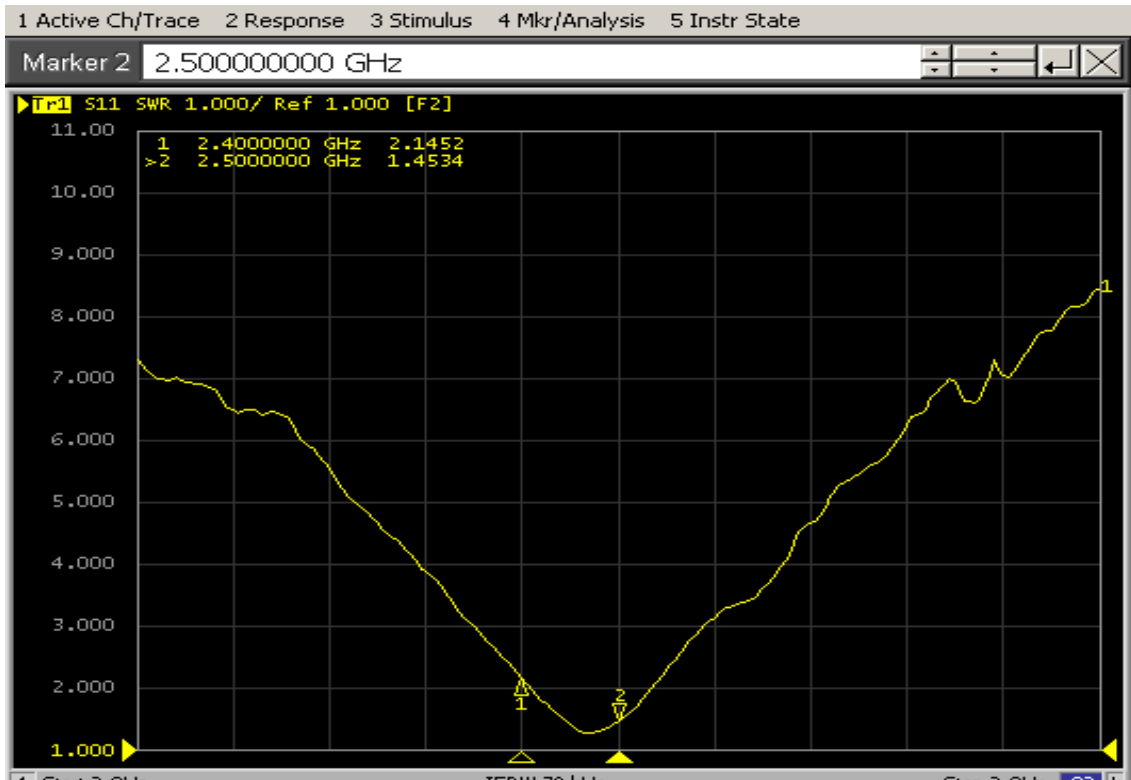
3

2

1



Electrical Test





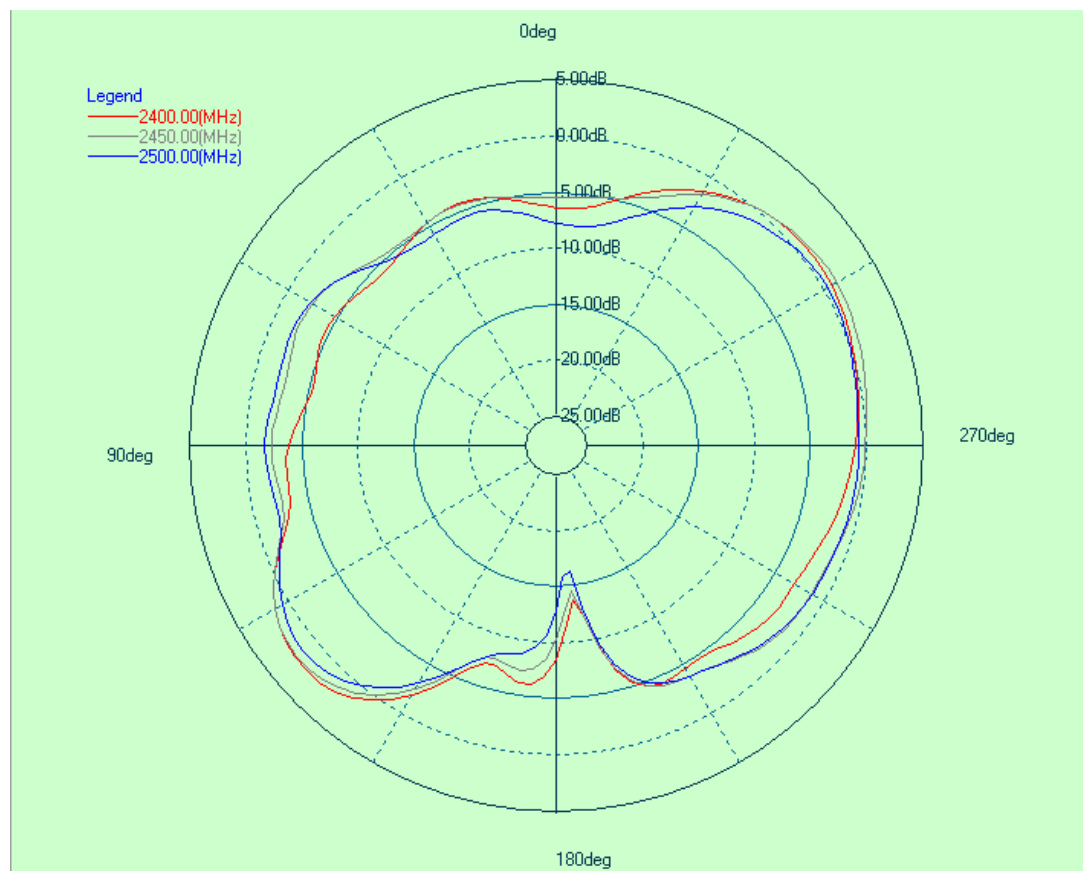
Antenna Efficiency

Band		Wi-Fi (2400 ~ 2500MHz)		
Frequency (MHz)		2400	2450	2500
WiFi	Efficiency (%)	63	72	68
	Peak Gain (dBi)	2.45	3.46	3.86



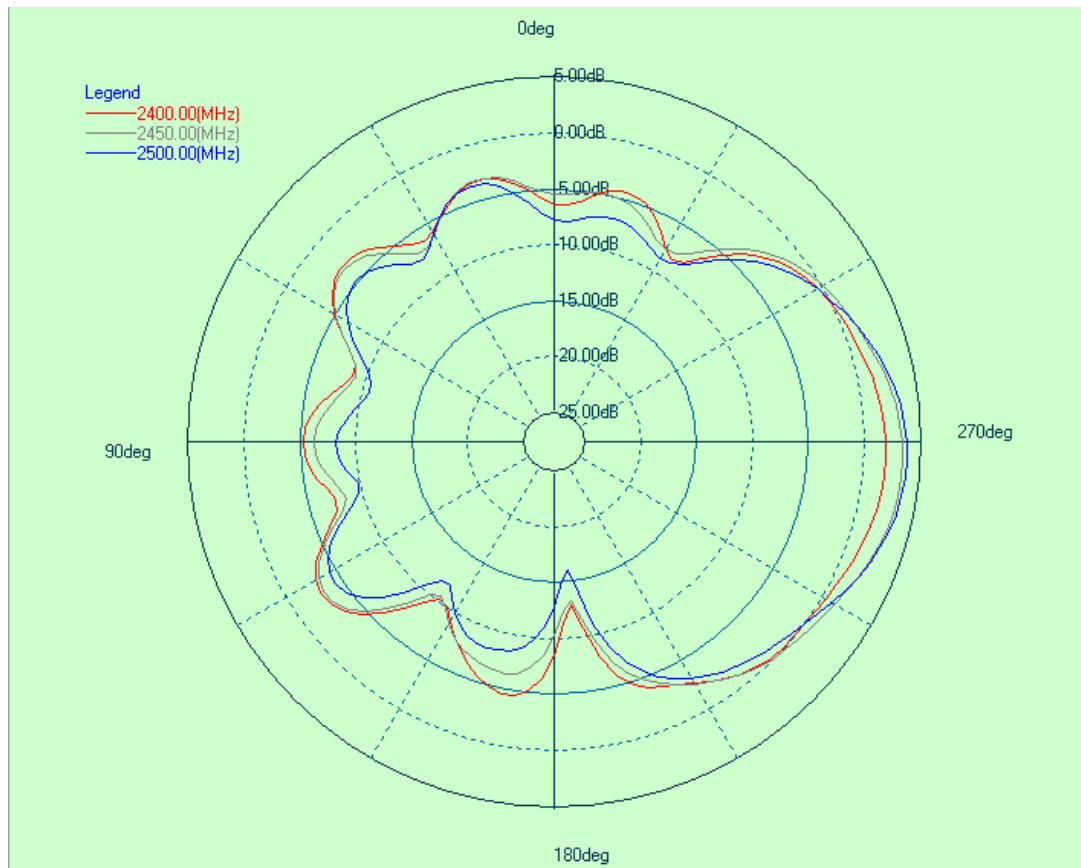
2D Radiation Pattern

XZ Plane





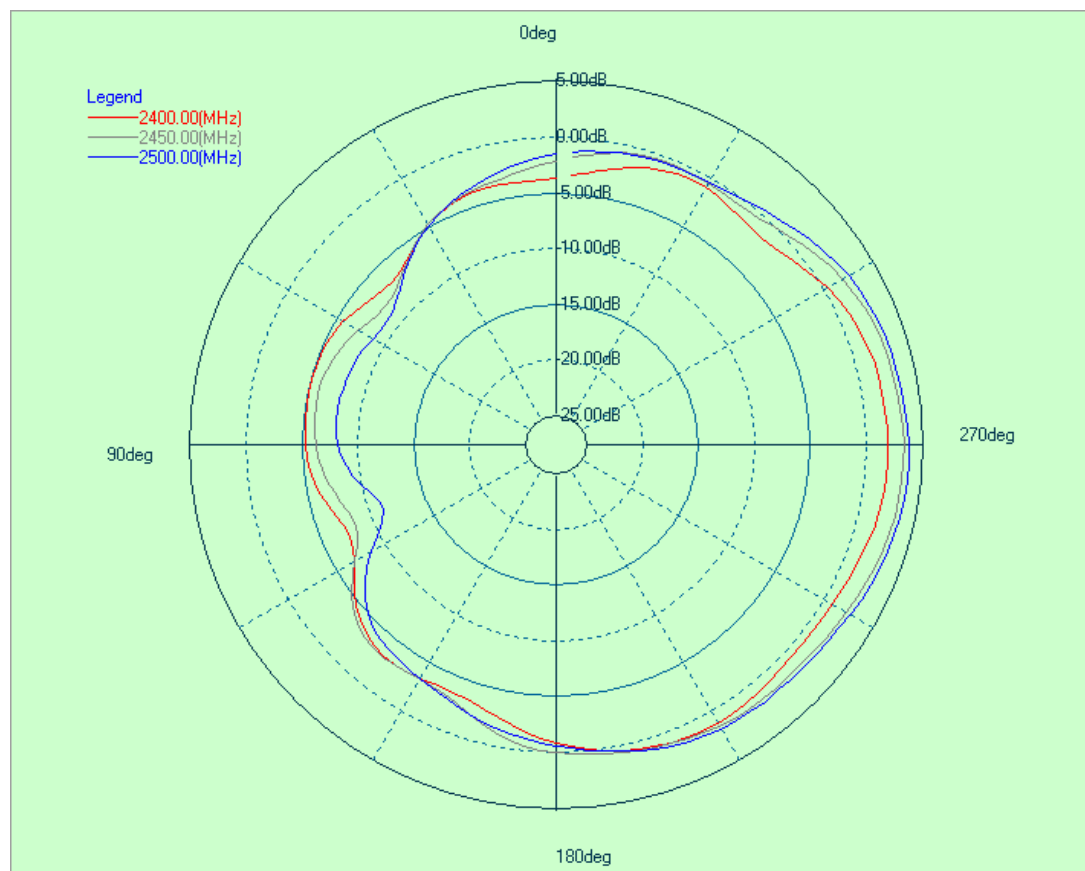
2D Radiation Pattern YZ Plane





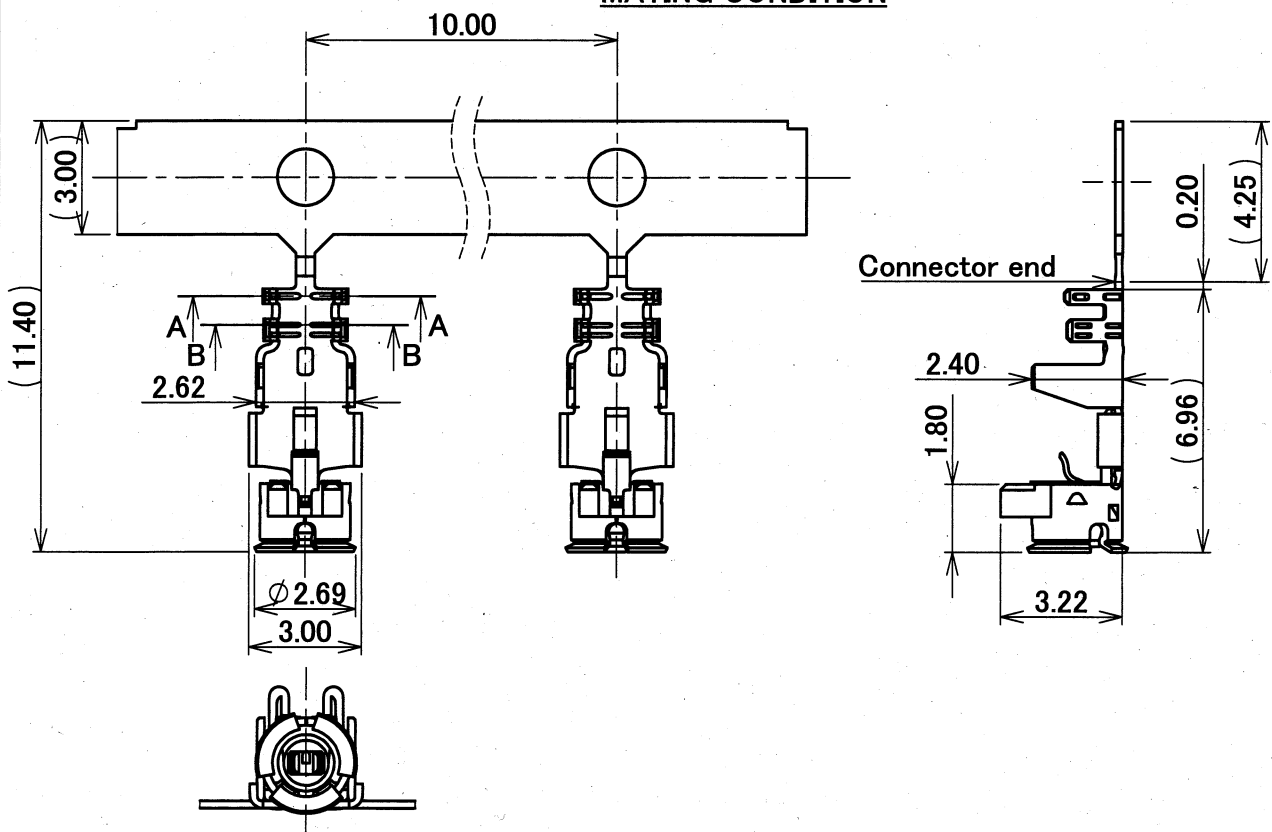
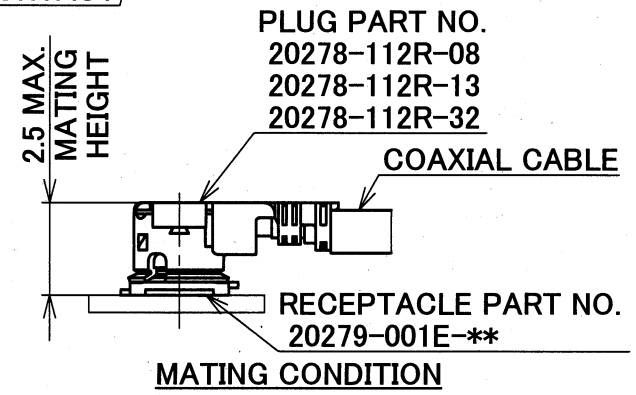
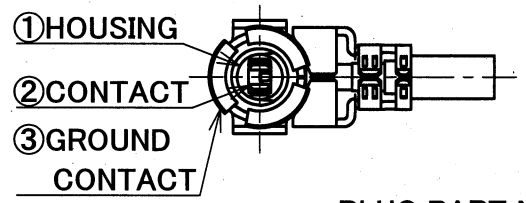
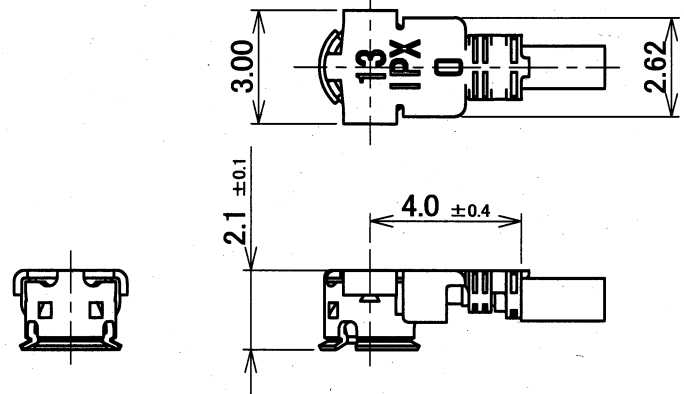
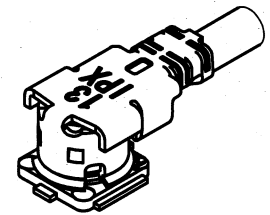
2D Radiation Pattern

XY Plane



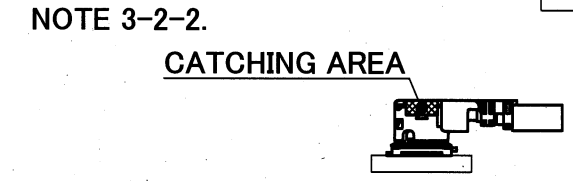
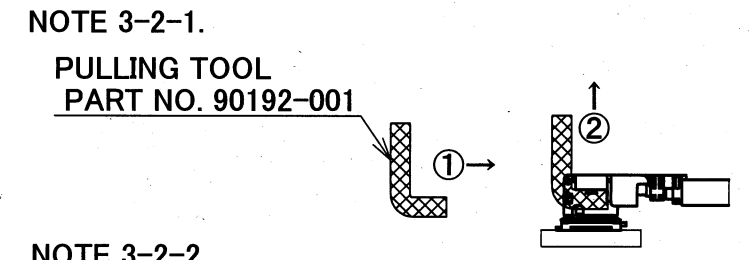
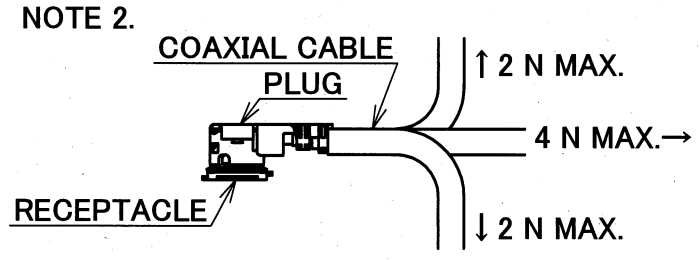
Recommended P/N 20278-112R-**

PART No.	APPLICABLE CABLE
20278-112R-08	AWG#36 (0.81 O.D.)
20278-112R-13	AWG#32 (1.13 O.D.)
20278-112R-32	AWG#32 (1.32 O.D.)



NOTES

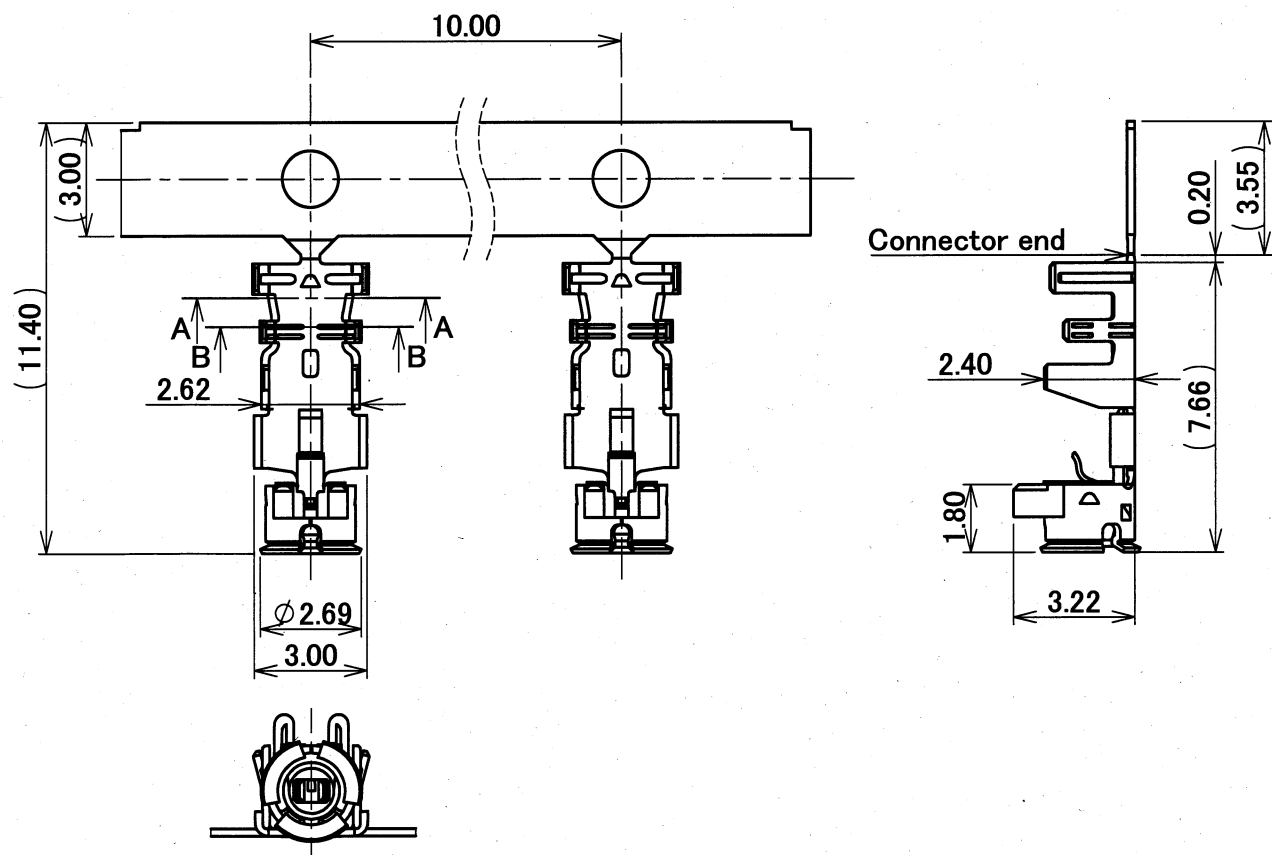
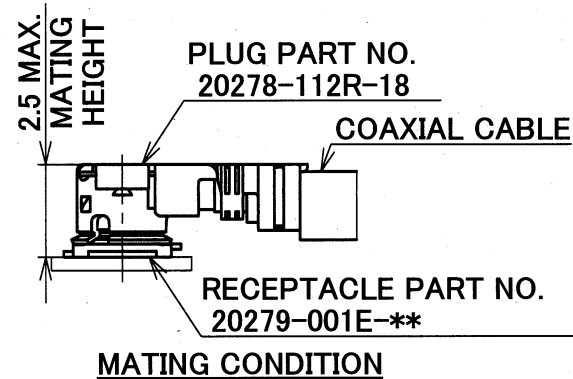
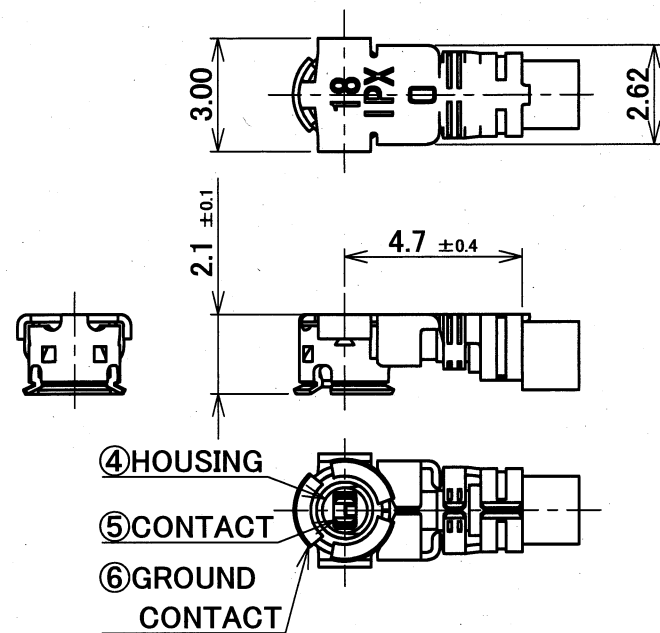
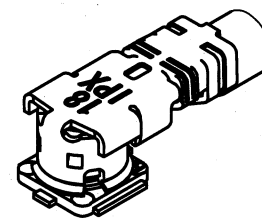
1. APPLICABLE CONNECTOR:
20279-001E-**, 20314-001E-01, 20431-001E-01, 20441-001E-01
2. PERMISSIBLE LOAD OF CABLE AT MATING
3. SUGGESTIONS FOR MATING & UNMATING OPERATION.
 - 3-1. MATING
PLEASE MATE THE CONNECTOR STRAIGHTLY TO VERTICAL DIRECTION AS MUCH AS POSSIBLE, ADJUSTING THE MATING AXIS OF PLUG AND RECEPTACLE. AS EXCESSIVE SLANT ANGLE MATING MAY BREAK THE CONNECTOR, PLEASE DON'T DO IT.
 - 3-2. UNMATING
 - 3-2-1. IN CASE OF UNMATING BY PULLING TOOL
PLEASE USE THE PULLING TOOL AS THE FOLLOWING DRAWING, AND PLEASE PULL PLUG TO VERTICAL DIRECTION AS DIRECTLY AS POSSIBLE.
 - 3-2-2. IN CASE OF UNMATING DIRECTLY BY HAND
PLEASE CATCH THE CATCHING AREA OF PLUG, AND PLEASE PULL PLUG TO VERTICAL DIRECTION AS DIRECTLY AS POSSIBLE.
 - 3-3. CRIMP OVER STANDARDS OF OUTER CONDUCTOR
STANDARDS: LESS THAN 10% FROM TOTAL NUMBERS OF OUTER CONDUCTOR.
(NUMBERS OF OUTER CONDUCTOR'S CRIMP OVER FROM OUTER CONDUCTOR'S BARREL)
 - 3-4. CAUTION ABOUT HEAT SHRINKAGE TUBES
PLEASE BE CAREFUL NOT TO MELT HOUSING WHEN USING HEAT SHRINKAGE TUBES. IT WILL BECOME CAUSE OPEN CIRCUIT.
4. THIS IS "PB-FREE" CONNECTOR.



NO.	DESCRIPTION	MATERIAL	FINISH, REMARKS
3	GROUND CONTACT	PHOSPHOR BRONZE	ALL OVER Ni 1.00 μm MIN. CONTACT PART Au 0.05 μm MIN.
2	CONTACT	PHOSPHOR BRONZE	ALL OVER Ni 1.00 μm MIN. CONTACT PART Au 0.10 μm MIN.
1	HOUSING	PBT	UL94V-0, 20278-112R-08: WHITE 20278-112R-13, -32: BLACK

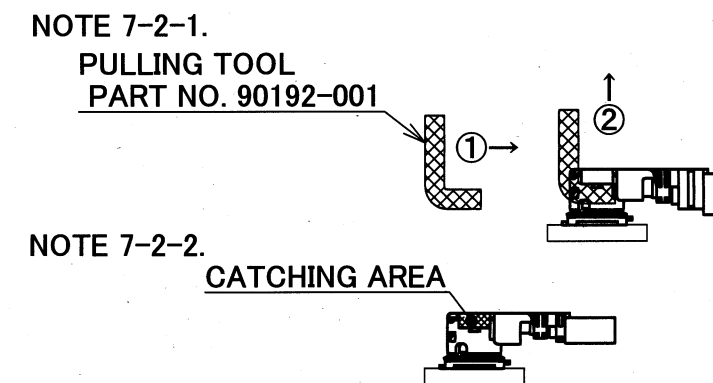
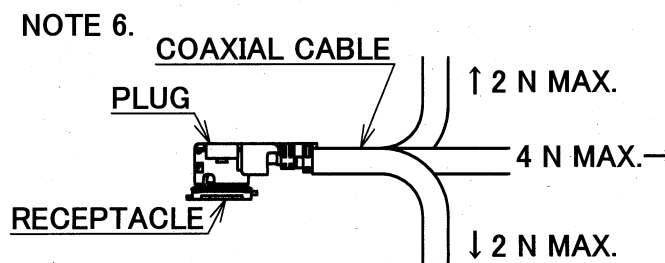
REV.	ECN	BY	DATE	APP.	ANGLE	6 OVER 30 MAX.	±0.3	PROJECTION	SERIES No.	CUSTOMER COPY
					±2°	6 OVER 30 MAX.	±0.3		R15	SCALE 5:1 UNIT mm SIZE A3
					6 MAX.	30 OVER 120 MAX.	±0.5			
REVISION RECORD					GENERAL TOLERANCE			TITLE		
					DWG.	DATE	MHF® I			
					K.Oobayashi	2001/07/13	PLUG (Au TYPE)			
					CHK.	DATE	20278			
					APP.	DATE	DWG. No.		SHEET 1/6	REV. 26
					K.Katabuchi	2001/07/13	20278			

PART No.	APPLICABLE CABLE
20278-112R-18	AWG#30 (1.80 O.D.)



NOTES

- 5. APPLICABLE CONNECTOR:
20279-001E-**, 20314-001E-01, 20431-001E-01, 20441-001E-01
- 6. PERMISSIBLE LOAD OF CABLE AT MATING
- 7. SUGGESTIONS FOR MATING & UNMATING OPERATION.
- 7-1. MATING
PLEASE MATE THE CONNECTOR STRAIGHTLY TO VERTICAL DIRECTION AS MUCH AS POSSIBLE, ADJUSTING THE MATING AXIS OF PLUG AND RECEPTACLE. AS EXCESSIVE SLANT ANGLE MATING MAY BREAK THE CONNECTOR, PLEASE DON'T DO IT.
- 7-2. UNMATING
- 7-2-1. IN CASE OF UNMATING BY PULLING TOOL
PLEASE USE THE PULLING TOOL AS THE FOLLOWING DRAWING, AND PLEASE PULL PLUG TO VERTICAL DIRECTION AS DIRECTLY AS POSSIBLE.
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- 7-3. CRIMP OVER STANDARDS OF OUTER CONDUCTOR
STANDARDS: LESS THAN 10% FROM TOTAL NUMBERS OF OUTER CONDUCTOR.
(NUMBERS OF OUTER CONDUCTOR'S CRIMP OVER FROM OUTER CONDUCTOR'S BARREL)
- 7-4. CAUTION ABOUT HEAT SHRINKAGE TUBES
PLEASE BE CAREFUL NOT TO MELT HOUSING WHEN USING HEAT SHRINKAGE TUBES. IT WILL BECOME CAUSE OPEN CIRCUIT.
- 8. THIS IS "PB-FREE" CONNECTOR.

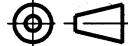


NO.	DESCRIPTION	MATERIAL	FINISH, REMARKS
6	GROUND CONTACT	PHOSPHOR BRONZE	ALL OVER Ni 1.00 μm MIN. CONTACT PART Au 0.05 μm MIN.
5	CONTACT	PHOSPHOR BRONZE	ALL OVER Ni 1.00 μm MIN. CONTACT PART Au 0.10 μm MIN.
4	HOUSING	PBT	UL94V-0, WHITE

REVISION RECORD					ANGLE	±2°	6 OVER 30 MAX.	±0.3	PROJECTION	SERIES No. R15	CUSTOMER COPY	
						6 MAX.	±0.2	30 OVER 120 MAX.				±0.5
					GENERAL TOLERANCE				TITLE MHF® I PLUG (Au TYPE)	SCALE 5:1	UNIT mm	SHEET 2/6
					DWG.	DATE						
REV.	ECN	BY	DATE	APP.	CHK.	DATE						

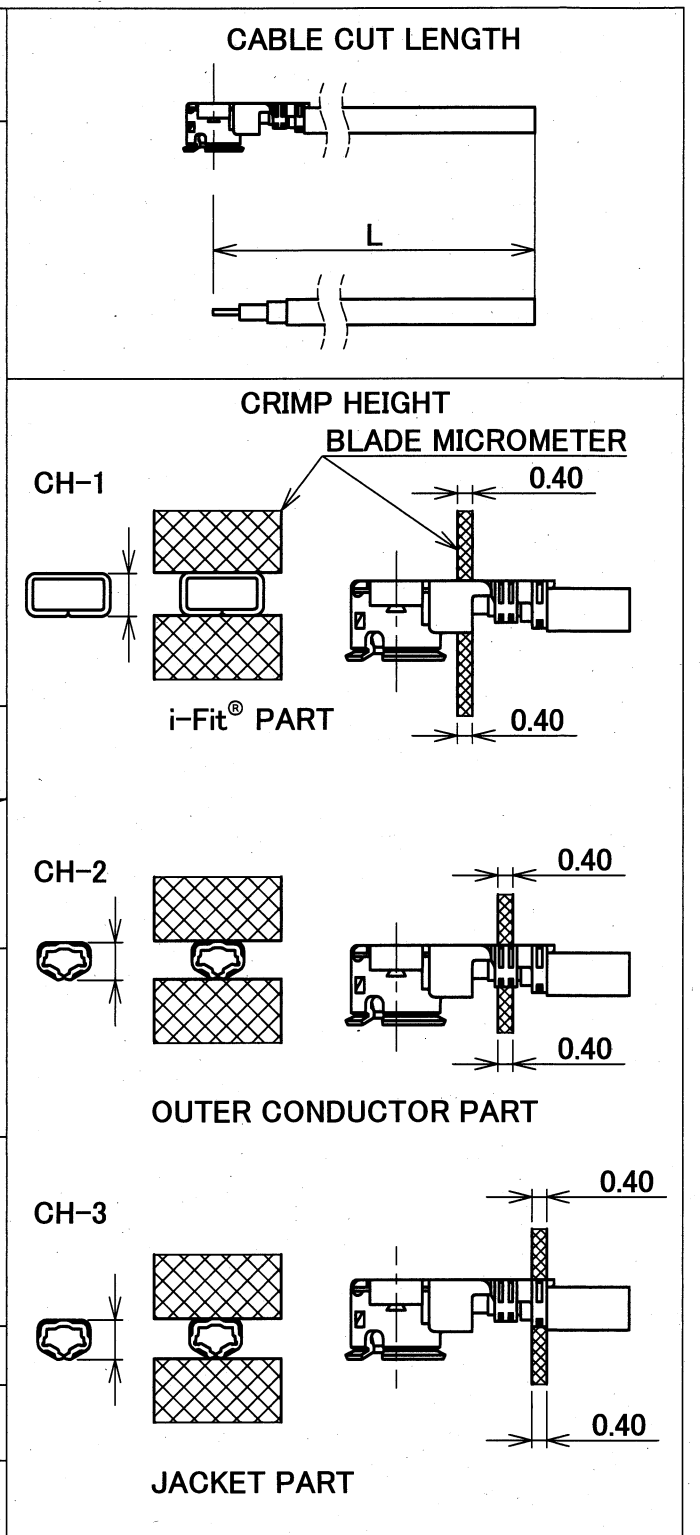


ITEMS	SPECIFICATION
RECOMMENDED APPLICABLE CONNECTOR PART No.	20279-001E-**
RATING VOLTAGE	60 V AC (R.M.S)
RATING FREQUENCY	DC~6 GHz
OPERATING TEMPERATURE	233~363 K (-40°C~+90°C)
VSWR	1.3 MAX. AT 0.1~3 GHz, 1.5 MAX. AT 3~6 GHz
MAIN CONTACT RESISTANCE	INITIAL: 20 mohm MAX. / AFTER TEST: 25 mohm MAX.
GROUND CONTACT RESISTANCE	INITIAL: 10 mohm MAX. / AFTER TEST: 15 mohm MAX.
INSULATION RESISTANCE	INITIAL: 500 Mohm MIN. / AFTER TEST: 100 Mohm MIN.
DIELECTRIC WITHSTANDING VOLTAGE	200 V AC, 1 MINUTE
DURABILITY	30 CYCLES
UNMATING FORCE (INITIAL / AFTER TEST)	5 N MIN. / 3 N MIN.
CRIMP STRENGTH	20278-112R-08, 20278-112R-13, 20278-112R-32: 10 N MIN. 20278-112R-18: 15 N MIN.
PRODUCT SPECIFICATION	PRS-1676
TEST REPORT	TR-12044
PACKING STANDARD	300-233
INSTRUCTION MANUAL	HIM-10002

ANGLE	±2°	6 OVER 30 MAX.	±0.3	PROJECTION 	SERIES No. R15	CUSTOMER COPY
6 MAX.	±0.2	30 OVER 120 MAX.	±0.5			
GENERAL TOLERANCE.				TITLE MHF® I PLUG (Au TYPE)	SCALE 5:1	UNIT mm
DWG.	DATE					
CHK.	DATE					
APP.	DATE					
				DWG. No.	20278	SIZE A3
				SHEET 3/6		REV. 26



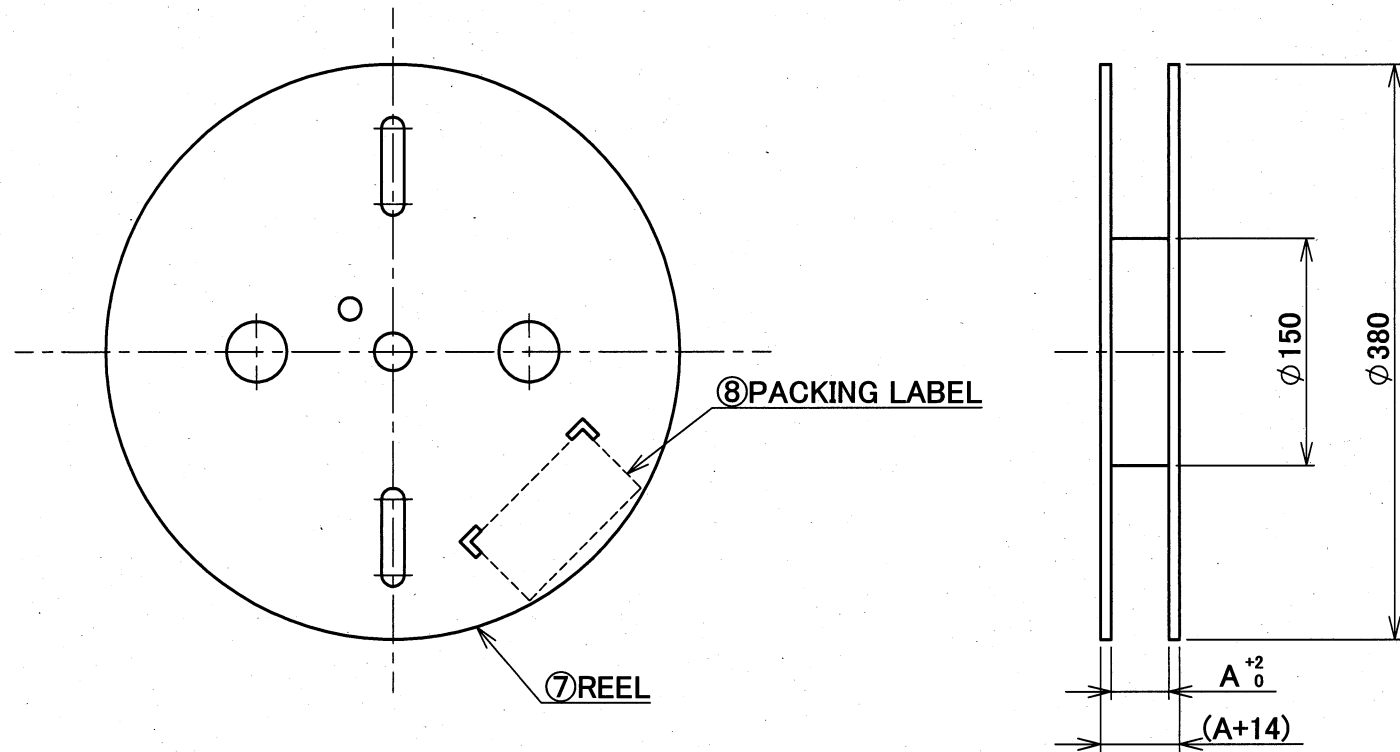
PART NO.		20278-112R-08	20278-112R-13	20278-112R-32	20278-112R-18
APPLICABLE CABLE NOMINAL DIMENSION					
BRAIDED SHIELD OF OUTER CONDUCTOR		SINGLE	SINGLE	DOUBLE	SINGLE
PART NO. OF HAND TOOL	PART NO. OF SEMI AUTO TERMINATION MACHINE	90187-008C 90213-008C	90187-013C 90213-013C	90187-032C 90213-032C	90233-018 90232-018
SECT. B-B					
SECT. A-A					
CRIMP HEIGHT	CH-1	1.34~1.40	1.34~1.40	1.34~1.40	1.34~1.40
	CH-2	0.76~0.84	1.06~1.14	1.20~1.30	1.41~1.49
	CH-3	0.85~0.97	1.15~1.35	1.26~1.46	1.70~1.80



NOTE 9. MUST NOT USE SOLDER COATED INNER CONDUCTOR AND OUTER CONDUCTOR.

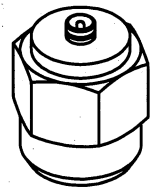
ANGLE	±2°	6 OVER 30 MAX.	±0.3	PROJECTION	SERIES No.	CUSTOMER COPY
	6 MAX.	±0.2	30 OVER 120 MAX.	±0.5	R15	
GENERAL TOLERANCE.				TITLE	SCALE	
DWG.	DATE			MHF® I PLUG (Au TYPE)	-	
CHK.	DATE				UNIT	
APP.	DATE				mm	
					DWG. No.	
				20278	A3	SHEET 4/6 REV. 26

PART NO.	A	QTY. PER EMBOSS REEL (PIECES / REEL)	QTY. PER PACKING CARTON (REELS / CARTON)
20278-112R-**	20.0	2,000 / REEL	4 REELS / CARTON = 8,000 PIECES

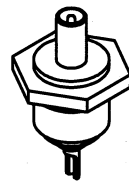


NO.	DISCRIPTION	MATERIAL	FINISH , REMARKS
8	PACKING LABEL	-	-
7	REEL	CB	-

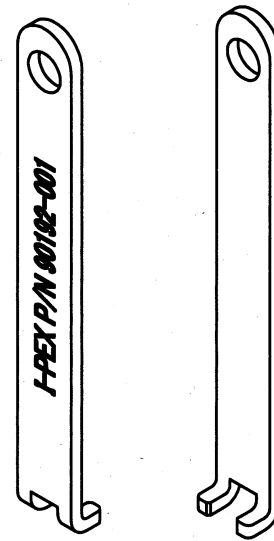
ANGLE	$\pm 2^\circ$	6 OVER 30 MAX.	± 0.3	PROJECTION	SERIES No.	CUSTOMER COPY
6 MAX.	± 0.2	30 OVER 120 MAX.	± 0.5		R15	
GENERAL TOLERANCE.				TITLE		SCALE
DWG.	DATE		MHF [®] I PLUG (Au TYPE)			UNIT
CHK.	DATE					mm
APP.	DATE			DWG. No.		SIZE
					20278	A3
						SHEET 5/6 REV. 26



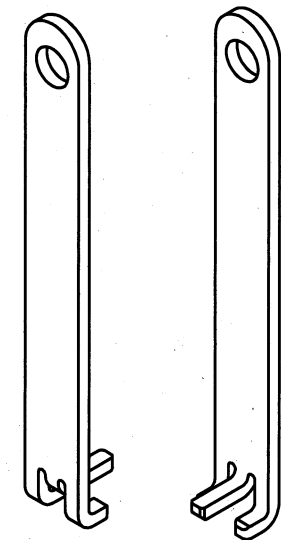
MHF I/II SMA ADAPTOR
PART NO. 90193-001



MHF I/II PLUG INSPECTION CONNECTOR
PART NO. 90194-001



FRONT SIDE BACK SIDE
MHF I/II PULLING TOOL
PART NO. 90192-001



FRONT SIDE BACK SIDE
MHF I PUSHING AND PULLING TOOL
PART NO. 90224-001

ANGLE	±2°	6 OVER 30 MAX.	±0.3	PROJECTION 	SERIES No. R15	CUSTOMER COPY
6 MAX.	±0.2	30 OVER 120 MAX.	±0.5			
GENERAL TOLERANCE.				TITLE MHF® I PLUG (Au TYPE)	SCALE 2:1	UNIT mm
DWG.	DATE					
CHK.	DATE					
APP.	DATE					
				DWG. No.	20278	SIZE A3
				SHEET 6/6		REV. 26





線材規格

CABLE SPECIFICATION

SPECIFICATION: 1.13mm CABLE (Low Loss)		CONSTRUCTION D.W.G	
ITEM	SPECIFICATION		
CONDUCTOR	MATERIAL	Silver-coated Copper Wire	
	Composition(No./mm)	7/0.08	
	NOM.O.D(mm)	0.24±0.05	
INSULATION	Material	FEP(Natural)	
	Nom. Thick.(mm)	0.24	
TAPE	NOM.O.D(mm)	0.73±0.05	
	MATERIAL	Copper Mylar Tape	
BRAID	Composition(mm)	Vertical Wrapping the Copper Mylar Tape of 0.015	
	MATERIAL	Tinned annealed copper wire	
JACKET	Composition(mm)	Single Braid of 0.05	
	MATERIAL	FEP(*color)	
	Nom. Thick(mm)	0.1	
	Nom. O.D(mm)	1.18±0.05	
Color		According to corresponding have approved by the suppliers and customers	
Electrical Properties(at 20°C)			
Item	Unit	Details	
Conductor Resistance	Ω/km	Max.581	
Insulation Resistance	MΩ.km	Min.500	
Dielectric Strength	V(AC)/min	500	
Capacitance	pF/m	98	
REMARK			
MASTER WAVE TECHNOLOGY CO., LTD.			
CHECKED	DATE	2020/8/26	
DRAWING	REV	B	

Characteristic Impedance	Ω	50±2.0	
Attenuation	dB/m	1GHz	1.75
		2GHz	2.35
		3GHz	2.90
		4GHz	3.45
		5GHz	3.80
	6GHz	4.35	
Temperature range	°C	-55~200	
Standing wave(0-6GHz)	/	≦1.30	
Rating Voltage	V	30	